NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Generating Availability Data System

Data Reporting Instructions

Effective January 1, 2021

RELIABILITY | RESILIENCE | SECURITY




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Section I: Introduction

NERC developed the *GADS Data Reporting Instructions* to assist utility personnel in reporting information to the Generating Availability Data System (GADS). This reporting system, initiated by the electric utility industry in 1982, expands and extends the data collection procedures begun by the industry in 1963. NERC-GADS is recognized today as a valuable source of reliability, availability, and maintainability (RAM) information. This information, collected for both total-unit and major equipment groups, is used by analysts industry-wide in numerous applications (See Table I-1). GADS maintains complete operating histories on more than 8,000 generating units, representing over 90 percent of the installed generating capacity of the United States and Canada. As of January 1, 2013, GADS became a mandatory industry program for conventional generating units 20 MW and larger. GADS remains open to all non-required participants in the Regional Entities (shown in Table I-2) and any other organization, domestic or international,[1] that operate electric generating facilities willing to follow the GADS mandatory requirements as presented in the document *Final GADSTF Recommendations Report* dated July 20, 2011.

Table I-1: Applications of GADS Data		
New Plants	**Plant Strategies**	**Maintenance Strategies**
Design	Load following	Preventive/Predictive
Procurement	Power reductions	Inspection Scheduling
Construction	Goals/benchmarking	Surveillance
	High-impact outages	
System Strategies	**Plant Modifications**	**Outage Planning**
Dispatch	Replacement	Critical Items
Maintenance	Reconfiguration	Resource allocation

Utility designers, operating engineers, and system planners developed GADS to meet the information needs of the electric utility industry. For this purpose, they established specific objectives for the GADS program: compilation and maintenance of an accurate, dependable, and comprehensive database capable of monitoring the performance of electric generating units and major pieces of equipment. GADS is not a substitute for the detailed and often unique data systems typically found at power plants or for maintenance data programs that record detailed equipment failures and repair techniques. The objectives of the GADS program can be met through the collective effort of participating GADS members, the cooperation in reporting to GADS, and sharing information with the industry.

With the GADS mandatory program, participating organizations must be prepared to commit the necessary effort needed to provide timely, accurate, and complete data. The *GADS Data Reporting Instructions* detail the data elements collected by GADS, data identified by the industry as being vital to the understanding and interpretation of generating unit and major equipment performance. By following the strict guidelines set forth in these instructions, we have found that the industry analysts can best apply the data in the most beneficial manner.

Industry Development of GADS

Before any data element was included in GADS, an industry committee determined its applicability to utility operation and RAM analyses scrutinized it. A series of industry meetings were held to discuss the analytical usefulness of each element and to determine if utilities could reasonably provide that data to GADS. Consequently, the only data

[1] NERC management reserves final approval authority for GADS data with international organizations on a case-by-case basis.

requested in the *GADS Data Reporting Instructions* meet industry-prescribed needs. In reviewing this document, you will find that most, if not all, of the requested data elements are already being collected in your utility's plant-specific data system.

The industry also realized a need to include standardized terminology in the GADS program if it were to function on an international scale. As a result, the definitions promulgated by the Institute of Electrical and Electronic Engineers' (IEEE) Standard 762, "Definitions for Reporting Electric Generating Unit Reliability, Availability and Productivity" were incorporated.

Utilities started their reporting using the GADS guidelines on January 1, 1982. GADS superseded the earlier data collection procedures begun by the Edison Electric Institute (EEI), a program started in the mid-1960s. GADS contains many of the same elements previously collected by EEI in addition to the many new data items. This seeming duplication of data was created intentionally: the EEI information can be derived from GADS so analyses that include data from earlier than 1982 can be completed.

Unit Boundaries and Problems Outside Plant Control

A number of generating companies have been deregulated over the last several years. As a result, part of the GADS database contains deregulated units and regulated units. As more and more electric utilities divide into owners and/or operators of generating, transmission, and distribution companies, GADS must also make changes to accommodate industry needs. To do so, we must determine where the GENCO responsibilities end and the TRANSCO take over.

Based on research by the IEEE Standard 762 committee, the boundary between the GO and TO is as follows: "A generating unit includes all equipment up to (in preferred order) (1) the high-voltage terminals of the generator step-up (GSU) transformer and the station service transformers; (2) the GSU transformer (load) side of the generator-voltage circuit breakers; or (3) at such equipment boundary as may be reasonable considering the design and configuration of the generating unit."

Not all plants have the high-voltage terminals of the generator step-up (GSU) transformer and the station service transformers as shown in (1) above. Therefore, the boundaries are shown in preferred order based on unit design. If (1) is not applicable, then (2); if not (2) then (3).

GADS will continue to collect all problems that prevent the generating facility from providing electrical power to the customer. However, there are additional guidelines provided by IEEE Standard 762. In Appendix K of this manual "Outside Plant Management Control" are guidelines to determine what is and is not within the plant management responsibilities. As a result, new equations are introduced for measuring plant performance. For further details, refer to Appendix F of this manual.

Table I-2: Regional Entities

MRO Midwest Reliability Organization	SERC SERC Reliability Corporation
NPCC Northeast Power Coordinating Council	Texas RE Texas Regional Entity
RF Reliability*First*	WECC WECC

Arrangement of Data Reporting Instructions

The *GADS Data Reporting Instructions* document details the procedures, format, and frequency to follow when reporting data to GADS.

This document has several sections, and each section treats a particular area of data to report to GADS. Section II describes the three general types of data to be reported to GADS: event, performance, and design. Sections III and IV provides the details for the event and performance reporting requirements, respectively. Section V describes the format and procedure to follow when reporting design data to GADS.

Section II: Data Scope and Transmittal

Scope

There are three types of data reported to GADS:

1. Event (07 format)
2. Performance (05 format)
3. Design

The GADS Data Reporting Instructions document describes the event and performance data in detail in Sections III and IV. The nine mandatory design data fields described in Section V must be submitted before reporting any event or performance data to NERC. All other design appendices in Appendix E are voluntary but encouraged for GADS work.

For the purposes of data reporting, the term "unit" is defined as follows:

Nuclear and fossil (steam) units — units consisting of a single reactor or boiler and a single turbine generator. In cases where multiple boilers and/or multiple turbine-generators are headed together, the entire group is considered a single unit and reported using the "Miscellaneous Unit" design data forms found in Appendix E, pages E-MS-1 to E-MS-5.

Hydro, pumped storage, gas turbine, jet engine, and diesel units — units consisting of the unique prime mover and a single generator. In cases where multiple combinations of turbines/engines and generators exist, either physically or because of operating philosophy, the entire group may be considered as a single unit or reported as individual units. You should note your specific reporting criteria on the design data forms.

Combined-Cycle units (or blocks) — By definition, a combined-cycle is a process for generating energy (either electricity or steam) constituted by the marriage of a Rankine Cycle (use heat to boil water to make steam to turn a steam turbine) and a Brayton Cycle (expand hot gas to turn a gas turbine). The combined-cycle consists of one or more gas turbines/jet engines and one or more heat recovery boilers. The heat recovery boiler sends steam to a steam turbine for generating electricity. Each gas turbine/jet engine and each steam turbine is a "unit". The entire group is considered a "block". Units where the gas turbines/jet engines can generate independent of the heat recovery boilers and steam turbine are also combined-cycle blocks. Report design data using the "Combined-Cycle Block" design data forms found in Appendix E, pages E-CC-1 to E-CC-25.

Co-generation units — units consisting of one or more gas turbines/jet engines and one or more heat recovery boilers. Co-generation is similar to the combined-cycle block except part of the steam from the heat recovery boiler is used for other purposes (process steam), not generating electricity. The entire ensemble is considered a single block. Report design data using the "Combined-Cycle Block" design data forms found in Appendix E, E-CC-1 to E-CC-25.

Fluidized bed combustion units — units consist of one or more bubbling, circulating, or pressurized bed boilers or steam turbines. Consider the entire group as a single unit.

Miscellaneous units — Miscellaneous conventional generating units are all other units (including variable fuel – biomass, landfill gases, etc.) used to generate electric power for the grid. Groups of units using the same electric meter are also categorized in the miscellaneous units group. For example, if you have five hydro units of 5 MW each and they all have the same common revenue meter (measuring the electric output of the five units combined), then this block of hydro units would be considered a 25 MW miscellaneous unit.

Reporting data to NERC-GADS begins when either one of the two following conditions is met:

1. The unit first enters the active state. This is termed the "service date" and occurs when the unit is first declared available for the dispatch of power at some level of its capability.
2. The unit first operates at 50% of its generator nameplate megawatt capability. For purposes of determining reporting requirements, the generator nameplate capability can be calculated by multiplying the MVA (megavolt amperes) by the rated power factor found on the nameplate affixed to the generator (nameplates in the case of multiple generator units).

The nine required design fields must be reported to GADS prior to reporting event and performance data. Your generating company is required to report to GADS if your organization owns generating facilities and is listed on the NERC Compliance Registry (NCR). This requirement applies to generators within North America that have a nameplate capacity of 20MW or greater. All other generating units by non-registered generating companies or units smaller than the required MW size are invited to participate in GADS on a voluntary basis.

We encourage all generating organizations to report all data elements currently collected for their units and any additional information they can reasonably provide.

Transmittal and Format

Submit event and performance data to Open Access Technology International, Inc. (OATI) using the webE-GADS data collection system **within 45 days after the end of every calendar quarter** throughout the life of each unit. If a unit is deactivated (retired) or sold, continue to report that unit for the remainder of the calendar year using the instructions shown on Page III-6 of these reporting instructions. In addition, please complete the "Change in Unit Status" form found in Appendix A. The completed "Change in Unit Status" form should be submitted to NERC at gads@nerc.net.

Section III: Event Reporting

An "event" occurs any time a generating unit's operating status or capability changes. GADS receives reports on four general classifications of events: outages, derates, reserve shutdowns, and non-curtailing events. Reporting event data, in addition to performance and design data, provides all the information needed to evaluate generating unit availability. Event data are especially useful since they are often used to do specialized unit and equipment operation and design analyses.

As of January 1, 2013, Reporting to the GADS program is mandatory for all conventional units that have a nameplate capacity of 20 MW and larger. Reporting the level of detail requested in these *GADS Data Reporting Instructions* enables you and other industry analysts to perform detailed, useful analyses. Table III-1 below presents the classes of events generating companies must report for different types and sizes of conventional, non-renewable generating units.

Table III-1: Event Reporting Requirements vs Unit Type/Size Starting January 1, 2013

Units		Event Classifications			
Types	**Size (MW)**	**Outage**	**Derates**	**Reserve Shutdown**	**Non-Curtailing**
Fossil (Steam)	20+	Required	Required	Required	Voluntary
Nuclear	20+	Required	Required	Required	Voluntary
Hydro & Pumped Storage (with automatic data recording equipment)	20+	Required	Required	Required	Voluntary
Hydro & Pumped Storage (without automatic data recording equipment)	20+	Required	Required	Voluntary	Voluntary
Gas Turbines/Jet Engines	20+	Required	Required	Required	Voluntary
Combined Cycle/Co-generators	20+	Required	Required	Required	Voluntary
Internal Combustion/Reciprocating Engines	20+	Required	Required	Required	Voluntary
Fluidized Bed Combustion	20+	Required	Required	Required	Voluntary
Miscellaneous – including multi-boiler/multi-turbine, geothermal, other miscellaneous conventional generating units (such as variable fuel – biomass, landfill gases, etc.) used to generate electric power for the grid and similar in design and operation as the units shown above	20+	Required	Required	Required	Voluntary

Detailed event data reporting for all units is mandatory and is indicated by the term "required." The term "voluntary" implies that each operating company must determine if it can reasonably provide detailed data. NERC encourages all electric generating organizations to report all event data information and any additional information they can reasonably provide.

You are required to report reserve shutdown events on all units except hydro and pumped storage units without automatic data recording equipment. All other events (forced, maintenance, and planned) must be reported.

Event Report (07 Format)

Report event data to GADS in the event report (07) format, described in this section. Submit the data to Open Access Technology International, Inc. (OATI) using the webE-GADS data collection system **within 45 days after the end of each calendar quarter.**

There are four distinct sections of the event report: A) event identification; B) event magnitude; C) primary cause of event; and, D) additional cause of event or components worked during event. Together, these sections provide a complete description of each event experienced by a unit.

A description of each section and the data elements within it follows. Included are detailed instructions for reporting each event data element.

Section A: Event Identification

There are seven data elements, referred to as "fields," in this section (see Table III-2). These elements form a "key" — an identifier that makes each event card unique from all others in the database. This key is referenced at the beginning of every event record.

Record Code (columns 1-2) - Required
The "07" code uniquely identifies this data as an event report.

Utility (Company) Code (columns 3-5) - Required
Enter the three-character (alpha-numeric) code NERC assigned to your operating company. Appendix C contains a complete list of the operating companies participating in GADS and their assigned (operating company) codes.

Unit Code (columns 6-8) - Required
Enter the three-digit code your operating company assigned to the unit that you are reporting. This code distinguishes one unit from another in your operating company. Appendix C, Page C-1, contains a guide for selecting unit codes.

Year (columns 9-12) – Required

Table III-2: Record Layout of Section A – Event Identification

Column ID	Number of Columns	Starting Position
All Records		
A – Event Identification		
Record Code (required)	2	1
Utility (Company) Code (required)	3	3
Unit Code (required)	3	6
Year (required)	4	9
Event Number (required)	4	13
Report Revision Code (voluntary)	1	17
Event Type (required)	2	18

Enter the four-digit year in which the event occurred. Please note that this is not necessarily the year you reported the event to GADS, demonstrated in the following example:

> An event occurred on December 2, 2012 and was reported to GADS on January 31, 2013. Complete columns 9-12 as 2012. (Refer to Page III-21 for instructions on reporting events that begin in one year and continue into the next.)

Event Number (columns 13-16) - Required
Each time a unit experiences an event, assign it a unique "event number" and enter it in this field. Two events occurring on the same unit in the same year cannot have the same event number.

You do not have to assign event numbers sequentially, although it is preferred. If you find you have omitted one after gathering all the events to submit for a quarter, do not renumber all the events for the year; simply assign the next available event number to the omitted event.

All events start when they start and end when they end. Never create new events to continue an event from month to month or year to year. Events that continue from one year into the next should be programmatically truncated for inclusion in the input file submitted to webE-GADS with a new end/start date; webE-GADS will combine the pieces back into one long event. They should always remain as one long year crossing event in your in-house GADS system. Refer to Page III-21 for further instructions.

Report Revision Code (column 17) - Voluntary
This one-character data field signals that a change must be made to an event already submitted to GADS. Changes can be corrections, additions, or deletions of existing events.

The first time you submit an event to GADS it is called an "original" event. All original events have a revision code of zero (0).

Use the following codes when making changes to an original event:

> **1, 2 … 9**
> Use these codes when making **corrections or additions** to original events. Each time you make a change, you must increase the revision code by one. Up to nine corrections and additions to an original event can be made.
>
> When making **corrections or additions** to an original event, you need to send NERC all records relating to that event on which the changes are to be made. On the record:
>
> 1. Complete columns 1-16, repeating the information from the original event; and
> 2. Increase the revision code in column 17 by one; and,
> 3. Make sure the same record number used in the original report is in columns 81-82. DO NOT LEAVE THE RECORD NUMBER BLANK; and,
> 4. Enter the correct or additional information in the appropriate field.
>
> **To delete data** from one or more data fields, GADS RECOMMENDS that you resubmit the entire data set — year-to-date — for that unit (or all units you report) to GADS. This procedure will insure that both you and the GADS database have the same records on file. You have the option to find the record that has the highest revision code and then increase this number by one or set all revision codes back to zero.

Event Type (columns 18-19) - Required
There are two "Unit States" defined by IEEE Standard 762: Inactive and Active. Inactive States are shown on Page III-4-5; Active States on Pages III-5-17. Enter the two-character code which best describes the event (inactive, outage, derates, reserve shutdown, or Non-curtailing) experienced by the unit. For outages and deratings, the event type codes also define the urgency of the event (i.e. how long can you live with the problem?).

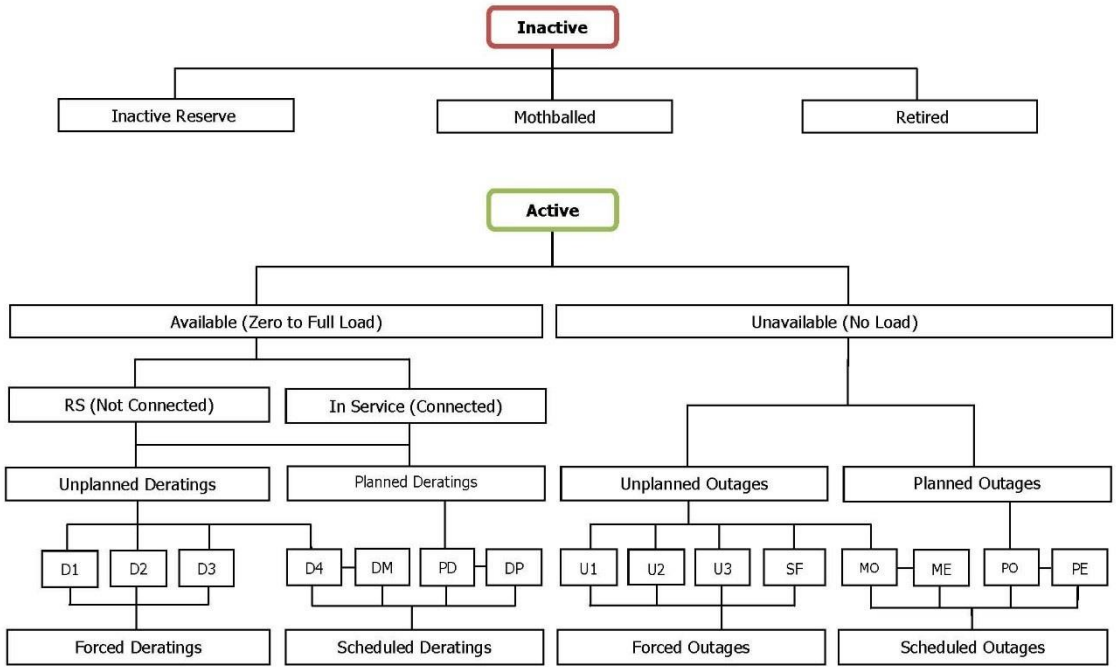

Figure III-1: Unit States Diagram

Inactive States

The two most general unit states are shown at the top of Figure III-1: active and inactive. Inactive state is called "Deactivated Shutdown" in IEEE Standard 762 and is defined as "the state in which a unit is unavailable for service for an extended period of time for reasons not related to the equipment." GADS interprets this to include:

IR **Inactive Reserve**

IR is defined by IEEE Standard 762 and GADS as "the state in which a unit is unavailable for service but can be brought back into service after some repairs in a relatively short duration of time, typically measured in days." GADS added "after some repairs" and defines the phrase "after some repairs" to mean that some action may be needed to prepare the unit for service because it had been sitting idle for a period of time, and some equipment parts have deteriorated or need replacing before the unit can be operated. The unit should be operable at the time the IR begins. This does not include units that may be idle because of a failure and dispatch did not call for operation. A unit that is not operable or is not capable of operation at a moment's

notice should be on a forced maintenance or planned outage and remain on that outage until the proper repairs are completed and the unit can operate. The unit must be on RS a minimum of 60 days before it can move to IR status. Use Cause Code "0002" (three zeros plus 2) for these events.

MB Mothballed (MB)

MB is defined by IEEE Standard 762 and GADS as "the state in which a unit is unavailable for service but can be brought back into service after some repairs with appropriate amount of notification, typically weeks or months." GADS added "after some repairs" and defines the phrase "after some repairs" to mean that some action may be needed because the unit had been idle for a period of time and some equipment, systems or parts may have deteriorated and should be replaced or repaired prior to the units return to service. The unit may have also experienced a series of mechanical problems, prior to the MB event, for which management may wish to wait for a period of time to determine if the unit should be returned to service or retired. Granted IEEE Standard 762 states that the unit must be capable of operation prior to being placed in the deactivated state; however, in actual practice management may want to delay a decision to fix the generator and 'suspend' it in a deactivated state until a decision to repair or retire is rendered. If this option is chosen the unit must enter the MB event no earlier than 60 days after the preceding outage event (In other words the unit must incur a forced outage of a minimum 60 days prior to the start of an MB event if the unit is inoperable). If the choice is to retire the generator after a decision is made, then the generator can be immediately retired coincident with the end of the MB event; If the decision is to repair, all repairs to make the unit operable must be completed under an outage of same type that preceded the MB event (in other words, if the generator entered the MB event on the heels of a forced outage, it must return to a forced outage for repairs to make the generator operable). If repairs are being made on the unit in order to restore it to operating status once the MB event has started, the MB event must end prior to the commencement of those repairs and the appropriate outage type started until those repairs have been completed and the outage ended. Also, if there are long lead-time item(s) that are ordered (such as a GSU, a generator rotor or the like) the MB event should end when the initial order has been placed, since a decision at that time has been rendered to repair the generating unit. Again, once a decision is rendered to repair the unit, whether or not orders are placed and/or work is started, the mothball event must end and the appropriate outage type started. Repair work cannot be conducted on a unit in the mothball state. Use Cause Code "9991" for these events.

RU Retired

RU is defined by IEEE Standard 762 and GADS as "the State in which a unit is unavailable for service and not expected to return to service in the future." RU should be the last event for the remainder of the year (up through December 31 at 2400). The unit must not be reported to GADS in any future submittals. Use Cause Code "9990" for these events.

Active States

The lower part of Figure III-1 more precisely describes the operating state of a unit at any given time. The fourth level shows the most detailed operating states; this is the level of detail incorporated into the GADS program. The codes in the blocks are the GADS event types.

Notice on the diagram that D4 (maintenance derating) and MO (maintenance outage) are classified as both "unplanned" and "scheduled." IEEE Standard 762 classifies these types of events as "unplanned." GADS recognizes that, historically, many operating companies referred to these events as "scheduled" and continue to do so. Both classifications are shown here to illustrate the relationship between unplanned and scheduled events. The evaluation of unit availability is not affected by the difference in terminology.

Outages

An outage exists whenever an active unit is not synchronized to the grid system and not in a reserve shutdown state. The general outage event classification is divided into eight distinct event types. Special instructions for reporting testing during and following outages can be found on Page III-10.

An outage starts when the unit is either desynchronized from the grid or when it moves from one unit state to another (for example, goes from a reserve shutdown to a maintenance outage.) The outage ends when the unit is synchronized to the grid or moves to another unit state.

When a unit moves from one outage state to another, the exact date and time that the first outage ends will be the same as when the second outage starts. The unit state can only be changed if the first outage ends. For example, if the unit is forced off-line due to a water wall tube leak (just before it was to come off-line for a planned outage), then the forced outage leak repair must be completed before the unit state can be changed from a U1 to a PO. The maintenance crew can start the PO work, but it will not be a PO until the U1 outage work is complete and the unit could have been put back in service if not scheduled to go on PO.

PO Planned Outage

An outage that is scheduled well in advance and is of a predetermined duration, can last for several weeks, and occurs only once or twice a year. Typically, these events are specifically listed in the plant budget. Turbine and boiler overhauls or inspections, testing, and nuclear refueling are typical planned outages. For a planned outage, all of the specific individual maintenance and operational tasks to be performed are determined in advance and are referred to as the "original scope of work." The general task of repairing turbines, boilers, pumps, etc. is not considered a work scope because it does not define the individual tasks to be performed. For example, if a general task such as repair boiler is considered the work scope, it is impossible to conclude that any boiler work falls outside of the original scope of work. Discovery work and re-work which render the unit out of service beyond the estimated PO end date are not considered part of the original scope of work. A planned extension may be used only in instances where the original scope of work requires more time to complete than the estimated time. For example, if an inspection that is in the original scope of work for the planned outage takes longer than scheduled, the extra time should be coded as an extension (PE). However, if damage found during the inspection results in an extension of the outage, the extra time required to make repairs should be coded as a forced outage.

MO Maintenance Outage

An outage that can be deferred beyond the end of the next weekend (defined as Sunday at 2400 hours or as Sunday turns into Monday), but requires that the unit be removed from service, another outage state, or Reserve Shutdown state before the next Planned Outage (PO). Characteristically, a MO can occur any time during the year, has a flexible start date, may or may not have a predetermined duration, and is usually much shorter than a PO. Discovery work and re-work which render the unit out of service beyond the estimated MO end date are not considered part of the original scope of work. A maintenance extension may be used only in instances where the original scope of work requires more time to complete than the estimated time. For example, if an inspection that is in the original scope of work for the outage takes longer than scheduled, the extra time should be coded as an extension (ME). If the damage found during the inspection is of a nature that the unit could be put back on-line and be operational past the end of the upcoming weekend, the work could be considered MO. If the inspection reveals damage that prevents the unit from operating past the upcoming weekend, the extended work time should be Forced Outage (U1).

There are cases when there are equipment issues and a unit could theoretically run past the next weekend, but the unit would not be run because of high risk for unit damage. If the risk is too high to run the unit, management is unwilling to run the unit, running the unit violates sound engineering practice or running the

unit would invalidate your insurance, the outage is forced not maintenance. Examples are DC emergency equipment out of service or one ground on the generator.

Note: If an outage occurs before Friday at 2400 hours (or before Friday turns into Saturday), the above definition applies. But if the outage occurs after Friday at 2400 hours and before Sunday at 2400 hours (the 48 hours of Saturday and Sunday), the MO will only apply if the outage can be delayed past the next, not current, weekend. If the outage cannot be deferred, the outage shall be a forced event.

PE Planned Outage Extension

GADS defines a planned outage extension as an extension of a Planned Outage (PO) beyond its estimated completion date. This means that at the start of the PO, the outage had an estimated duration (time period) for the work and a date set for the unit to return to service. All work during the PO is scheduled (part of the original scope of work) and all repair times are determined before the outage started.

For more information on PE rules and regulations see below.

ME Maintenance Outage Extension

GADS defines a maintenance outage extension as an extension of a maintenance outage (MO) beyond its estimated completion date. This means that at the start of an MO, the outage had an estimated duration (time period) for the work and a date set for the unit to return to service. All work during the MO is scheduled (part of the original scope of work) and all repair times are determined before the outage started.

For more information on ME rules and regulations see below.

PE and ME Rules and Regulations

The "predetermined duration" of an outage also determines the "estimated completion date" of the PO or MO. If the unit is scheduled for four weeks of repairs, then the unit is expected back in service at a certain date four weeks after the start of the outage. In cases where the outage is moved up or back according to the needs of the operating company, ISO, or power pool, then the start of the outage plus duration of the outage determines the new completion date. As long as the outage is no longer than planned, the expected completion date is moved to coincide with the predetermined duration period.

If the unit is on outage (for example, U1 outage due to a boiler tube leak) at the time the unit is scheduled to start the PO or MO work, then the work on the cause of the outage (tube repairs) must be completed before changing from the U1 outage to the PO or MO outage. PO and MO work can start but is not counted as PO or MO work until the U1 repairs are complete.

All work during PO and MO events is determined in advance and is referred to as the "original scope of work." Use ME and PE only in instances where the original scope of work requires more time to complete than originally scheduled. Where applicable, the extension of the planned or maintenance outage may be required to be approved in advance by your power pool or ISO. Advance warning of an extension is very important. However, GADS is not a dispatch-orientated database but rather an equipment-orientated one. The reporting of the PE and ME is based on IEEE Standard 762-GADS rules, not ISO requirements. Therefore, if the extension meets the GADS rules, then report it as an ME or PE and not a U1 when reporting to GADS only.

Do not use ME and PE in instances where unexpected problems or conditions are discovered during the outage which render the unit out of service beyond the estimated end date of the PO or MO. Report these delays as Unplanned (Forced) Outage-Immediate (U1). Do not use ME and PE if unexpected problems occur during unit startup. If a unit completes a PO or MO before the original estimated completion date and volunteers to return to service (i.e., the

unit is released to dispatch), then any problems causing outages or deratings after that date are not considered to be part of the PO or MO.

ME, PE or U1 must start at the same time (month/day/hour/minute) that the PO or MO ended. See *Appendix G*, Example 7, Pages G-26 to G-27.

SF Startup Failure

This is an outage that results when a unit is unable to synchronize within a specified startup time following an outage or reserve shutdown.

The startup period for each unit is determined by the operating company. It is unique for each unit, and depends on the condition of the unit at the time of startup (cold, warm, and hot). A typical unit startup occurs in three phases: warm up, synchronization, and ramp up. NERC defines a startup period to begin with the command to start and end when the unit is synchronized. An SF begins when a problem preventing the unit from synchronizing occurs. The SF ends when the unit is synchronized, another SF occurs, or the unit enters another permissible state. Problems encountered during ramp up that force the unit offline are considered outages not SF events.

U1 Unplanned (Forced) Outage — immediate

This is an outage that requires immediate removal of a unit from service, another outage state, or a reserve shutdown state. This type of outage usually results from automatic control system trips or operator-initiated manual trips of the unit in response to unit alarms but can also occur while the unit is offline.

There is a need by a number of the NERC Planning Committee working groups and subcommittees to collect the various types of trips experienced by generating units. They are most interested in automatic grid separation trips caused by many things, including transmission. In order to maintain the historical meanings of the existing component trip codes 82 and 83, GADS created the two amplification codes T1 and T2 to be used for complete, 100% unit trips:

T1 – Tripped/shutdown grid separation — automatic. A full outage that suddenly trips the unit from some loading to zero loading without operator initiation. This is an unexpected grid separation event where the unit is in normal operation when the mechanical, electrical, or hydraulic control or protective systems automatically trip the generating unit(s). This trip is not when the unit is manually tripped, or when the unit operator assisted to lower loadings and then the unit automatically tripped. The unit must be in service (breakers closed) before a grid separation trip event is accepted by GADS. No other unit outage condition can precede this event.

T2 – Tripped/shutdown grid separation — manual. The unit is quickly removed from service with operator assistance. This type of outage includes operator-initiated trips in response to unit alarms.

If the cause of the trip is not known, then you can use amplification code 84 but it must be changed to the appropriate amplification code (T1 or T2) before the end of the year to be acceptable by GADS.

84 - Unknown – investigation underway (change this code once failure mechanism is determined)

If the U1 is not a trip but the result of a change of state (from planned outage to U1, for example), then the amplification code can be any other amplification code if the operating company chooses to report it. In other words, the amplification code under such conditions is voluntary.

Starting January 1, 2011, the need to report T1, T2 or 84 amplification codes became mandatory to pass GADS edits. For a complete list of the amplification codes see *Appendix J* of the *GADS Data Reporting Instructions.*

U2 Unplanned (Forced) Outage — Delayed

This is an outage that does not require immediate removal of a unit from the in-service state, instead requiring removal within six hours. This type of outage can only occur while the unit is in service.

U3 Unplanned (Forced) Outage — Postponed

This is an outage that can be postponed beyond six hours but requires that a unit be removed from the in-service state before the end of the next weekend (Sunday at 2400 or before Sunday turns into Monday). This type of outage can only occur while the unit is in service.

Interpretation of Outages and Their Reporting

The IEEE Standard 762 defines the outage types and when the appropriate outage should be reported. However, the experiences of the industry also dictate interpretations of which outage type is most appropriate for a situation. The following are interpretations of when certain full outages should be reported and the reason for the apparent difference to the IEEE Standard 762 rules. In these examples, we will illustrate the points using fictitious generating units but real life situations.

Scenario #1: Forced Outage to Planned Outage

Riverglenn #1, a fossil unit, is four days away from its scheduled planned outage when it experiences a boiler tube leak. The unit must come off-line within 6 hours for repairs. Since the unit is scheduled for a planned outage, the dispatch (or ISO) allowed the unit to go into its outage early.

It normally takes 36 hours to repair a tube leak. Therefore, the first 36 hours of the outage would be forced (U2) outage. After the 36-hour period, the PO outage starts.

Scenario #2: Forced Outage that Can Wait for Repairs Until the End of the Next Weekend.

On a Thursday, Riverglenn #1 experiences a sudden increase in vibration in its ID Fan. The vibration is not severe enough to trip the unit, but there are signs that the unit must be removed from service soon to check the problem and make repairs. After some discussion, management decides Riverglenn can be removed from service next week without further damage to the unit or endangering the safety of the personnel. On Friday, dispatch (or ISO) allows Riverglenn to come down for repairs because another unit that had been out for maintenance is now available for operation.

Even though Riverglenn came off-line the same week as its problem started, the outage is a maintenance outage because it could have remained on-line until the end of the next weekend.

Scenario #3: Forced Outage that Cannot Wait for Repairs Until the End of the Next Weekend.

Jumbo #1, a gas turbine, began to vibrate on Friday. At first, the vibrations were not severe, but over the following 4 hours, the mils of vibration increased to where the unit needed to be removed from service. The unit continued to generate until after the peak period was over. Jumbo was not needed again until the following Monday afternoon. Shortly after the peak period, the operator tripped the unit.

Even though the unit was not needed until Monday, the unit could not have operated through the weekend because of the vibration problem. Therefore, the outage is a forced outage (U3) and is enforced until the vibration problem is solved.

Scenario #4: Forced Outage to Reserve Shutdown with Economic Repairs.

High Top #3, a small fossil unit, experienced a forced-outage failure in its boiler. However, the unit was not needed the remainder of the week. Management decided to repair the unit on standard work time with no overtime or

weekend pay. Working standard 8-hour days, crews completed the repairs in 12 hours over a two-and-a-half-day period (44 hours).

Although the unit was not needed, the unit was not available due to management decision for the full 44 hours and so the forced outage is reported from the time the unit came off-line until the unit was available for operation (44 hours later). No part of the 44 hours is RS time. The RS time starts after the repairs and unit is available for operation.

Scenario #5: Extending a Planned/Maintenance Outage When Work Is Part of Original Scope of Work.
During the planned overhaul of Riverglenn #1, the planned repairs to the electrostatic precipitator were more extensive than expected. More parts were ordered to complete the repairs. However, unexpected longer repairs to the ESP delayed the return to service for 3 additional days.

Since the ESP repairs were part of the original scope of work and the unit receives the okay for extension from its ISO, the additional 3-day delay is the justification for the planned outage extension.

Scenario #6: Extending a Planned Outage when work is not part of original scope of work.
Part way through the planned outage of Riverglenn #1, the mechanics checked the packing on the boiler startup feed pump and decided it would be best to replace it. It was not part of the original scope of work but was determined important to prevent a future unit outage. As a result of the repairs and no packing on site, the PO was delayed from returning to service on time for 12 hours.

All hours of the outage except the last 12 hours are PO. The last 12 hours is a Forced Outage (U1) because it 1) delayed the startup of the unit and 2) was not part of the original work scheduled during the outage.

Scenario #7: Unexpected Repairs During Planned/Maintenance Outage But Completed Within the Scheduled Outage Time.
Riverglenn #1 was in its annual overhaul when it was discovered that several blades on its ID fan needed replacement. It was not part of the original scope of work to repair the blades, but parts were available through the OEM and repairs to the fan were completed during the allotted planned outage time. There were no delays in unit startup caused by the ID fan repairs.

Since the unit was not delayed from its scheduled startup due to the fan repairs, there was no penalty to the unit because of the "surprise" repairs. The company reported the ID Fan repair as part of the "work completed during the outage" section to GADS.

Notes on Reporting Outages

Testing Following Outages
Typically following outages, equipment that was repaired or replaced is tested. These testing periods must be reported to GADS. The reporting procedure to follow depends on whether or not the unit was synchronized during the testing period:

a. **On-line testing (synchronized)**
   If the unit must be on-line and in service at some reduced load to perform testing following a Planned Outage (PO), Maintenance Outage (MO), or Unplanned (Forced) Outage (U1, U2, U3, SF), report the testing as a Planned Derating (PD), Maintenance Derating (D4), or Unplanned (Forced) Derating (D1), respectively. The PD, D4, or D1 starts when the testing begins, and ends when testing is completed. Report any generation produced while the unit was on-line during the testing period on the performance report (see Page IV-4).

b. **Off-line testing (not synchronized)**

In cases where the unit does not have to be synchronized after the outage to perform testing, report the testing as part of the outage event using Section D of the event report. The outage ends when the testing is completed and the unit is placed in service or enters another state.

If you wish, you may report this type of testing separate from the outage event. In this case, the testing period becomes a new event, the outage ending when the testing period begins. You must use the same event type for the testing event as you did for the original outage (a PE or ME is not considered an original outage — use the PO or MO event type, as appropriate). The testing event ends when the unit is synchronized or placed in another unit state.

Outside Management Control Outages

There are outages from outside sources that can result in restricted generating capabilities or full outages in generating units. These outages include (but are not limited to) ice storms, hurricanes, tornados, poor fuels, interruption of fuel supplies, etc. A list of causes and their cause codes are presented in Appendix K of the *GADS Data Reporting Instructions*. Appendix K also sets special limits to the Outside Management Control (OMC) uses of the cause codes.

REPORT ALL OMC events to GADS, and they should not be classified as reserve shutdown or non-curtailing events. The GADS software performs calculations of events with and without OMC events. The calculation details are described in Appendices F and K. The use of equations without OMC events is left to the decision of plant and corporate management.

Special Comment Regarding the Reporting of Pumped Storage Units to GADS

GADS collects data on all conventional unit types, including pumped storage units. Pumped storage units provide two types of service: generating and non-generating. In the generating mode, the unit acts like a generator and turbine to provide electric power. In the non-generating mode, the pumped storage unit acts as a motor and pump to move water back into the reservoir for reuse in the future. The 2006 version of IEEE Standard 762 credits pumped storage units in several statistics whether the unit is in the generating or non-generating mode.

When reporting pumped storage units to GADS, know that NERC is more interested in the generating aspect of pumped storage units than the non-generating mode. Therefore, if the unit is prevented from generating power, then those events must be reported to GADS using the standard procedures.

In the case where the pumped storage unit cannot operate in the non-generating mode but can operate in the generating mode, then the operator should report the non-generating mode equipment failure as an NC forced outage event.

In the case where the pumped storage unit cannot operate in the generating mode but either can or cannot operate in the non-generating mode, then the event must be reported using the normal outage procedure. NC event types are not appropriate in this case. The event should describe the reason why it cannot generate electricity.

Deratings

A derating exists whenever a unit is limited to a power level that is less than the unit's net maximum capacity. Similar to outages, the general derating event classification is divided into distinct event types, based on IEEE Standard 762.

A derating starts when the unit is not capable of reaching 100% capacity. The available capacity is based on the output of the unit and not on dispatch requirements. The derating ends when the equipment that caused the derating is returned to service, whether it is used at that time by the operators or not. More than one derate can occur at one time.

If a derating is less than 2% of the unit's Net Maximum Capacity (NMC) **and** less than 30 minutes in duration, then report the derating at your discretion (optional). Otherwise, all other deratings shall be reported to GADS. For example, a derate that is 10% of the NMC but last 10 minutes should be reported to GADS, and a derate that is 1% of the NMC but last 6 hours should be reported to GADS.

Do not report deratings caused by ambient-related conditions or system dispatch requirements (see notes on reporting deratings, Page III-13).

PD Planned Derating

This is a derating that is scheduled well in advance and is of a predetermined duration.

Periodic deratings for tests, such as weekly turbine valve tests, should not be reported as PD's. Report deratings of these types as Maintenance Deratings (D4).

On combined cycle and co-generation units always account for the loss of waste heat input to the HRSG whenever a gas turbine goes on planned outage by adding a concurrent planned derate to the steam turbine. Be sure to use the same start/end dates/times and the same cause code as the planned outage and specify in the description that this is a concurrent planned derate due to the outage on the appropriate gas turbine.

D4 Maintenance Derating

This is a derating that can be deferred beyond the end of the next weekend (Sunday at 2400 or before Sunday turns into Monday) but requires a reduction in capacity before the next Planned Outage (PO). A D4 can have a flexible start date and may or may not have a predetermined duration.

On combined cycle and co-generation units always account for the loss of waste heat input to the HRSG whenever a gas turbine goes on maintenance outage by adding a concurrent maintenance derate to the steam turbine. Be sure to use the same start/end dates/times and the same cause code as the maintenance outage and specify in the description that this is a concurrent maintenance derate due to the outage on the appropriate gas turbine.

Note: *If a derate occurs before Friday at 2400 hours (or before Friday turns into Saturday), the above definition applies. But if the derating occurs after Friday at 2400 hours and before Sunday at 2400 hours (the 48 hours of Saturday and Sunday), the D4 will only apply if the derating can be delayed passed the next, not current, weekend. If the derating cannot be deferred, the derating shall be a forced derating event.*

DP Planned Derating Extension

GADS defines a planned derating extension as an extension of a planned derate beyond its estimated completion date. This means that at the start of the PD, the derate had an estimated duration (time period) for the work and a date set for the unit to return to service. All work during the PD is scheduled (part of the original scope of work) and all repair times are determined before the outage started.

Use a DP only in instances where the scope of work requires more time to complete than originally scheduled. Do not use a DP in instances when unexpected problems or delays outside the scope of work are encountered that render the unit incapable of full load beyond the estimated end date of the PD. The DP must start at the same time (month/day/hour/minute) that the PD ended.

DM Maintenance Derating Extension

If a maintenance derating (D4) continues beyond its estimated completion date, then it is considered maintenance derate extension (DM). This means that at the start of the D4 event, the derate has an estimated

work time and a set date for the unit for returning to service. All work during the D4 is scheduled (part of the original scope of work) and all repair times are determined before the outage started.
Use a DM only in instances where the scope of work requires more time to complete than originally scheduled. Do not use a DM in those instances where unexpected problems or delays outside the scope of work are encountered which render the unit incapable of full load beyond the estimated end date of the D4. The DM must start at the same time (month/day/hour/minute) that the D4 ended.

D1 Unplanned (Forced) Derating — Immediate
This is a derating that requires an immediate reduction in capacity.

D2 Unplanned (Forced) Derating — Delayed
This is a derating that does not require an immediate reduction in capacity, but rather within six hours.

D3 Unplanned (Forced) Derating — Postponed
This is a derating that can be postponed beyond six hours but requires a reduction in capacity before the end of the next weekend.

On combined cycle and co-generation units always account for the loss of waste heat input to the HRSG whenever a gas turbine goes on forced outage or a startup failure by adding an appropriate concurrent derate (D1, D2, or D3) to the steam turbine. Be sure to use the same start/end dates/times and the same cause code as the as the forced outage or startup failure and specify in the description that this is a concurrent derate due to the forced outage or startup failure on the appropriate gas turbine.

Notes on Reporting Deratings

Ambient-related Losses
Do not report ambient-related losses, such as those caused by high cooling water intake temperatures (other than regulatory-imposed discharge limits — cause code 9660, etc.), as derating events to GADS. There are two reasons for this: first, the level of record keeping required to track these types of losses as events is excessive; second, ambient-related losses are easily computed using the information you supply to GADS on the performance report, specifically maximum capacity and dependable capacity. The difference between these two values reflects losses due to ambient conditions only. To determine ambient losses in megawatt hours (MWh), simply multiply the difference between maximum capacity and dependable capacity by the total number of hours in the study period.

System Dispatch Requirements
Sometimes units operate at less than full capacity for reasons other than ambient-related conditions or equipment failures. This operating mode, imposed by system dispatch requirements, is referred to as “load following.” Load following is not reported to GADS. That information is not relevant to unit availability and is therefore beyond the scope of the GADS program.

Although load following is not reported to GADS, any maintenance, testing, etc. done during the load following period should be reported as an event. Under certain conditions, this work can be reported as a non-curtailing event (NC).

Figure III-2 describes the relationships between maximum capacity, dependable capacity, and available capacity as a result of deratings, and system dispatch requirements.

Ramping Up at Unit Startup and Down at Unit Shutdown
Each unit has a “standard” or “normal” time for reaching full load capabilities after a full outage or ramping down (coming off-line) to a full outage state. GADS doesn’t set time periods for each unit; the operators know the units and can judge if a unit is taking longer than normal to ramp up after an outage or coast down for removal from service.

If a unit ramps up to the full load level OR up to the level of required load within the "normal" time period — set by the operators of the unit — following a full outage, there is no derating on the unit from the time of synchronization to the load point.

If the unit takes longer than normal ramp up time to the full load level OR up to the required load, then there is a derating. The generating capacity of the unit at the end of the normal period will be the level of the derate and the derate will last until the unit can either reach full load capability or level of required load.

FOR ALL UNITS EXCEPT NUCLEAR: There is no derating for unit shutdown. Each unit must be shut down safely, without damaging equipment or posing a safety hazard to personnel. Some shutdowns are quick as a unit trip; others are slower such as coast down to unit planned outages. In either case, the unit is not derated.

FOR NUCLEAR UNITS: Coast down to refueling may take weeks, depending on the operation of the unit. If the unit can recover from coast down and can still produce 100% capability during coast down, there is no derating. If the unit is not capable of 100% capacity, the derate is at the level of capability until the unit is taken off-line.

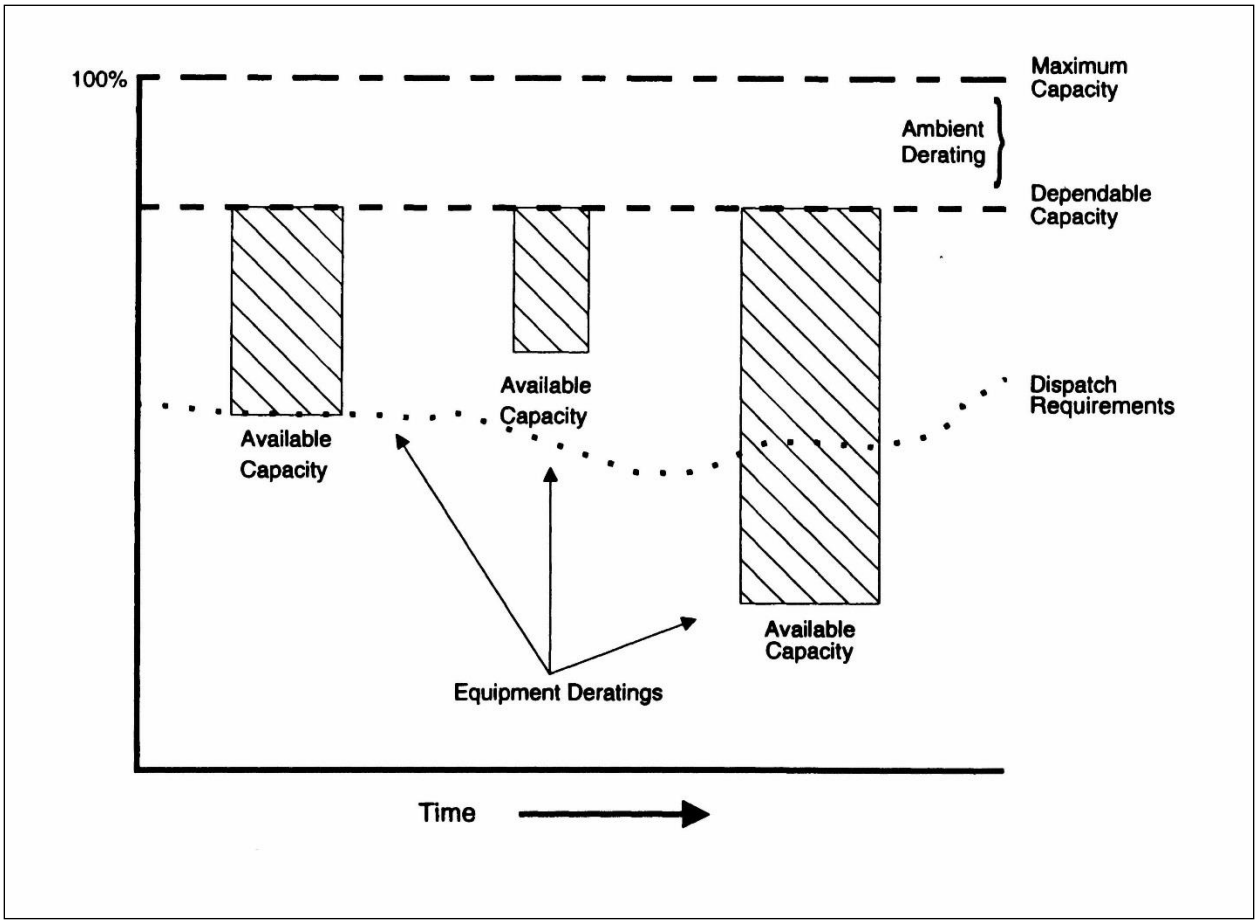

Figure III-2: Possible Derating Situations

Overlapping Deratings

Deratings often overlap each other in duration. GADS considers all deratings additive except the parts which are shadowed by an outage or a dominant derating. Additive simply means that the total capacity reduction on the unit is the sum of the individual overlapping derating reductions. Shadowed means that all or a portion of a derating occurs during another outage or dominant derate, during which the non-dominant derate does not affect the

available capacity of the unit. While the shadowed derate is not used in equivalent hour calculations, the equipment unavailability should still be reported using one of the following methods:

1. Report each component failure as a separate derating. Use engineering judgement to determine the available capacity as a result of each. NERC processes the data first by sorting by start date and time, then derated capacity, and lastly event number. This means that when start dates are identical, the GADS will process the derating with the lower available capacity first. In instances where both the start dates and the derated capacities of the events are the same the system will process the derating with the lower event number first.
2. Report as one derating event, indicating one component as the primary cause of the event and the other(s) using Section D of the event report.

Deratings that Vary in Magnitude with Time

Certain deratings vary in magnitude over time, such as those caused by stack emission, thermal discharge, and fuel limitations. You may use one of two methods to report these types of deratings to GADS:

1. Report a new derating to GADS each time the available capacity of the unit changes.
2. Determine the unit's average available capacity during the entire restricted period and report only one continuous averaged derating event to GADS. The start and end dates of the averaged derating event would be the start and end of the overall restricted period.

The averaging technique used to determine the unit's available capacity involves first calculating the megawatt hours (MWh) lost at each level of the derating, summing them, and then dividing by the number of hours in the overall derating period. This calculation yields the average megawatts (MW) lost during the period, from which the average available capacity of the unit during the period is determined. This is the only number you report in Section B of the event report (see Page III-28).

The following example demonstrates this averaging technique:

A 1000 MW unit experienced a derating caused by a stack emission limitation over a 10 day period (240 hours). During this period, the magnitude of the derating varied as follows:

1. 40 hours at 30 MW
2. 10 hours at 60 MW
3. 110 hours at 20 MW
4. 80 hours at 40 MW.

During this time, the unit also experienced an Unplanned (Forced) Outage – Immediate (U1) event for 90 hours and a Reserve Shutdown (RS) event for 20 hours.

First, the total megawatt hours (MWh) lost at each derating level are calculated and summed:

(40 hours x 30 MW) + (10 hours x 60 MW) + (110 hours x 20 MW) + (80 hours x 40 MW) = 7200 total MWh lost.

Next, the average megawatts (MW) lost over the 10-day period is calculated by dividing the total MWh lost by the number of hours in the entire derating period:

7200/240 = 30 average MW lost

Finally, the available capacity for the unit over the 10-day derating period is calculated by subtracting the average MW lost from the unit's dependable capacity.

1000 MW - 30 MW = 970 MW available capacity

Again, the start and end dates of this derating would be the start and end dates of the entire period. The available capacity as a result of the event to be reported on the event report is 970.

Notice in the example that one outage and one reserve shutdown event also occurred during the period of the stack emission limitation. It is important to note that deratings of the type described above exist even if the unit is shut down, limited by a more severe derating, or masked by a reserve shutdown. For this reason, the average megawatts lost over the 10-day period in the example is calculated based on the total number of hours in the period (240), not just the number of hours the unit was synchronized. NERC computer programs recognize any full power outages that occur during a continuous derating period and do not double-count the overlapping periods when calculating performance indexes.

Dominant Derating Reporting
(See Page III-19 for details)

Reserve Shutdowns - RS

This is an event where a unit is available for load but is not synchronized due to lack of demand. This type of event is sometimes referred to as an economy outage or economy shutdown. If a unit is shut down due to any equipment-related problems, whether or not the unit was needed by the system, report an Unplanned (Forced) Outage, Maintenance Outage, or Planned Outage. **Do not** report a Reserve Shutdown.

While a unit is on RS, maintenance work is often performed that would have resulted in a unit outage or derating had the unit been on-line. This work can be reported as part of the RS event if, at any time, the work can be stopped or completed without preventing the unit from:

1. Synchronizing after a normal startup cycle, and
2. Reaching its available capacity after a normal loading cycle.

The criteria above remain the same whether or not the system needed the unit.

If the above criterion is met, report maintenance work done during the RS on the event report, section D (beginning with record 04), using an event contribution code 3 – other components worked during event.

If maintenance work cannot be stopped or completed, the reserve shutdown condition of the unit changes and an outage or derating must be reported. If the unit cannot be synchronized while the work is being performed, an outage exists and the RS must end. If the unit cannot attain its available capacity while the work is being performed, a derating exists. The RS event does not end, but report the derating as well. Estimate the available capacity as a result of the derating.

Non-curtailing Events - NC

This is an event that occurs whenever equipment or a major component is removed from service for maintenance, testing, or other purposes that do not result in a unit outage or derating.

An NC also can exist when a generating unit is operating at less than full capacity due to system dispatch requirements. During this period, equipment can be removed from service for maintenance, testing, or other reasons and be reported as an NC if both the following conditions are met:

1. The available capacity of the unit is not reduced below what is required by system dispatch, and
2. Maintenance work can be stopped or completed and the unit can reach its net dependable capacity (NDC) level within its normal ramp-up time if and when the system needs the unit.

If the conditions cannot be met, report an outage or derating event rather than an NC.

Section B: Event Magnitude

GADS uses the information in this section to determine the impact of the event identified in Section A on the unit. This section is located on record 01 of the event report. See *Table III-3*.

Table III-3: Record Layout of Section B – Event Magnitude

Column ID	Number of Columns	Starting Position
Record 01		
B – Event Magnitude		
Start of Event (required)	8	20
(Blank Columns)	20	28
End of Event (required)	8	48
Gross Available Capacity (voluntary but recommended)	4 + 2 decimals	56
Net Available Capacity (required)	4 + 2 decimals	62
(Blank Columns)	1	68
Dominant Derating Code (voluntary but highly recommended)	1	69
(Blank Columns)	11	70
Record Number (required)	2	81

Start of Event (Record 01, columns 20-27) - Required
Enter the time (month/day/hour/minute) the event began:

Outages — time the unit was desynchronized (either operator or equipment initiated) or entered the outage state from another state.

Deratings — time the system, major component, or piece of equipment became unavailable for service affecting an actual or potential loss of unit capacity.

Reserve Shutdowns — time the unit was desynchronized or entered the reserve shutdown state from another state.

Non-curtailing Events — time the system, major component, or piece of equipment became unavailable for service (either operator or equipment initiated).

Use a 24-hour clock to record time. Record midnight as **2400** and the beginning of a new day as **0000**. For an event that began on July 31 at 3:26 p.m., the start of event is recorded as:

07	31	15	26

Event Transitions

Sometimes events occur in succession with no intervening unit synchronization. These events are considered "related," even though they must be reported separately. The matrix below describes the relationships between events and it details permissible event type changes. See Example 9 in Appendix G.

TO FROM	U1	U2	U3	SF	MO	PO	ME	PE	RS	DM	DP
U1 – Immediate	Yes	No	No	Yes	Yes	Yes	No	No	Yes		
U2 – Delayed	Yes	No	No	Yes	Yes	Yes	No	No	Yes		
U3 – Postponed	Yes	No	No	Yes	Yes	Yes	No	No	Yes		
SF - Startup Failure	Yes	No	No	Yes	Yes	Yes	No	No	Yes		
MO – Maintenance	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes		
PO – Planned	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes		
ME – Maintenance Extension	Yes	No	No	Yes	Yes	Yes	No	No	Yes		
PE – Planned Extension	Yes	No	No	Yes	Yes	Yes	No	No	Yes		
RS – Reserve Shutdown	Yes	No	No	Yes	Yes	Yes	No	No	Yes		
D1 – Immediate	*IEEE Standard 762 does not recognize transition to/of deratings from/to other event types except as shown.*									No	No
D2 – Delayed										No	No
D3 – Postponed										No	No
D4 – Maintenance										Yes	No
PD – Planned										No	Yes
DM – Maintenance Derating Extension										No	No
DP – Planned Derating Extension										No	No

Figure III-3: Allowable Event Type Changes

"YES" denotes that a change from one event type to another without intervening synchronization is permissible, and the end date of the first event can be the same as the start date of the successive event. "NO" indicates that there is no relationship between the event types and individual events separated by some period of time must be reported.

When there is no intervening synchronization between events, the start time of one event is the same as the end time of the immediately preceding event.

End of Event (Record 01, columns 48-55) - Required

Enter the time (month/day/hour/minute) the event ended:

Outages — time the unit was synchronized or placed in another appropriate unit state.

Deratings — time the system, major component, or piece of equipment became available for service affecting an actual or potential increase in unit capacity.

Reserve Shutdowns — time the unit was synchronized or placed in another appropriate unit state.

Non-curtailing Events — time the system, major component, or piece of equipment became available for service.

For events that extend through multiple months or quarters within the same year, do not wait until the event is over before reporting it to GADS. Instead, report the event and leave the end date blank. When the event does end, submit the end date as a revision, following the instructions on Pages III-3. Every event must have an end date at the end of every year.

All events start when they start and end when they end. Events that continue from one year into the next should be programmatically truncated for inclusion in the input file submitted to webE-GADS with a new end/start date; webE-GADS will combine the pieces back into one long event. They should always remain as one long year crossing event in your in-house GADS system. For events that continue into the next year, report the end date as **12312400**. Report the event in the next year with a start date of **01010000**.

Take care to change the Year (Section A, columns 9-12) to reflect the current year for the end date and the next year for the start date.

In addition to the year and start date, the event being carried into the next year must have a revision code of zero (0). All other details remain the same.

Gross Available Capacity (GAC) as a Result of the Event
(Record 01, columns 56-61) – Voluntary (but recommended)

Net Available Capacity (NAC) as a Result of the Event
(Record 01, columns 62-67) – Required

Enter the capacity that is available from the unit given the restriction imposed by the derating event being reported. This is the capacity after the reduction has been taken into account. *Complete these fields only when the event type is a derating.*

The GAC is the greatest capacity at which the unit can operate during the period of restriction caused by the derating. The NAC is the GAC less any capacity utilized for station service or auxiliary loads.

Either GAC or NAC or both must be completed when the event type is a derating. Net data is required. If you voluntarily report the gross available capacity (GAC) then you must report, gross maximum capacity (GMC), gross dependable capacity (GDC), and gross actual generation (GAG) on the performance report (95). Data consistency is necessary to calculate availability statistics.

See *Notes on Reporting Deratings*, for more information concerning the reporting of deratings.

Dominant Derating Code (Record 01, column 69) – Voluntary but strongly recommended.

The purpose of the dominant derating code is to mark the dominate derating if two or more deratings are occurring at the same time. By marking the dominate derate, the computer program will process the cause code for that dominate derating for its full impact and hide part of the impact credited to other derates. In other words the computer program will not treat the dominant derate as additive and it will shadow any derates it overlaps like an outage. Unit performance statistics will not be affected. Cause code statistics will be more accurate by recording the true frequency and impact of the dominate derate.

Use the Dominant Derating Code in column 69 of record 01. Identify a dominant derate with a “D”.

See Appendix G, Examples 3B and 3D for examples of dominant derates.

One example of how two derates should be reported to GADS – one without the Dominant Derating Code and one with the Dominant Derating Code – is shown in *Figure III-4*.

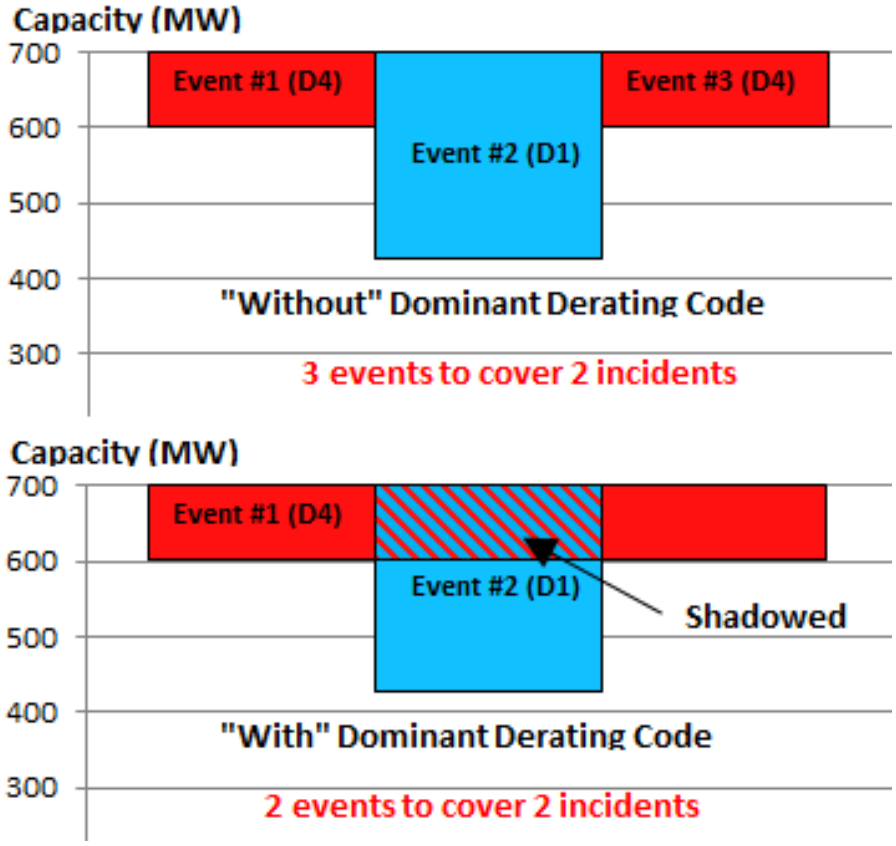

Figure III-4: Example of Dominant Derating Code Reporting

Section C: Primary Cause of Event

Section D: Additional Cause of Event or Components Worked during Event

The *GADS Data Reporting Instructions* describes the data elements reported in Sections C and D together because they are the same.

Use Section C to detail the system, major component, or piece of equipment primarily responsible for causing the event. You can find Section C on records 02 and 03 of the event report (refer to *Table III-4*). You must complete one Section C for every event submitted to GADS with the exception of reserve shutdown events. Because the only "cause" of a reserve shutdown is economic, reporting Section C is optional. **Only one Section C may be reported for each event.**

Use Section D to report factors contributing to the cause of the event that are not primarily responsible; additional components worked on while the event was in progress; factors significantly affecting the startup/ramping of the unit; or, problems that extended the event. Section D begins with records 04 and 05 of the event report (refer to *Table III-5*).

Since you can use Section D for several different reasons, multiple Section D cards are allowed. Use only one Section D for each system, component, or piece of equipment you are describing. Up to 46 sets of Section D records (numbers 04-99) are allowed, so you can describe up to 46 different items. See question in change list.

Both Sections C and D consist of two cards each, one even-numbered and one odd-numbered. Use the even-numbered record, which contains information like man-hours worked, to begin the description of the causes or contributing factors of the event. The odd-numbered record is used *only* to continue the description begun on the even-numbered card. If additional space is not needed for a description, omit the odd-numbered record rather than submit a blank one to GADS.

The first 19 characters (A – Event Identification) of each record (04-99) are identical to that of Record 01. These 19 characters link the records together.

Note: *Never begin describing a new system, major component, or piece of equipment on an odd-numbered card.*

Table III-4: Record Layout of Section C – Primary Cause of Event (Records 02 and 03)

Column ID	Number of Columns	Starting Position
Record 02		
A – Event Identification		
Record Code (required)	2	1
Utility (company) Code (required)	3	3
Unit Code (required)	3	6
Year (required)	4	9
Event Number (required)	4	13
Report Revision Code (voluntary)	1	17
Event Type (required)	2	18
C – Primary Cause of Event		
System/Component Cause Code (required)	4	20
Cause Code Amplification Code – (required for U1 events coming from in service only; strongly recommended for all other events.)	2	24
Time Work Started (voluntary)	8	26
Time Work Ended (voluntary)	8	34
(Blank Columns)	2	42
Event Contribution Code (voluntary)	1	44
Problem Alert (voluntary)	1	45
Man-hours Worked (voluntary)	4	46
Verbal Description (voluntary but strongly recommended.)	31	50

Table III-4: Record Layout of Section C – Primary Cause of Event (Records 02 and 03)		
Column ID	**Number of Columns**	**Starting Position**
Record Number (required)	2	81
Record 03		
A – Event Identification		
Record Code (required)	2	1
Utility (company) Code (required)	3	3
Unit Code (required)	3	6
Year (required)	4	9
Event Number (required)	4	13
Report Revision Code (voluntary)	1	17
Event Type (required)	2	18
C – Primary Cause of Event		
System/Component Cause Code (required)	4	20
(Blank Columns)	2	24
Verbal Description (voluntary but strongly recommended.)	55	26
Record Number (required)	2	81

Table III-5: Record Layout of Section D – Additional Work During Event (Records 4+ and 5+)		
Column ID	**Number of Columns**	**Starting Position**
Record 04+ (Even Numbered)		
A – Event Identification		
Record Code (required)	2	1
Utility (Company) Code (required)	3	3
Unit Code (required)	3	6
Year (required)	4	9
Event Number (required)	4	13
Report Revision Code (voluntary)	1	17
Event Type (required)	2	18
D – Additional Work During Event		
System/Component Cause Code (required)	4	20

Table III-5: Record Layout of Section D – Additional Work During Event (Records 4+ and 5+)		
Column ID	**Number of Columns**	**Starting Position**
Cause Code Amplification Code (Required for U1 events coming from in service only; strongly recommended for all other events.)	2	24
Time Work Started (voluntary)	8	26
Time Work Ended (voluntary)	8	34
(Blank Columns)	2	42
Event Contribution Code (voluntary)	1	44
Problem Alert (voluntary)	1	45
Man-hours Worked (voluntary)	4	46
Verbal Description (voluntary but strongly recommended.)	31	50
Record Number (required)	2	81
Records 05+ (Odd Numbered)		
A – Event Identification		
Record Code (required)	2	1
Utility (Company) Code (required)	3	3
Unit Code (required)	3	6
Year (required)	4	9
Event Number (required)	4	13
Report Revision Code (voluntary)	1	17
Event Type (required)	2	18
D – Additional Work During Event		
System/Component Cause Code (required)	4	20
(Blank Columns)	2	24
Verbal Description (Voluntary but strongly recommended.)	55	26
Record Number (required)	2	81

System/Component Cause Code (Record 02, columns 20-23) – Required
Enter the four-digit code from Appendix B that best identifies the system, major component, or piece of equipment you are describing. Appendix B is divided into sections for easily locating the appropriate cause codes for each unit type. Appendix D – Cause Code Cross Reference, identifies the allowable range of system/component cause codes for each type of unit.

Cause Code Amplification Code (Record 02, columns 24-25) **-** Required for Unplanned (Forced) Outages – Immediate (U1) events coming from in service to U1 only. No other amplification codes are required for U1 or any other event type. Amplification codes are strongly recommended for all other events but on a voluntary basis only.

The purpose of the amplification code is to further identify the cause of an outage by describing the failure mode. The amplification code is two alpha-numeric characters following the cause code. Failure modes are leaks, corrosion, personnel error, fire, etc. They are almost identical to the GADS failure mechanism codes (see Appendix H), except the amplification code is just two characters. Some existing cause codes already contain these amplification codes as part of their description. The amplification code allows all cause codes to be described with the set of failure modes without increasing the number of cause codes. It will also allow analysts to further explore the common causes of outages.

You can find a list of the cause code amplification codes in Appendix J.

Time: Work Started (Record 02, columns 26-33) - Voluntary
Enter the date (month/day/hour/minute) the system or component became unavailable for service. This time can be before the start of the event but should not factor time spent during preparatory work before the system or component was physically taken out of service. You may leave this field blank, but if you do not provide this information, GADS assumes that the work started when the event began.

Time: Work Ended (Record 02, columns 34-41) - Voluntary
Enter the date (month/day/hour/minute) the system or component became available for service. You can leave this field blank, but if you do not provide this information, GADS assumes that the work ended when the event ended.

Event Contribution Code (Record 02, column 44) - Voluntary
Enter the one-digit code that best describes how the system, major component, or piece of equipment identified in columns 20-23 contributed to the event. Choose the appropriate code from the following list:

Codes

1 **Primary cause of event**
The contribution code (1) must always appear in Section C: Primary Cause of Event. A (1) can only be used on Section D -Additional Cause of Event for a Planned Outage (PO) or a Maintenance Outage (MO) when work on multiple components is scheduled.

2 **Contributed to primary cause of event**
Use this code to describe other systems, components, external conditions, or human factors that contributed to cause the event but were not primarily responsible for the event.

3 **Work done during the event**
Use this code to identify systems or components that were worked on during the event but did not contribute to the initiation of the event or cause a delay in startup.

5 **After startup, delayed unit from reaching load point**

Note: *Event Contribution Codes 2, 3, and 5 can be reported on Section D cards, and may be used more than once.*

Problem Alert (Record 02, column 45) - Voluntary
Enter an "X" in this field if you believe the problem with the system or component is generic to its design or operation practices. Because this information may be helpful to others using similar equipment, an "X" alerts the NERC staff to initiate an investigation.

Man-hours Worked (Record 02, columns 46-49) - Voluntary
Enter the number of man-hours spent correcting the cause of the event or making repairs. Include hours expended for on-site repairs as well as any off-site work. If man-hours exceed four digits, enter 9999 in this field and describe the actual number of man-hours expended in the verbal description. If this situation occurs, consider reporting more detailed cause codes, and subdividing the man-hours into segments associated with each system or component.

Verbal Description (Record 02, columns 50-80; Record 03, columns 26-80) - Voluntary but strongly recommended.
GADS provides this space to allow you to give a more detailed explanation of the event and the cause(s) you identified by system/component cause code(s). You can also use it to report the expanded data format as described, beginning on Page III-27. Use only two sequential records (02-03, 04-05, etc.) to provide the description for each cause code you report.

Your narrative should include a balanced description of the major aspects of the event, focusing on these key areas: 1) System/Component Cause Code, 2) Failure Description and Appearance, 3) Cause of Immediate Failure and Contributing Factors, and 4) Corrective Actions. You have limited space available for your description, so NERC suggests using common abbreviations as much as possible. Be brief as only the first 86 characters of what is written is recorded by web-EGADS. Following the guidelines below will help you to develop a complete and concise description encompassing the key areas noted below.

1. **System/Component Cause Code** (Record 02, columns 20-23) – Required

   Enter the four-digit code from Appendix B that best identifies the system, major component, or piece of equipment. Appendix B is divided into sections for easily locating the appropriate cause codes for each unit type.

2. **Failure Description and Appearance**

   Describe the manner in which the failure occurred. Identify the failure mode in generic terms, not in terms of the failure mechanism or failure effect(s). The following key words may be useful in describing the type and mode of the failure, but these lists are by no means comprehensive. You may use these words as well as any others you feel are appropriate.

Types of Failure	Typical Failure Modes
Erosion	Leak
Corrosion	Crack
Electrical	Breach
Electronic	Physical Distortion
Mechanical	Physical Displacement
Hydraulic	Collapse
Instruments	Fracture/Break
Operational	Not Start/Move
	Not Stop
	Not Close
	Not Open
	Not Hold
	Not Release
	Out of Limits
	Out of Adjustment
	Spurious Operation, False Response

3. **Cause of Immediate Failure and Contributing Factors**

The cause code already specifically identifies the primary system/component that caused the failure. However, it is advantageous to describe other observed factors which contributed to the failure such as non-operational or physical factors (e.g., engineering, design, human error, etc.). You may find the key words listed below useful in describing immediate and contributing factors, but this list is by no means comprehensive. You may use these words as well as any others you feel are appropriate.

Typical Contributing Factors

Foreign/Wrong Part	Instrument/Switch Miscalibration
Foreign/Incorrect Material	Insulation Breakdown
Particulate Contamination	Short/Grounded
Normal Wear	Open Circuit
Abnormal Wear	Contacts Burned/Pitted/Corroded
Lubrication Problem	Connection Defective
Weld Related	Circuit Defective
Abnormal Load	Burned/Burned Out
Abnormal Temperature	Electrical Overload
Abnormal Pressure	Material Defect
Abnormal Flow	Excess Vibration
Set Point Drift	Fire/Explosion
Improper Previous Repair	Natural Catastrophe
Incorrect Procedure/Instruction	Cyclic Fatigue

4. **Corrective Actions**

Record the actions taken to repair and correct the failure problem. If tests or recalibration are made to verify that repairs are successful, note them as well. You may find the key words listed below useful to describe corrective actions, but this list is by no means comprehensive. You may use these words as well as any others you feel are appropriate.

Typical Corrective Actions

Recalibrate	Replace Part(s)
Adjust	Repair Component(s)
Temporary Repair	Replace Component(s)
Temporary Bypass	Reseal
Redesign	Repack
Modify	Request License Revision
Repair Part(s)	

As an example, 1A relay coil wire burns open because of electrical overload and has to be replaced. The failure description would be “relay coil wire,” the appearance would be “burned open” and the cause would be “electrical overload.” Corrective action would be “replaced.” The verbal description would be completed as follows: “1A RELAY COIL WIRE BURNED OPEN-ELECTRICAL OVERLOAD REPLACED WIRE”

Expanded Data Reporting

Some operating companies have expressed an interest in reporting more detailed operating and maintenance data that will allow them to perform more detailed reliability analyses. Also, by including these new data elements, they can eliminate duplicate reporting to other industry databases. To accommodate this request, NERC has added several new data elements to GADS.

Reporting of this additional information is optional, although strongly encouraged. We believe the reporting of this information will enhance the usefulness of our database and benefit the entire electric power industry. If you

choose to report this information to GADS, follow the instructions below (see *Table III-6*). If you choose not to supply the additional data, report the verbal description.

Failure Mechanism Code* (Record 02, columns 50-53) - Voluntary
From the list provided in *Appendix H*, enter the code that best describes the manner in which the component failed. Report the failure mechanism code in columns 50-53 on all even-numbered records containing a system/component cause code.

Trip Mechanism (manual or automatic)* (Record 02 column 54) - Voluntary
Enter the code that describes how the unit was shut down. Use "A" for automatically (control system initiated), or "M" for manually (operator initiated). Report the trip mechanism in column 54 of all even-numbered records containing a contribution code of 1 in column 44.

Cumulative Fired Hours at Time of Event* (Record 02, columns 55-60) - Voluntary
Enter the cumulative number of fired hours the unit experienced at the time the event began. This data is taken directly from the fired-hours meter typically located on the unit's control panel. This meter clocks cumulative operating hours since unit start-up. Report the fired hours in columns 55-60 of all even-numbered records containing a contribution code of 1 in column 44.

Cumulative Engine Starts at Time of Event* (Record 02, columns 61-65) - Voluntary
Enter the cumulative number of engine starts the unit experienced at the time the event began. This data is taken directly from the engine starts counter, typically located on the unit's control panel. This counter clocks cumulative engine starts since unit start-up. The engine starts must be reported in columns 61-65 of all even-numbered records containing a contribution code of 1 in column 44.

Table III-6: Record Layout of Event Records Using Failure Codes

Column ID	Number of Columns	Starting Position
Record 02		
A – Event Identification		
Record Code (required)	2	1
Utility (Company)Code (required)	3	3
Unit Code (required)	3	6
Year (required)	4	9
Event Number (required)	4	13
Report Revision Code (voluntary)	1	17
Event Type (required)	2	18
C – Primary Cause of Event		
System/Component Cause Code (required)	4	20
Cause Code Amplification Code (Required for U1 events coming from in service only; strongly recommended for all other events.	2	24

Table III-6: Record Layout of Event Records Using Failure Codes		
Column ID	**Number of Columns**	**Starting Position**
Time Work Started (voluntary)	8	26
Time Work Ended (voluntary)	8	34
(Blank Columns)	2	42
Event Contribution Code (voluntary)	1	44
Problem Alert (voluntary)	1	45
Man-hours Worked (voluntary)	4	46
Failure Mechanism Code* (voluntary)	4	50
Trip Mechanism* (voluntary)	1	54
Cumulative Fired Hours at Time of Event* (voluntary)	6	55
Cumulative Engine Starts at Time of Event* (voluntary)	5	61
Verbal Description (Voluntary but strongly recommended.)	15	66
Record Number (required)	2	81
Record 03		
A – Event Identification		
Record Code (required)	2	1
Utility (Company)Code (required)	3	3
Unit Code (required)	3	6
Year (required)	4	9
Event Number (required)	4	13
Report Revision Code (voluntary)	1	17
Event Type (required)	2	18
C – Primary Cause of Events		
System/Component Cause Code (required)	4	20
(Blank Columns)	2	24
Verbal Description (Voluntary but strongly recommended.)	55	26
Record Number (required)	2	81

***Gas turbine and jet engine units only.

Section IV: Performance Reporting

Performance data provide information, in a summarized format, pertaining to overall unit operation during a particular month in a given year. These data are needed to calculate unit performance, reliability, and availability statistics. NERC requires performance data for all unit types and sizes reported to the GADS program.

Reporting to the GADS program is mandatory for all conventional units 20 MW and larger, starting January 1, 2013. Reporting the level of detail *GADS Data Reporting Instructions* requests enables you and other industry analysts to perform detailed and useful analyses. Figure III-1 presents the classes of events generating companies must report for different types and sizes of conventional, non-renewable generating units.

Performance Report (05 Format)

Report performance data to GADS in the Performance Report (05) format, as described in this section. Submit the data to Open Access Technology International, Inc. (OATI) using the webE-GADS data collection system **within 45 days after the end of each quarter**. You must submit performance data for a unit even if it was off-line during the entire quarter. It is preferred to report year-to-date information each quarter rather than four, single quarterly submittals.

There are six distinct sections of the performance report: A) unit identification; B) unit generation performance; C) unit starting characteristics; D) unit time information; E) primary fuel; and, F) secondary fuel. Together, these sections provide an overall summary of the operating status of a unit.

The performance report (05) is divided into several sections. The different sections of the performance report are on different records: Section A is on all records, B, and C on Record 01, section D on record 02, and sections E and F on records 03 and 04 respectively. Unless otherwise stated, do not zero fill or asterisk fill unused data fields in any section of the performance report.

NERC invites Generator Owners and Operators to report on units that have a nameplate capacity of 20MW or less on a voluntary basis.

A description of each section and the data elements within it follows. Included are detailed instructions for reporting each performance data element.

Section A: Unit Identification

There are six data elements, referred to as "fields," in this section. See Table IV-1. These elements form a "key" — an identifier that makes each performance record unique from all others in the database. This key is referenced at the beginning of every record used to report performance data.

Table IV-1: Record Layout of Section A – Unit Identification

Column ID	Number of Columns	Starting Position
All Records		
A – Unit Identification		
Record Code (required)	2	1
Utility (Company) Code (required)	3	3
Unit Code (required)	3	6

Table IV-1: Record Layout of Section A – Unit Identification		
Column ID	**Number of Columns**	**Starting Position**
Year (required)	4	9
Report Period (required)	2	13
Report Revision Code (voluntary)	1	15

Record Code (columns 1-2) - Required
This "05" code uniquely identifies these data as a Performance Report.

Utility (Company) Code (columns 3-5) - Required
Enter the three character (alphanumeric) code NERC assigned to your operating company. Appendix C contains a complete list of the operating companies participating in GADS and their assigned utility (operating company) codes.

Unit Code (columns 6-8) - Required
Enter the three-digit code your operating company assigned for the unit that you are reporting. This code distinguishes one unit from another in your utility. Appendix C, Page C-1, contains a guide for selecting unit codes.

Year (columns 9-12) - Required
Enter the year (YYYY) for which data are being summarized.

Report Period (columns 13-14) - Required
Enter the month of the year for which data are being summarized:

Table IV-2: Monthly Summaries		
01 - January	05 - May	09 - September
02 - February	06 - June	10 - October
03 - March	07 - July	11 - November
04 - April	08 - August	12 - December

Report Revision Code (column 15) - Voluntary
This one-character data field signals that you wish to make a change to a performance report already submitted to GADS. Changes can be corrections, additions, or deletions of existing reports.

The first time you submit a performance report to GADS it is called an "original." Give all original reports a revision code of zero (0).

Use the following codes when making changes to an original performance report:

1, 2, … 9
Use these codes when making corrections or additions to original performance reports. Each time you make a change, you must increase the revision code by one. You can make up to nine corrections and additions to an original report.

When making **corrections or additions** to an original report, you need to send GADS all records relating to the performance report you intend to change. On the record:

1. Complete columns 1-14, repeating the information from the original report;
2. Increase the revision code in column 15 by one;
3. Make sure the same record number used in the original report is in columns 124-125. Do not leave the record number blank; and
4. Enter the updated information in the appropriate field.

To delete data from one or more data fields, GADS recommends that you resubmit the entire data set–year-to-date–for that unit (or all units you report) to GADS. This procedure will insure that both you and the GADS database have the same records on file. You also have the option to find the record that has the highest revision code and then increase this number by one or set all revision codes back to zero.

Section B. Unit Generation Performance

GADS uses the data you provide in this section to calculate performance statistics. GADS requests both gross and net values but only requires certain net values. Reporting gross data, net data, or both depends on how the unit is electrically metered. Some units are metered on a single basis (gross or net). Enter your unit's data on the basis of how your unit is actually metered. If you meter both gross and net, enter both values. If you meter on a single basis but can estimate the other, do so and enter the estimated value in the appropriate field. Complete the elements in section B as detailed below. The value you report, whether it is gross or net must be consistent with the available capacity as a result of deratings reported on the event reports (07).

Table IV-3: Record Layout of Section B – Unit Generation Performance

Column ID	Number of Columns	Starting Position
Record 01		
B – Unit Generation Performance		
Gross Maximum Capacity (voluntary)	4 + 2 decimals	16
Gross Dependable Capacity (voluntary)	4 + 2 decimals	22
Gross Actual Generation (voluntary)	7 + 2 decimals	28
Net Maximum Capacity (required)	4 + 2 decimals	37
Net Dependable Capacity (required)	4 + 2 decimals	43
Net Actual Generation (required)	7 + 2 decimals	49

Gross Maximum Capacity (GMC) (Record 01, columns 16-21) – Voluntary but recommended

Enter the maximum capacity the unit can sustain over a specified period of time when not restricted by ambient conditions or deratings. To establish this capacity, a formal demonstration is required. No standard demonstration test method or test duration exists at this time, but many of the NERC Regions have their own criteria that all operating companies in those Regions follow. If your operating company has not set demonstration test requirements, contact your regional manager listed in Appendix C.

The GMC of a unit should change only as a result of a new performance tests or permanent unit modifications. Never change the GMC due to equipment problems even if they persist for a lengthy period of time **unless** the unit is permanently modified as a result. If the unit is permanently modified, note changes in the unit's design on a new design data form and submit it to NERC-GADS for updating.

Gross Dependable Capacity (GDC) (Record 01, columns 22-27) - Voluntary but recommended
Enter the gross power level that the unit can sustain during a given period if there are no equipment, operating, or regulatory restrictions. Therefore by definition, the GDC is the GMC modified for ambient limitations.

The GDC is the same in intent and purpose as the historically reported Maximum Dependable Capacity (MDC).

Gross Actual Generation (GAG) (Record 01, columns 28-36) - Voluntary but recommended
Enter the actual number of gross electrical megawatt-hours (MWh) generated by the unit during the month.

If you report both service hours and gross actual generation (one to 9999999), you must also report GMC or GDC. Similarly, if you report both service hours and a gross capacity value, you must also report gross actual generation. This provides consistency when calculating performance statistics.

Net Maximum Capacity (NMC) (Record 01, columns 37-42) - Required
NMC is the unit's GMC minus any capacity (MW) utilized for that unit's station service or auxiliary load.

Net Dependable Capacity (NDC) (Record 01, columns 43-48) - Required
NDC is the unit's GDC minus any capacity (MW) utilized for that unit's station service or auxiliary load.

Net Actual Generation (NAG) (Record 01, columns 49-57) - Required
NAG is the unit's GAG minus generation (MWh) utilized for that unit's station service or auxiliary load. If NAG is negative during the month being reported, enter a minus sign in the column immediately before the reported value.

For consistency in calculating statistics, if you report net actual generation (negative integer or positive integer), you must also report NMC or NDC. Similarly, if you report a net capacity value, you must also report net actual generation.

Please note: *If you only report either the gross or the net capacities, the GADS editing program will calculate any missing GAC, GAG, GMC, GDC, NAC, NAG, NMC, or NDC using the following criteria:*

Table IV-4 Unit Capacity/Generation Estimation Factors and MW Multipliers

Unit Type Name	Capacity/ Generation Estimation Factor	MW Multiplier	Unit Type Code Ranges
CC GT units	2.00	0.20	300-399, 700-799
CC steam units	5.00	0.20	100-199, 600-649
CoG GT units	2.00	0.20	300-399, 700-799
CoG steam units	5.00	0.20	100-199, 600-649
Co-generator Block	4.00	0.10	800-899
Combined Cycle Block	4.00	0.15	800-899
Fluidized Bed	5.00	0.10	650-699

Table IV-4 Unit Capacity/Generation Estimation Factors and MW Multipliers			
Unit Type Name	**Capacity/ Generation Estimation Factor**	**MW Multiplier**	**Unit Type Code Ranges**
Fossil-Steam	5.00	0.30	100-199, 600-649
Gas Turbine/Jet Engine (Simple Cycle Operation)	2.00	0.30	300-399, 700-799
Geothermal	4.00	0.10	800-899
Internal Combustion/Reciprocating Engines	0.00	0.10	400-499
Miscellaneous	4.00	0.10	800-899
Multi-boiler/Multi-turbine	4.00	0.10	800-899
Nuclear	5.00	0.10	200-299
Pumped Storage/Hydro	2.00	0.50	500-599, 900-999

Typical performance data validations where the MW Multipliers are used:
Gross Maximum Capacity MW <= Nameplate Rating * (1.00+ MW Multiplier)
NAG <= ((NMC+1) * Service Hours * (1 + MW Multiplier)

For example, if you report a fossil unit's NMC and NDC, then the program will take your NMC and multiply it by 1.05 to determine the new GMC. The same operation would occur for determining the GDC from the NDC number and the GAC from the NAC number reported on a derating.

If you report only one capacity (for example NMC), then the program will assume the NMC and NDC are equal and will record the unit as such. It will then calculate the GMC and GDC using the calculation stated above.

If you think the differences between gross and net are different than the numbers stated above, then complete all capacities (maximum and dependable) with the correct numbers. The computer will accept entered numbers and will only calculate new numbers if the fields are blank, zero-fielded, or have an asterisk (*).

The MW multipliers shown above are used in data error checking routines on your performance data. Several typical checks involving the MW multipliers are shown below Table IV-4. These types of data error checks only produce warnings which should always be investigated as an error of this type would not be normal.

Special Note on Gas Turbines and Jet Engines

Gas turbine and jet engine capacities are very sensitive to outside temperatures and their capacities are not as constant as fossil or nuclear plants. See *Figure IV-1* below as an example. Therefore, base the GMC and NMC capacities of these units on the International Organization of Standardization (ISO) charts (at standard temperatures and pressures) for each individual Gas Turbine and Jet Engine unit. Once the GMC and NMC are determined, any non-equipment restriction that lessens the capacity would be the GDC and NDC numbers. Report the monthly average GMC, GDC, NMC and NDC to GADS.

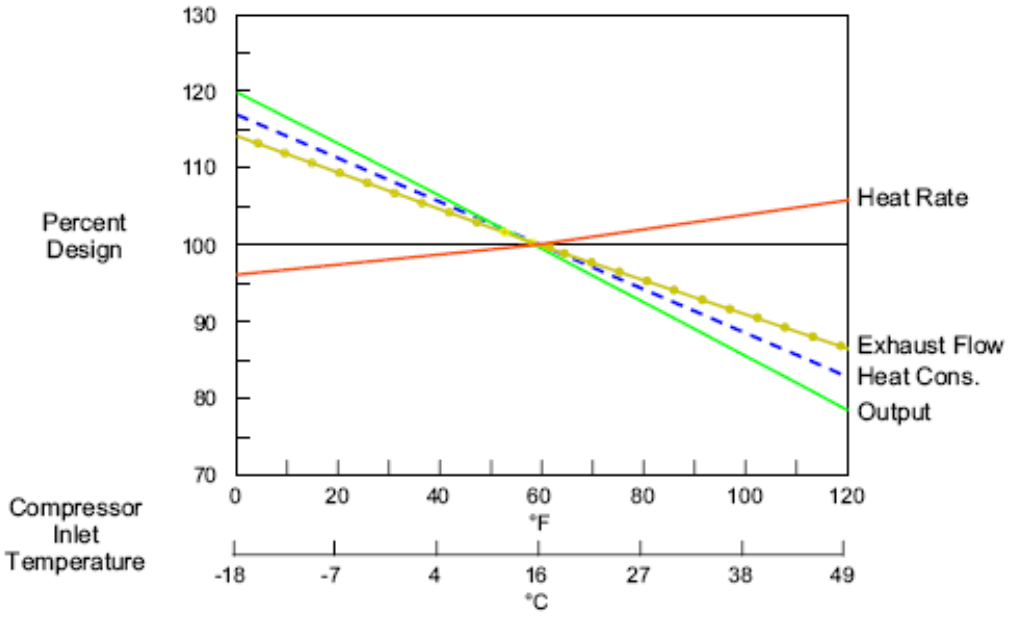

Figure IV-1: Effects of Ambient Temperature on Gas Turbines/Jet Engines

Section C: Unit Starting Characteristics

Use the data elements in this section to establish the manner in which the unit was operated during the month. This information is needed when sorting data for use in special availability and reliability applications. Section C is located on record 01; refer to *Table IV-5* below.

Table IV-5: Record Layout of Section C – Unit Starting Characteristics

Column ID	Number of Columns	Starting Position
Record 01		
C – Unit Starting Characteristics		
Typical Unit Loading Characteristics (voluntary)	1	58
Attempted Unit Starts (required)	3	59
Actual Unit Starts (required)	3	62
(Blank Columns)	34	65
Verbal Description (voluntary)	25	99
Record Number (required)	2	124

Typical Unit Loading Characteristics (Record 01, column 58) - Voluntary
Enter the code from Table IV-6 below that best describes how the unit was operated or loaded during the month being reported. Generally, these are numbered from least starts to most starts.

Table IV-6: Unit Loading Characteristics	
Code	**Description**
1	Base loaded with minor load following at night and on weekends
2	Periodic startups with daily load-following and reduced load nightly
3	Weekly startup with daily load-following and reduced load nightly
4	Daily startup with daily load-following and taken off-line nightly
5	Startup chiefly to meet daily peaks
6	Other (describe in verbal description)
7	Seasonal Operation

If the unit was off-line during the entire period, describe how the unit typically would have been loaded had it been on-line.

Attempted Unit Starts (Record 01, columns 59-61) – Required
Enter the number of attempts made to start the unit during the month to either generate, pump, or synchronous condense where the unit goes from a stopped position to generating, pumping, or synchronously condensing mode. Please note that:

- Repeated failures for the same cause without attempted corrective actions are considered a single start.
- Repeated initiations of the starting sequence without accomplishing corrective repairs are counted as a single attempt.

If you abandon startup attempts, the unit is shut down for repairs, and then started at a future time, report two startup attempts.

Actual Unit Starts (Record 01, columns 62-64) - Required
Enter the number of times the unit actually starts during the month to generate, pump, or condense where the unit goes from a stopped position to generate, pump, or synchronous condensing mode.

The number of actual unit starts must be less than or equal to the number of attempted unit starts.

Verbal Description (Record 01, columns 99-123) - Voluntary
If you enter Code 6 (Other) for the typical unit loading characteristics, as noted in column 58 in Table IV-5, describe how the unit actually was operated during the month.

Unlike the verbal description field on the event report (07), you must abbreviate your description to fit in columns 99-123. **You may not use additional records.**

Section D. Unit Time Information

The data reported in Section D (see *Table IV-7*) summarize information reported on the event report (07). The technique for summarizing event data is described on page IV-9. If reserve shutdown event data are not reported for the special group of hydro and pumped storage units (see *Table III-1*, Page III-1), the data needed to complete section D must be computed from your own station records.

The first 15 characters of Record 02 (A – Unit Identification) are identical to that of record 01. These 15 characters link the records together.

Table IV-7: Record Layout of Section D – Unit Time Information		
Column ID	**Number of Columns**	**Starting Position**
Record 02		
A – Unit Identification		
Record Code (required)	2	1
Utility Code (required)	3	3
Unit Code (required)	3	6
Year (required)	4	9
Report Period (required)	2	13
Report Revision Code (voluntary)	1	15
D – Unit Time Information		
Unit Service Hours (required)	3 + 2 decimals	16
Reserve Shutdown Hours (required)	3 + 2 decimals	21
Pumping Hours (required)	3 + 2 decimals	26
Synchronous Condensing Hours (required)	3 + 2 decimals	31
Available Hours (required)	3 + 2 decimals	36
Planned Outage Hours (required)	3 + 2 decimals	41
Forced Outage Hours (required)	3 + 2 decimals	46
Maintenance Outage Hours (required)	3 + 2 decimals	51
Extensions of Scheduled Outages (required)	3 + 2 decimals	56
Unavailable Hours (required)	3 + 2 decimals	61
Period Hours (required)	3 + 2 decimals	66
Inactive Hours (required)	3 + 2 decimals	71
(Blank Columns)	48	76
Record Number (required)	2	124

Unit Service Hours (Record 02, columns 16-20) - Required
Enter the number of hours the unit was synchronized to the system. For units equipped with multiple generators, count only the hours when at least one of the generators was synchronized, whether or not one or more generators were actually in service.

Reserve Shutdown Hours (Record 02, columns 21-25) - Required
Enter the sum of all hours the unit was available to the system but not synchronized for economy reasons.

Pumping Hours (Record 02, columns 26-30) - Required
Enter the number of hours the hydro turbine/generator operated as a pump/motor.

Synchronous Condensing Hours (Record 02, columns 31-35) - Required
Enter the number of hours the unit operated in the synchronous condensing mode (applies primarily to hydro/pumped storage and some combustion turbine units). Do not report these hours as unit service hours.

Available Hours (Record 02, columns 36-40) - Required
Enter the sum of the unit service hours, reserve shutdown hours, pumping hours (if applicable), and synchronous condensing hours (if applicable), as entered in columns 16-35 above.

Planned Outage Hours (Record 02, columns 41-45) - Required
Enter the sum of all hours the unit was off-line due to planned outages (PO) as detailed on the event reports completed for this unit. The technique used to compute hours from the event reports is described below.

Unplanned (Forced) Outage Hours and Startup Failure Hours (Record 02, columns 46-50) – Required
Enter the sum of all hours the unit was off-line due to immediate, delayed, and postponed outages (U1, U2, and U3) and startup failures (SF) outages as detailed on the event reports completed for this unit. The technique used to compute hours from the event reports is described below.

Maintenance Outage Hours (Record 02, columns 51-55) - Required
Enter the sum of all hours the unit was off-line due to maintenance outages (MO) as detailed on the event reports completed for this unit. The technique used to compute hours from the event reports is described below.

Extensions of Scheduled Outages (Record 02, columns 56-60) - Required
Enter the sum of all hours the unit was off-line due to extensions of scheduled (maintenance and planned) outages (ME and PE) as detailed on the event reports completed for this unit. The technique used to compute hours from the event reports is described below.

Unavailable Hours (Record 02, columns 61-65) - Required
Enter the sum of planned outage hours (PO), unplanned (forced) outage hours (U1, U2, U3, SF), maintenance outage hours (MO), and extensions of scheduled outages (ME, PE), as entered in columns 41-60 above.

Computing Hours from the Event Report (07)

1. Calculate the duration of each outage (PO, MO, ME, PE, U1, U2, U3, and SF) and reserve shutdown (RS) reported as an event to the GADS database by subtracting the START OF EVENT from the END OF EVENT. Convert this to hours and adjust for Daylight Savings Time (DST) as appropriate.
2. Add the total number of hours during the month spent in each outage category (PO, MO, ME, PE, U1, U2, U3, and SF) and the reserve shutdown category (RS). Round the resultant values to two decimal places and enter in the appropriate fields in Section D of the Performance Report.

Period Hours (Record 02, columns 66-70) - Required
Enter the number of hours in the month being reported that the unit was in the **active** state (see Page III-5). The sum of available hours and unavailable hours must equal period hours. The period hours in each month or year are as follows in Table IV-8:

Table IV-8: Period Hours	
Month*	**Hours**
January	744
February	672*
March	744 < 2007, 743** >= 2007
April	719** < 2007, 720 >= 2007
May	744
June	720
July	744
August	744
September	720
October	745** < 2007, 744 >=2007
November	720 < 2007, 721** >= 2007
December	744
Year	8760*

* Add 24 hours during a leap year.
** May be adjusted one hour as appropriate for daylight saving time.

Inactive Hours (Record 02, columns 71-75) - Required
Enter the number of hours in the month being reported that the unit was in the **inactive** state. (See Page III-5 for details of inactive states.)

Section E. Primary Fuel
Section F. Secondary Fuel

Sections E and F, shown in *Table IV-9*, detail the type, amount, and quality of fuels burned in the unit during the reporting period. These sections are used to report primary and secondary fuels burned and are located on Record 03 of the Performance Report. Tertiary and quaternary fuels may be reported; however, no unique sections of the Performance Report exist for this purpose. Instead, use another Section E and another Section F, changing the record number from 03 to 04. Enter the tertiary fuel data in Section E on the 04 record and the quaternary fuel data in Section F on the 04 record.

Reporting **E. Primary Fuel Code is required** for all units except hydro/pumped storage units (optional for these units only). If a unit was not operated during the reporting period, enter the type of fuel that would have been burned in the unit had it been on-line.

Secondary, tertiary, and quaternary fuel sections are not used for hydro/pumped storage units, wind- or solar-powered units, or nuclear units.

The first 15 characters of Records 03 and 04 (A – Unit Identification) are identical to that of Records 01 and 02. These 15 characters link the records together.

Table IV-9: Record Layout of Section E – Primary Fuel; and F – Secondary Fuel		
Column ID	**Number of Columns**	**Starting Position**
Record 02		
A – Unit Identification		
Record Code (required)	2	1
Utility Code (required)	3	3
Unit Code (required)	3	6
Year (required)	4	9
Report Period (required)	2	13
Report Revision Code (voluntary)	1	15
E – Primary Fuel (03); Tertiary Fuel (04)		
Fuel Code (required)	2	16
Quantity Burned (voluntary)	5 + 2 decimals	18
Average Heat Content (voluntary)	6	25
% Ash (voluntary)	2 + 1 decimal	31
% Moisture (voluntary)	2 + 1 decimal	34
% Sulfur (voluntary)	1 + 1 decimal	37
% Alkalines (voluntary)	2 + 1 decimal	39
Grindability Index / % Vanadium (voluntary)	2 + 1 decimal	42
Ash Softening Temperature (voluntary)	4	45
(Blank columns)	21	49
F – Secondary Fuel (03); Quaternary Fuel (04)		
Fuel Code (required)	2	70
Quantity Burned (voluntary)	5 + 2 decimals	72
Average Heat Content (voluntary)	6	79
% Ash (voluntary)	2 + 1 decimal	85
% Moisture (voluntary)	2 + 1 decimal	88
% Sulfur (voluntary)	1 + 1 decimal	91
% Alkalines (voluntary)	2 + 1 decimal	93
Grindability Index / % Vanadium (voluntary)	2 + 1 decimal	96

Table IV-9: Record Layout of Section E – Primary Fuel; and F – Secondary Fuel		
Column ID	**Number of Columns**	**Starting Position**
Ash Softening Temperature (voluntary)	4	99
(Blank columns)	21	103
Record Number (required)	2	124

Please Note: *Performance record 04 for the tertiary and quaternary fuels is identical to performance record 03*

Fuel Code (Records 03 & 04, columns 16-17 and 70-71) - Required
Enter the two-character code from Table IV-10 that identifies the fuels burned in the unit during the reporting period.

Table IV-10: Fuel Types and Codes			
Code	**Description**	**Code**	**Description**
BM	Biomass	**PC**	Petroleum Coke
CC	Coal	**PR**	Propane
LI	Lignite	**SL**	Sludge Gas
PE	Peat	**GE**	Geothermal
WD	Wood	**NU**	Nuclear
OO	Oil	**WM**	Wind
DI	Distillate Oil (No. 2)	**SO**	Solar
KE	Kerosene	**WH**	Waste Heat
JP	JP4 or JP5	**OS**	Other-Solid (Tons)
WA	Water	**OL**	Other-Liquid (BBL)
GG	Gas	**OG**	Other-Gas (Cu. Ft.)

Report in **E. Primary Fuel** the code for the fuel that made the greatest contribution to thermal generation during the period. In **F. Secondary Fuel,** enter the code for the fuel that made the second greatest contribution to generation. You can only report fuels used for ignition or warm-up in this section if there was no more important secondary fuel. Tertiary and quaternary fuels, reported in Sections E and F on Record 04 of the Performance Report, are those which made the third and fourth greatest contribution to generation, respectively.

Quantity Burned (Record 03 & 04, columns 18-24 and 72-78) - Voluntary
Enter the quantity of fuel consumed during the reporting period. Note, NERC-GADS computer programs recognize a decimal place indicator that appears in the performance report. Therefore, enter a factor of the actual quantity burned in this field. Use the following factors to determine the correct number to enter: 1,000 short tons (2,000 pounds) for coal; 1,000 barrels (42 gallons/barrel) for oil; and, 1,000,000 cubic feet for gas. Do not attempt to manually enter a decimal place.

Example:
If coal is your primary fuel and the unit burned 900 tons of coal during the reporting period, enter 0000090 in columns 18-24 of record 03. (900/1000 = 0.90, which when assuming two decimals, becomes 0000090.)

If oil is your primary fuel and the unit burned 900,000 barrels of oil, enter 0090000 in columns 18-24 of Record 03. (900,000/1000 = 900.00, which when assuming two decimals, becomes 0090000.)

When reporting data for geothermal units, enter in this field the quantity of steam brought into the plant from the geothermal wells. The factor used to determine the number to enter is 1,000,000. Thus, 1,234,500,000 pounds of steam is entered as 0123450 in columns 18-24 of Record 03.

Leave columns 18-24 blank when reporting data for nuclear units.

If a unit didn't burn one of its fuel types in a given month enter zero (0) as its quantity burned.

Average Heat Content (Records 03 & 04, columns 25-30 and 79-84) - Voluntary
Enter the average heat content for the fuel, to the nearest Btu/lb. of coal, Btu/gal. of oil or Btu/cu. ft. of gas. Enter a weighted average if the heat content of the fuel varied.

When reporting data for geothermal units, enter the heat content calculated using the following equation:

$$\frac{\text{Steam Consumption (lbs)} \times 1195.5 \text{ (Btu/lb)}}{\text{Net Generation (kWh)}}$$

For nuclear units, enter the Net Plant Heat Rate (Btu/kWh) in this field.

If a unit didn't burn one of its fuel types in a given month enter zero (0) as its heat content.

% Ash (Records 03 & 04, columns 31-33 and 85-87)* - Voluntary
Enter the average ash content of the fuel to the nearest 0.1% (by weight). Obtain this factor from an ultimate analysis of the fuel.

% Moisture (Records 03 & 04, columns 34-36 and 88-90)* - Voluntary
Enter the average moisture content of the fuel to the nearest 0.1% (by weight). Obtain this factor from an ultimate analysis of the fuel.

% Sulfur (Records 03 & 04, columns 37-38 and 91-92)* - Voluntary
Enter the average sulfur content of the fuel to the nearest 0.1% (by weight). Obtain this factor from an ultimate analysis of the fuel.

% Alkalis (Records 03 & 04, columns 39-41 and 93-95)* - Voluntary
Enter the sum of the average sodium and potassium contents of the fuel to the nearest 0.1% (by weight), as obtained from an ash analysis.

Coal Units Only: Grindability Index (Records 03 & 04, columns 42-44 and 96-98)* - Voluntary
If the fuel type has been identified as coal (CC) or lignite (LI), enter the weighted average grindability index of the fuel burned during the period. When entering the grindability index, disregard the decimal point.

Oil Units Only: % Vanadium and Phosphorus (Records 03 & 04, columns 42-44 and 96-98)* - Voluntary
If the fuel type has been identified as oil (OO), kerosene (KE), JP4/5 (JP), or distillate oil (DI), enter the sum of the average vanadium and phosphorus contents of the fuel to the nearest 0.1% (by weight) as obtained from an ash analysis.

Ash Softening Temperature (Records 03 & 04, columns 45-48 and 99-102)* - Voluntary
Enter the average ash softening temperature (^{o}F) of the fuel. This temperature should be determined under reducing atmosphere conditions.

** Because the average heat content (Btu), ash, moisture, sulfur, alkalis, grindability index, vanadium and phosphorus, and softening temperature values may change during a month due to new fuel supplies, etc., these values should be weighted averages.*

Example:
(15,000 Btu x 10 tons of coal + 18,000 Btu x 20 tons of coal)/30 tons of coal = Weighted Average Heat Content. The number of columns shown on these sections indicates a computer-inserted decimal point. Do not manually insert a decimal point. For example, a % Moisture value of 6.8% would be entered as 068 in columns 34-36 because the number of columns shown, 2 + 1 decimal, indicates a computer inserted decimal point one column from the right.

Section V: Design Data Reporting

In the approved recommendations by the NERC Board of Trustees, you must submit nine design data fields for all units you report to the GADS database. This required design data must be reported to GADS before submitting GADS event and performance data. These nine required design data fields are:

- GADS utility code (assigned by GADS Services)
- GADS unit code (assigned by the reporting company following the guidelines in Appendix C of the *GADS Data Reporting Instructions*.)
- NERC Regional entity where the unit is located
- Name of the unit
- Commercial operating date
- Type of generating unit (fossil, combined cycle, etc.)
- MW size (nameplate)
- State or province location of the unit
- Energy Information Administration (EIA) Plant number (US units only)

The required nine design items should be entered into the webE-GADS data collection system.

For years, GADS has been collecting additional design information using the forms in Appendix E of the *GADS Data Reporting Instructions*. This data provides information regarding installed equipment design and operating characteristics of a unit and are used in special analyses as sorting criteria. Submittal of the additional design data is solely voluntary. If you wish to send GADS the additional design data, complete the design data forms which apply to the type of unit you are reporting, as detailed in Table V-1. The appropriate design data forms for each unit type are found in Appendix E.

Table V-1: Location of Design Data Forms for Voluntary Design Reporting

Unit Type	Pages
Fossil (Steam)	E-FS-1 – 37
Fluidized Bed Combustion	E-FB-1 – 49
Nuclear	E-NU-1 – 7
Internal Combustion/Reciprocating Engines	E-IC/RE-1 – 4
Hydro/Pumped Storage	E-HY-1 – 5
Gas Turbine or Jet Engine	E-GT-1 – 6
Combined Cycle and Co-generation Blocks	E-CC-1 – 25
Miscellaneous	E-MS-1 – 5

When completing the voluntary design data forms, only fill in the fields for which you have data**. Do not zero fill or asterisk fill any unused fields.** In many cases, you will be asked to complete a data field by choosing one answer from a list of alternatives. If none or all of the alternatives apply, enter a "9" in the data field. When you enter a

"9," you must detail the correct information for that field on the reverse side of the design data form or attach an addendum sheet. To make a change to the voluntary design data after it has been submitted to GADS, follow the procedure described below:

1. Select the appropriate design data form from Appendix E.
2. Fill in the utility and unit identification data in the appropriate fields.
3. Enter the new data in the appropriate fields on the design data form. If the change being referenced defines a change in the unit's design, then also note the day, month, and year the change was completed in the margin on the new form.

Appendix A: Change in Unit Status Report Form

Complete the following *Change in Unit Status Report Form* whenever a unit is purchased, deactivated or reactivated from service.

If a unit is deactivated (retired), continue to report that unit for the remainder of the calendar year using the instructions shown in Section III of the *GADS Data Reporting Instructions*. Fill out the unit information in the Unit Purchase/Retirement section, and also the Unit Deactivation information. Submit the completed *Change in Unit Status* form to gads@nerc.net.

If a unit is purchased, continue to report that unit for the remainder of the calendar month using the instructions shown in Section III of the *GADS Data Reporting Instructions*. Submit the completed *Change in Unit Status Report Form to* gads@nerc.net. Please fill out both sections of the Unit Purchase/Retirement section, including original company and new company information. If you do not know who the new company is, contact NERC or your Regional Coordinator. Regional Coordinator information can be found at the NERC website. http://www.nerc.com/pa/RAPA/gads/Pages/default.aspx

If a unit changes owners at a company level, but keeps the same utility and unit information, keep reporting under the same utility and unit codes. Fill out the NCR number information for Original Company NCR Number and New Company NCR Number.

If a unit was previously retired but has come back into service, fill out the reactivation part on page A-3.

Seller Information

Unit Purchase / Retirement

(This page should be filled out by the seller. Please provide this Form to the buyer to have the buyer information filled out.)

Company Number NCR | | | | | | |

Entity Contact Name: _____

Entity Contact Email: _____

Original Utility Code: | | | |

Entity Contact Phone: _____

Original Unit Code (s)

Sold date:

Month	Day	Hour	Year

Buyer Information

Unit Purchase

(This page should be filled out by the buyer.) To search for NCR numbers go to: https://www.nerc.com/pa/comp/Pages/Registration.aspx, and then navigate down the page to Registration > Compliance Registry Files > NERC Active Entities List.

New Company NCR Number

Entity Contact Name: _____

Entity Contact Email: _____

New Utility Code:

Entity Contact Phone: _____

New Unit Code (s)

Unit Deactivation Information

Deactivation date: Month | Day | Hour | Year

Reason(s) for deactivation:

Do you plan on reactivating the unit, and if so, what (month/year)?

No | Yes | Month | Year

What major equipment work, if any, will be done while the unit is inactive?

Unit Reactivation Information:

Entity Contact Name: _____

Entity Contact Email: _____

Entity Contact Phone: _____

	Month	Day	Hour	Year
Reactivation date:				

Reason(s) for reactivation:

What major equipment work, if any, was done while the unit was inactive?

(Submit new design data as needed)

Appendix B01: Index to Combined Cycle Gas Turbine Unit Cause Codes

Using This Appendix

This appendix contains system/component cause codes to use when completing GADS Event Report (07). For ease of use, it is divided into sections based on the type of generating unit, and each section contains all the codes that can be used for a specific unit type. For example, Section B08 contains the cause codes to be used when reporting fossil steam units, and Section B15 contains the cause codes to be used when reporting hydro/pumped storage units. Appendix D – Cause Code Cross Reference, identifies the allowable range of system/component cause codes for each type of unit.

When copying the *GADS Data Reporting Instructions* for distribution to individual plants, copy only the section(s) of this appendix that are appropriate for the type(s) of unit(s) at each plant. Then the plant data reporter will have only the codes needed to report events, and may avoid some data reporting errors.

Guide for Code Selection

The intent of this appendix is not to provide an exhaustive list of codes for all possible causes or all components, but to provide the most common cause codes. Please add the details of events in the verbal description field to help understand what issues are occurring at the plant. Also, utilities have the option of reporting more detailed information concerning the manner in which a system or component failed using the Failure Mechanism Code. See Section III, page 27 and Appendix H for more information.

When reporting an event, select the code which best describes the cause or component responsible for the event. The following criteria are to be used in selecting a code:

- Assign the cause of the event to the major component or system that was responsible for the event, not to an auxiliary component or operation that triggered the failure of a major component or system. For instance, failure of an air line to one feedwater regulating valve may cause closure of that valve, resulting in a boiler trip on low level. In this case, the cause code for the feedwater regulating valve would be reported, not the code for the service air system. Note the fact that the valve closure was triggered by an air line failure in the verbal description. On the other hand, if the feedwater regulating valve closure had resulted from a complete loss of station air, the cause code for the station air system would be reported as the primary cause of the event. In this case, the station air system problem causes malfunctions of numerous valves and instruments throughout the plant, and no one major component or system could be uniquely identified as causing the outage.
- Report power supplies (motor control centers, breakers, etc.) which serve a particular component using the code for that component. Report power supply systems that serve multiple components using the code for the power supply system. For instance, if a breaker failure results in the loss of an FD fan, the code for the FD fan would be used. However, if a problem in the AC power distribution caused not only the loss of the FD fan but also the loss of several other major components, then use the code for AC power distribution.
- Report instruments or controls (such as pressure switches, pressure regulators, position indicators, etc.) that are part of a particular fan, pump, or valve, using the code for that component. Codes have been assigned to some control systems, such as feedwater control. Report all instruments, transmitters, logic modules, etc., associated with these systems using the code for that control system.

- Use the codes for major overhaul only for non-specific overhaul work as shown below. Major repairs conducted during a major overhaul are to be reported separately using the appropriate code(s). For example, consider the case where a general turbine overhaul is conducted, during which reblading of a high pressure turbine wheel is required. Use the code 4400 to report the overhaul and include such things as opening and closing of the turbine, cleaning, and minor repairs as man-hours worked. Use the code 4012 to report the reblading of the HP turbine wheel and include only the man-hours worked on the reblading in the man-hours worked field. Appendix D contains a table of acronym definitions for the unit types (CCGT, CCST, etc.) shown below.

CROSS REFERENCE BY UNIT TYPE OF THE MAJOR OVERHAUL CAUSE CODES FOR NON-SPECIFIC OVERHAUL WORK IN APPENDIX B

System Name	Component Name	Cause Code ID	Cause Code Name	CCGT	CCST	CoGT	CoST	CoB	CCB	FBC	FS	GT/JE	GEO	IC/RE	MISC	MB/MT	NU	PS/H	Total
Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections	1800	Major boiler overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
Boiler	Boiler Overhaul and Inspections	1800	Major boiler overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	4
Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections	1801	Minor boiler overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
Boiler	Boiler Overhaul and Inspections	1801	Minor boiler overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	4
Nuclear Reactor	Miscellaneous (Reactor)	2900	Reactor overhaul (use for non-specific overhaul only; see page B-CCGT-2)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Steam Turbine	Miscellaneous (Steam Turbine)	4400	Major turbine overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)	1	1	1	1	1	1	1	1	0	1	0	1	1	1	0	12
Steam Turbine	Miscellaneous (Steam Turbine)	4402	Minor turbine overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)	1	1	1	1	1	1	1	1	0	1	0	1	1	1	0	12
Generator	Miscellaneous (Generator)	4830	Major generator overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
Generator	Miscellaneous (Generator)	4831	Minor generator overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
Gas Turbine	Miscellaneous (Gas Turbine)	5260	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)	1	1	1	1	1	1	0	0	1	0	0	1	1	0	0	9
Jet Engine	Miscellaneous (Jet Engine)	5660	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)	1	1	1	1	1	1	0	0	1	0	0	1	1	0	0	9
Internal Combustion/Reciprocating Engines	Miscellaneous (Internal Combustion/Reciprocating Engines)	5890	Major overhaul (use for non-specific overhaul only; see Page B-CCGT-2)	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2
Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)	7200	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2

CROSS REFERENCE BY UNIT TYPE OF THE MAJOR OVERHAUL CAUSE CODES FOR NON-SPECIFIC OVERHAUL WORK IN APPENDIX B																			
System Name	Component Name	Cause Code ID	Cause Code Name	CCGT	CCST	CoGT	CoST	CoB	CCB	FBC	FS	GT/JE	GEO	IC/RE	MISC	MB/MT	NU	PS/H	Total
Total				8	8	8	8	8	8	6	6	4	4	3	10	8	5	3	97

- Use the codes for "External" and "Safety, Regulatory, and Environmental" only when no other system/component cause code applies. For instance, if stack emission limits are exceeded because of a fault in the flue gas scrubber, use a scrubber code. However, if a new limit on emissions is imposed and is exceeded even though the scrubber is functioning properly, then use an environmental code.

Guide for Code Addition and Deactivation

The cause codes are reviewed annually and users are asked to submit suggestions for new cause codes which will get reviewed, and if approved, added.. Sometimes an omission is reported where an existing cause code should apply to more unit types than it does currently, and if approved, it will be added to them. Cause codes no longer in use are deactivated, however they continue to exist in historical records. Deactivated cause codes can be reactivated if ever needed again. There are fifteen unit types and whenever a cause code is approved to be added to one of them the following general rules listed below may also apply. These rules operate on the principle that it is "better to have it and not need it than to need it and not have it" in order to provide for any reasonable potential future cause code usage.

1) If a request for a new Fossil Steam unit type cause code is approved it will also be added to the Fluidized Bed, Miscellaneous, and Multi-boiler/Multi-Turbine unit types. Fluidized Bed units are Fossil Steam units with a different type of boiler, so it may apply. Miscellaneous units are different configurations of the other unit types (except Nuclear) so it may also apply to this unit type. Multi-boiler/Multi-Turbine units are Fossil Steam or Fluidized Bed units with multiple boilers and/or steam turbines so it may also apply to this unit type as well. Fluidized Bed, Miscellaneous, and Multi-boiler/Multi-Turbine unit types can all have equipment that is unique to them, so the reverse, adding specialized cause codes to these unit types, may not always apply to Fossil Steam units. Consideration will also be given to steam cycle components of combined cycle steam units, co-generation steam units, and their block reporting equivalents to see if the new cause codes apply to these steam cycles as well (reference Item 4).

2) If a request for a new Fluidized Bed unit type cause code is approved it will also be added to the Fossil Steam (as long as it is not unique to fluidized bed boilers), Miscellaneous, and Multi-boiler/Multi-Turbine unit types. Fluidized Bed units are Fossil Steam units with a different type of boiler, so it may apply. Miscellaneous units are different configurations of the other unit types (except Nuclear) so it may also apply to this unit type. Multi-boiler/Multi-Turbine units are Fossil Steam or Fluidized Bed units with multiple boilers and/or steam turbines so it may also apply to this unit type as well. Miscellaneous, and Multi-boiler/Multi-Turbine unit types can all have equipment that is unique to them, so the reverse, adding specialized cause codes to these unit types, may not always apply to Fluidized Bed units.

3) If a cause code is added to any unit type other than Nuclear, it will also be added to the Miscellaneous unit types. Miscellaneous units are simply different configurations of the other unit types (except Nuclear) so it may apply to this unit type also.

4) Combined Cycle Gas Turbine and steam units, Co-generation Gas Turbine and steam units, and their Block reporting equivalents are all very similar so anytime a new cause code is approved for addition to any one of these unit types it will be reviewed for addition to all six.

New cause code numbers are assigned using the principle of deductive logic, i.e. reasoning from the general to the specific, within the existing cause code groupings. For example: if a problem exists with a specific boiler tube that is not listed in the Boiler Tube Leak table for Fossil Steam units (Table B08-49) try to find a general cause code in that table that might apply, say 1005 – Generating tubes, and in the request for a new cause code ask for a more specific version of it, such as 1006 – Finned Generating tubes.

COMBINED CYCLE GAS TURBINE UNITS

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B01-1	Balance of Plant	Auxiliary Systems	Auxiliary Steam
B01-2	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems
B01-3	Balance of Plant	Auxiliary Systems	Fire Protection System
B01-4	Balance of Plant	Auxiliary Systems	Instrument Air
B01-5	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System
B01-6	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)
B01-7	Balance of Plant	Auxiliary Systems	Open Cooling Water System
B01-8	Balance of Plant	Auxiliary Systems	Seal Air Fans
B01-9	Balance of Plant	Auxiliary Systems	Service Air
B01-10	Balance of Plant	Auxiliary Systems	Service Water (Open System)
B01-11	Balance of Plant	Circulating Water Systems	
B01-12	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators
B01-13	Balance of Plant	Condensate System	Miscellaneous (Condensate System)
B01-14	Balance of Plant	Condensate System	Polishers/Chemical Addition
B01-15	Balance of Plant	Condensate System	Pumps, Piping, and Valves
B01-16	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals
B01-17	Balance of Plant	Condensing System	Condenser Controls
B01-18	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment
B01-19	Balance of Plant	Condensing System	Miscellaneous (Condensing System)
B01-20	Balance of Plant	Condensing System	Vacuum Equipment
B01-21	Balance of Plant	Electrical	
B01-22	Balance of Plant	Extraction Steam	
B01-23	Balance of Plant	Feedwater System	
B01-24	Balance of Plant	Heater Drain Systems	
B01-25	Balance of Plant	Miscellaneous (Balance of Plant)	
B01-26	Balance of Plant	Power Station Switchyard	
B01-27	Balance of Plant	Waste Water (zero discharge) Systems	
B01-28	Expander Turbine	Expander Turbine	
B01-29	External	Catastrophe	
B01-30	External	Economic	
B01-31	External	Fuel Quality	
B01-32	External	Miscellaneous (External)	
B01-33	Gas Turbine	Auxiliary Systems	
B01-34	Gas Turbine	Exhaust Systems	
B01-35	Gas Turbine	Fuel, Ignition, and Combustion Systems	

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B01-36	Gas Turbine	Inlet Air System and Compressors	Compressors
B01-37	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters
B01-38	Gas Turbine	Miscellaneous (Gas Turbine)	
B01-39	Gas Turbine	Turbine	
B01-40	Generator	Controls	
B01-41	Generator	Cooling System	
B01-42	Generator	Exciter	
B01-43	Generator	Generator	
B01-44	Generator	Miscellaneous (Generator)	
B01-45	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply
B01-46	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)
B01-47	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems	
B01-48	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Design Limitations	
B01-49	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)
B01-50	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)
B01-51	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures	
B01-52	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections	
B01-53	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation
B01-54	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown
B01-55	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam
B01-56	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators
B01-57	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam
B01-58	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass
B01-59	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)
B01-60	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks	
B01-61	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Water Condition	
B01-62	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)	
B01-63	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems	
B01-64	Inactive States	Inactive States	
B01-65	Jet Engine	Auxiliary Systems	
B01-66	Jet Engine	Exhaust Systems	
B01-67	Jet Engine	Fuel, Ignition, and Combustion Systems	
B01-68	Jet Engine	Inlet Air System and Compressors	Compressors
B01-69	Jet Engine	Inlet Air System and Compressors	Ducts and Filters
B01-70	Jet Engine	Miscellaneous (Jet Engine)	
B01-71	Jet Engine	Turbine	

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B01-72	Miscellaneous	Instruments and Controls	
B01-73	Performance	Performance	
B01-74	Personnel or Procedural Errors	Personnel or Procedural Errors	
B01-75	Pollution Control Equipment	CO Reduction	
B01-76	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)	
B01-77	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters
B01-78	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems
B01-79	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems
B01-80	Regulatory, Safety, Environmental	Other Operating Environmental Limitations	
B01-81	Regulatory, Safety, Environmental	Regulatory	
B01-82	Regulatory, Safety, Environmental	Safety	
B01-83	Regulatory, Safety, Environmental	Stack Emission	
B01-84	Steam Turbine	Controls	
B01-85	Steam Turbine	High Pressure Turbine	
B01-86	Steam Turbine	Intermediate Pressure Turbine	
B01-87	Steam Turbine	Low Pressure Turbine	
B01-88	Steam Turbine	Lube Oil	
B01-89	Steam Turbine	Miscellaneous (Steam Turbine)	
B01-90	Steam Turbine	Piping	
B01-91	Steam Turbine	Valves	

BALANCE OF PLANT

TABLE B01-1 Balance of Plant: Auxiliary Systems - Auxiliary Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3830	Auxiliary boiler
CC GT units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3831	Auxiliary steam piping
CC GT units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3832	Auxiliary steam valves
CC GT units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3833	Auxiliary steam controls and instruments
CC GT units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3834	Auxiliary boiler tube leaks
CC GT units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3835	Auxiliary boiler burner management system
CC GT units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3836	Steam transfer to other unit

CC GT units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3839	Other auxiliary steam problems (also see extraction steam codes 3520 to 3529; startup bypass codes 0630 to 0660; and soot blower steam code 0870)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-2 Balance of Plant: Auxiliary Systems - Closed Cooling Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3820	Closed cooling water pumps and motors
CC GT units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3821	Closed cooling water piping
CC GT units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3822	Closed cooling water valves
CC GT units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3823	Closed cooling water heat exchangers
CC GT units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3824	Closed cooling water system fouling
CC GT units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3825	Closed cooling water instrumentation
CC GT units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3826	Closed cooling water strainer
CC GT units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3829	Other closed cooling water system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-3 Balance of Plant: Auxiliary Systems - Fire Protection System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Auxiliary Systems	Fire Protection System	3860	Fire protection system pumps
CC GT units	Balance of Plant	Auxiliary Systems	Fire Protection System	3861	Fire protection system piping
CC GT units	Balance of Plant	Auxiliary Systems	Fire Protection System	3862	Fire protection system valves
CC GT units	Balance of Plant	Auxiliary Systems	Fire Protection System	3863	Fire protection system fouling
CC GT units	Balance of Plant	Auxiliary Systems	Fire Protection System	3864	Fire protection system instrumentation and controls
CC GT units	Balance of Plant	Auxiliary Systems	Fire Protection System	3869	Other fire protection system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-4 Balance of Plant: Auxiliary Systems - Instrument Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Auxiliary Systems	Instrument Air	3850	Instrument air compressors

CC GT units	Balance of Plant	Auxiliary Systems	Instrument Air	3851	Instrument air piping
CC GT units	Balance of Plant	Auxiliary Systems	Instrument Air	3852	Instrument air valves
CC GT units	Balance of Plant	Auxiliary Systems	Instrument Air	3853	Instrument air dryers
CC GT units	Balance of Plant	Auxiliary Systems	Instrument Air	3854	N2 backup to instrument air
CC GT units	Balance of Plant	Auxiliary Systems	Instrument Air	3859	Other instrument air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-5 Balance of Plant: Auxiliary Systems - Low-pressure Gas Compression System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3870	Fuel Gas Compressor and Motors
CC GT units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3871	Fuel Gas Compressor Piping
CC GT units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3872	Fuel Gas Compressor Valves
CC GT units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3873	Fuel Gas Compressor Heat Exchangers
CC GT units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3874	Fuel Gas Compressor Controls and Instrumentation
CC GT units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3875	Fuel Gas Compressor Filters
CC GT units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3876	Fuel Gas Compressor Fire System
CC GT units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3879	Fuel Gas Compressor - other
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-6 Balance of Plant: Auxiliary Systems - Miscellaneous (Auxiliary Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3898	Miscellaneous plant auxiliary process and services instrumentation and controls
CC GT units	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3899	Other miscellaneous auxiliary system problems
CC GT units	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	6299	Other combined cycle block problems (Use other gas turbine problem codes,

					other steam turbine codes, etc., whenever appropriate.)
CC GT units	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	6399	Other coal gasification equipment problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-7 Balance of Plant: Auxiliary Systems - Open Cooling Water System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3800	Open cooling water pumps and motors
CC GT units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3801	Open cooling water piping
CC GT units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3802	Open cooling water valves
CC GT units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3803	Open cooling water heat exchangers
CC GT units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3804	Open cooling water system fouling
CC GT units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3805	Open cooling water system instrumentation
CC GT units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3806	Open cooling water strainer
CC GT units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3809	Other open cooling water problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-8 Balance of Plant: Auxiliary Systems - Seal Air Fans

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3880	Seal air fan
CC GT units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3881	Seal air fan drive - motor
CC GT units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3882	Seal air control dampers and drives
CC GT units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3883	Seal air filters
CC GT units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3889	Other seal air fan problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-9 Balance of Plant: Auxiliary Systems - Service Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Auxiliary Systems	Service Air	3840	Service air compressors
CC GT units	Balance of Plant	Auxiliary Systems	Service Air	3841	Service air piping

CC GT units	Balance of Plant	Auxiliary Systems	Service Air	3842	Service air valves
CC GT units	Balance of Plant	Auxiliary Systems	Service Air	3843	Service air dryers
CC GT units	Balance of Plant	Auxiliary Systems	Service Air	3849	Other service air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-10 Balance of Plant: Auxiliary Systems - Service Water (Open System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3810	Service water pumps and motors
CC GT units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3811	Service water piping
CC GT units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3812	Service water valves
CC GT units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3813	Service water heat exchangers
CC GT units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3814	Service water system fouling
CC GT units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3815	Service water strainer
CC GT units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3819	Other service water problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-11 Balance of Plant: Circulating Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Circulating Water Systems		3210	Circulating water pumps
CC GT units	Balance of Plant	Circulating Water Systems		3211	Circulating water pump motors
CC GT units	Balance of Plant	Circulating Water Systems		3220	Circulating water piping
CC GT units	Balance of Plant	Circulating Water Systems		3221	Circulating water piping fouling
CC GT units	Balance of Plant	Circulating Water Systems		3230	Circulating water valves
CC GT units	Balance of Plant	Circulating Water Systems		3231	Waterbox
CC GT units	Balance of Plant	Circulating Water Systems		3232	Condenser tube cleaning system including debris filter
CC GT units	Balance of Plant	Circulating Water Systems		3233	Circulating water priming system
CC GT units	Balance of Plant	Circulating Water Systems		3235	Cooling tower booster pump
CC GT units	Balance of Plant	Circulating Water Systems		3236	Cooling tower booster motor
CC GT units	Balance of Plant	Circulating Water Systems		3238	Cooling tower fan motors
CC GT units	Balance of Plant	Circulating Water Systems		3239	Cooling tower fan motors - variable speed
CC GT units	Balance of Plant	Circulating Water Systems		3240	Cooling tower fans
CC GT units	Balance of Plant	Circulating Water Systems		3241	Cooling tower efficiency below design
CC GT units	Balance of Plant	Circulating Water Systems		3242	Cooling tower fill damage
CC GT units	Balance of Plant	Circulating Water Systems		3243	Cooling tower icing

CC GT units	Balance of Plant	Circulating Water Systems		3244	Cooling tower fires
CC GT units	Balance of Plant	Circulating Water Systems		3245	Other cooling tower problems
CC GT units	Balance of Plant	Circulating Water Systems		3246	Cooling tower fouling
CC GT units	Balance of Plant	Circulating Water Systems		3247	Cooling tower instrumentation
CC GT units	Balance of Plant	Circulating Water Systems		3248	Cooling Tower Overhaul
CC GT units	Balance of Plant	Circulating Water Systems		3250	Circulating water system instruments and controls
CC GT units	Balance of Plant	Circulating Water Systems		3260	Traveling screens
CC GT units	Balance of Plant	Circulating Water Systems		3261	Traveling screen fouling
CC GT units	Balance of Plant	Circulating Water Systems		3269	Circulating water biological conditions (ie, zebra mussels)
CC GT units	Balance of Plant	Circulating Water Systems		3270	Intake system problems other than traveling screens
CC GT units	Balance of Plant	Circulating Water Systems		3271	Intake grating fouling
CC GT units	Balance of Plant	Circulating Water Systems		3272	Circulating water screenwash system
CC GT units	Balance of Plant	Circulating Water Systems		3273	Debris in circulating water from outside sources (leaves, mud, etc.)
CC GT units	Balance of Plant	Circulating Water Systems		3280	High circulating water temperature (not due to season, tower efficiency below design, or other listed equipment problem)
CC GT units	Balance of Plant	Circulating Water Systems		3281	Circulating water tempering system
CC GT units	Balance of Plant	Circulating Water Systems		3282	Circulating water cooling ponds
CC GT units	Balance of Plant	Circulating Water Systems		3285	Circulating water chemistry
CC GT units	Balance of Plant	Circulating Water Systems		3299	Other circulating water system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-12 Balance of Plant: Condensate System - Low/Intermediate Pressure Heater and Deaerators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3339	LP heater head leaks
CC GT units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3340	LP heater tube leaks
CC GT units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3341	Other LP heater - general

CC GT units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3342	IP heater tube leaks
CC GT units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3343	Other IP heater - general
CC GT units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3344	Deaerator (including level control)
CC GT units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3345	IP heater head leaks
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-13 Balance of Plant: Condensate System - Miscellaneous (Condensate System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3360	Condensate makeup and return (including storage tanks)
CC GT units	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3370	Condensate system controls and instrumentation (not hotwell level, heater level, or deaerator level controls; see codes 3150-3159, 3344, 3502).
CC GT units	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3380	Condensate coolers
CC GT units	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3399	Other miscellaneous condensate system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-14 Balance of Plant: Condensate System - Polishers/Chemical Addition

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Condensate System	Polishers/Chemical Addition	3350	Condensate polishing and filtering systems
CC GT units	Balance of Plant	Condensate System	Polishers/Chemical Addition	3351	Chemical addition systems
CC GT units	Balance of Plant	Condensate System	Polishers/Chemical Addition	3352	Feedwater chemistry (not specific to condenser, polishers, or chemical addition)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-15 Balance of Plant: Condensate System - Pumps, Piping, and Valves

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3300	Condensate water pre-treatment
CC GT units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3310	Condensate/hotwell pumps
CC GT units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3311	Condensate/hotwell pump motor
CC GT units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3312	Condensate booster pump
CC GT units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3313	Condensate booster pump motor
CC GT units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3314	Condensate booster pump motor - variable speed
CC GT units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3315	Condensate booster pump drive (other than 3313 and 3314)
CC GT units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3320	Condensate piping
CC GT units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3330	Condensate valves
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-16 Balance of Plant: Condensing System - Condenser Casing or Shell and Internals

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3120	Tube sheets
CC GT units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3121	Expansion joint
CC GT units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3122	Gaskets and seals
CC GT units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3123	Hot well
CC GT units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3124	Tube sheet fouling
CC GT units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3129	Other condenser casing or shell and internal problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-17 Balance of Plant: Condensing System - Condenser Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Condensing System	Condenser Controls	3150	Hot well level controls
CC GT units	Balance of Plant	Condensing System	Condenser Controls	3151	Vacuum pump and air ejector controls
CC GT units	Balance of Plant	Condensing System	Condenser Controls	3152	Air-cooled condenser controls

CC GT units	Balance of Plant	Condensing System	Condenser Controls	3159	Other condensing system controls and instruments
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-18 Balance of Plant: Condensing System - Condenser Tubes and Support Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3110	Condenser tube leaks
CC GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3111	Condenser tube fouling shell side
CC GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3112	Condenser tube fouling tube side
CC GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3113	Condenser tube and water box cleaning (including circulating water flow reversal)
CC GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3114	Air-cooled condenser tubes
CC GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3115	Air-cooled condenser pumps
CC GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3116	Air-cooled condenser fans
CC GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3117	Air-cooled condenser fan motors
CC GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3118	Other Air-cooled condenser problems
CC GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3119	Other condenser tube casing or shell and internal problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-19 Balance of Plant: Condensing System - Miscellaneous (Condensing System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3170	Condenser inspection (use code 3110 to report looking for tube leaks)
CC GT units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3171	Air-cooled condenser inspections
CC GT units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3180	Major condenser overhaul
CC GT units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3185	Water side cathodic protection

CC GT units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3186	Auxiliary condenser and associated equipment
CC GT units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3190	Air leakage (for losses not attributable to previously noted equipment related codes)
CC GT units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3199	Other miscellaneous condensing system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-20 Balance of Plant: Condensing System - Vacuum Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Condensing System	Vacuum Equipment	3130	Air ejectors
CC GT units	Balance of Plant	Condensing System	Vacuum Equipment	3131	Air ejector piping and valves
CC GT units	Balance of Plant	Condensing System	Vacuum Equipment	3132	Inter and after condensers
CC GT units	Balance of Plant	Condensing System	Vacuum Equipment	3133	Vacuum pumps
CC GT units	Balance of Plant	Condensing System	Vacuum Equipment	3134	Vacuum pump piping and valves
CC GT units	Balance of Plant	Condensing System	Vacuum Equipment	3135	Vacuum pump motor and auxiliaries
CC GT units	Balance of Plant	Condensing System	Vacuum Equipment	3139	Other air extraction system problems - general
CC GT units	Balance of Plant	Condensing System	Vacuum Equipment	3149	Loss of vacuum not attributable to a particular component such as air ejectors or valves, or high back pressure not attributable to high circulating water temperature, or vacuum losses from a known cause.
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-21 Balance of Plant: Electrical

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Electrical		3600	Switchyard transformers and associated cooling systems - external (OMC)
CC GT units	Balance of Plant	Electrical		3601	Switchyard transformers and associated cooling systems - external (not OMC)
CC GT units	Balance of Plant	Electrical		3610	Switchyard circuit breakers - external (not OMC)

CC GT units	Balance of Plant	Electrical		3611	Switchyard circuit breakers - external (OMC)
CC GT units	Balance of Plant	Electrical		3612	Switchyard system protection devices - external (OMC)
CC GT units	Balance of Plant	Electrical		3613	Switchyard system protection devices - external (not OMC)
CC GT units	Balance of Plant	Electrical		3618	Other switchyard equipment - external (not OMC)
CC GT units	Balance of Plant	Electrical		3619	Other switchyard equipment - external (OMC)
CC GT units	Balance of Plant	Electrical		3620	Main transformer
CC GT units	Balance of Plant	Electrical		3621	Unit auxiliaries transformer
CC GT units	Balance of Plant	Electrical		3622	Station service startup transformer
CC GT units	Balance of Plant	Electrical		3623	Auxiliary generators
CC GT units	Balance of Plant	Electrical		3624	Auxiliary generator voltage supply system
CC GT units	Balance of Plant	Electrical		3629	Other switchyard or high voltage system problems - external
CC GT units	Balance of Plant	Electrical		3630	400-700 volt transformers
CC GT units	Balance of Plant	Electrical		3631	400-700 volt circuit breakers
CC GT units	Balance of Plant	Electrical		3632	400-700 volt conductors and buses
CC GT units	Balance of Plant	Electrical		3633	400-700 volt insulators
CC GT units	Balance of Plant	Electrical		3634	400-700 volt protection devices
CC GT units	Balance of Plant	Electrical		3639	Other 400-700 volt problems
CC GT units	Balance of Plant	Electrical		3640	AC instrument power transformers
CC GT units	Balance of Plant	Electrical		3641	AC Circuit breakers
CC GT units	Balance of Plant	Electrical		3642	AC Conductors and buses
CC GT units	Balance of Plant	Electrical		3643	AC Inverters
CC GT units	Balance of Plant	Electrical		3644	AC Protection devices
CC GT units	Balance of Plant	Electrical		3649	Other AC instrument power problems
CC GT units	Balance of Plant	Electrical		3650	DC instrument power battery chargers
CC GT units	Balance of Plant	Electrical		3651	DC circuit breakers
CC GT units	Balance of Plant	Electrical		3652	DC conductors and buses
CC GT units	Balance of Plant	Electrical		3653	DC protection devices
CC GT units	Balance of Plant	Electrical		3659	Other DC power problems
CC GT units	Balance of Plant	Electrical		3660	4000-7000 volt transformers
CC GT units	Balance of Plant	Electrical		3661	4000-7000 volt circuit breakers
CC GT units	Balance of Plant	Electrical		3662	4000-7000 volt conductors and buses

CC GT units	Balance of Plant	Electrical		3663	4000-7000 volt insulators
CC GT units	Balance of Plant	Electrical		3664	4000-7000 volt protection devices
CC GT units	Balance of Plant	Electrical		3669	Other 4000-7000 volt problems
CC GT units	Balance of Plant	Electrical		3670	12-15kV transformers
CC GT units	Balance of Plant	Electrical		3671	12-15kV circuit breakers
CC GT units	Balance of Plant	Electrical		3672	12-15kV conductors and buses
CC GT units	Balance of Plant	Electrical		3673	12-15kV insulators
CC GT units	Balance of Plant	Electrical		3674	12-15kV protection devices
CC GT units	Balance of Plant	Electrical		3679	Other 12-15kV problems
CC GT units	Balance of Plant	Electrical		3680	Other voltage transformers
CC GT units	Balance of Plant	Electrical		3681	Other voltage circuit breakers
CC GT units	Balance of Plant	Electrical		3682	Other voltage conductors and buses
CC GT units	Balance of Plant	Electrical		3683	Other voltage insulators
CC GT units	Balance of Plant	Electrical		3684	Other voltage protection devices
CC GT units	Balance of Plant	Electrical		3689	Other voltage problems
CC GT units	Balance of Plant	Electrical		3690	Station Service Power Distribution System, General
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-22 Balance of Plant: Extraction Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Extraction Steam		3520	HP Extraction steam piping
CC GT units	Balance of Plant	Extraction Steam		3521	HP Extraction steam valves
CC GT units	Balance of Plant	Extraction Steam		3522	HP Extraction steam instruments and controls
CC GT units	Balance of Plant	Extraction Steam		3529	Other HP extraction steam system problems
CC GT units	Balance of Plant	Extraction Steam		3530	IP Extraction steam piping
CC GT units	Balance of Plant	Extraction Steam		3531	IP Extraction steam valves
CC GT units	Balance of Plant	Extraction Steam		3532	IP Extraction steam instruments and controls
CC GT units	Balance of Plant	Extraction Steam		3539	Other IP extraction steam system problems
CC GT units	Balance of Plant	Extraction Steam		3540	LP Extraction steam piping
CC GT units	Balance of Plant	Extraction Steam		3541	LP Extraction steam valves
CC GT units	Balance of Plant	Extraction Steam		3542	LP Extraction steam instruments and controls

CC GT units	Balance of Plant	Extraction Steam		3549	Other LP extraction steam system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-23 Balance of Plant: Feedwater System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Feedwater System		3401	Startup feedwater pump
CC GT units	Balance of Plant	Feedwater System		3402	Startup feedwater pump drives - all types
CC GT units	Balance of Plant	Feedwater System		3407	Feedwater pump suction screens
CC GT units	Balance of Plant	Feedwater System		3408	Feedwater pump drive - local controls
CC GT units	Balance of Plant	Feedwater System		3409	Feedwater pump drive motor - variable speed
CC GT units	Balance of Plant	Feedwater System		3410	Feedwater pump
CC GT units	Balance of Plant	Feedwater System		3411	Feedwater pump drive - motor
CC GT units	Balance of Plant	Feedwater System		3412	Feedwater pump drive - steam turbine
CC GT units	Balance of Plant	Feedwater System		3413	Feedwater pump coupling and drive shaft
CC GT units	Balance of Plant	Feedwater System		3414	Feedwater pump local controls
CC GT units	Balance of Plant	Feedwater System		3415	Feedwater pump/drive lube oil system
CC GT units	Balance of Plant	Feedwater System		3416	Other feedwater pump problems
CC GT units	Balance of Plant	Feedwater System		3417	Feedwater pump drive - main shaft
CC GT units	Balance of Plant	Feedwater System		3418	Feedwater pump drive - other
CC GT units	Balance of Plant	Feedwater System		3419	Feedwater pump drive - gear
CC GT units	Balance of Plant	Feedwater System		3420	Feedwater piping and supports
CC GT units	Balance of Plant	Feedwater System		3430	Feedwater regulating (boiler level control) valve
CC GT units	Balance of Plant	Feedwater System		3431	Other feedwater valves
CC GT units	Balance of Plant	Feedwater System		3439	HP heater head leaks
CC GT units	Balance of Plant	Feedwater System		3440	High pressure heater tube leaks
CC GT units	Balance of Plant	Feedwater System		3441	Other high pressure heater problems (see condensate system for LP and IP heater codes)
CC GT units	Balance of Plant	Feedwater System		3451	Feedwater booster pump suction screens
CC GT units	Balance of Plant	Feedwater System		3452	Feedwater booster pump drive - local controls

CC GT units	Balance of Plant	Feedwater System		3453	Feedwater booster pump drive motor - variable speed
CC GT units	Balance of Plant	Feedwater System		3454	Feedwater booster pump
CC GT units	Balance of Plant	Feedwater System		3455	Feedwater booster pump drive - motor
CC GT units	Balance of Plant	Feedwater System		3456	Feedwater booster pump drive - steam turbine
CC GT units	Balance of Plant	Feedwater System		3457	Feedwater booster pump coupling and drive shaft
CC GT units	Balance of Plant	Feedwater System		3458	Feedwater booster pump local controls
CC GT units	Balance of Plant	Feedwater System		3459	Feedwater booster pump/drive lube oil system
CC GT units	Balance of Plant	Feedwater System		3460	Other feedwater booster pump problems
CC GT units	Balance of Plant	Feedwater System		3461	Feedwater booster pump drive - main shaft
CC GT units	Balance of Plant	Feedwater System		3462	Feedwater booster pump drive - other
CC GT units	Balance of Plant	Feedwater System		3463	Feedwater booster pump drive - gear
CC GT units	Balance of Plant	Feedwater System		3499	Other feedwater system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Excluding extraction or drain systems.					

TABLE B01-24 Balance of Plant: Heater Drain Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Heater Drain Systems		3501	Heater drain pumps
CC GT units	Balance of Plant	Heater Drain Systems		3502	Heater level control
CC GT units	Balance of Plant	Heater Drain Systems		3503	Heater drain piping
CC GT units	Balance of Plant	Heater Drain Systems		3504	Heater drain valves
CC GT units	Balance of Plant	Heater Drain Systems		3505	Heater drain pump drive
CC GT units	Balance of Plant	Heater Drain Systems		3509	Other heater drain system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-25 Balance of Plant: Miscellaneous (Balance of Plant)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3950	Process computer
CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3960	Thermal derating (thermal efficiency losses in balance of plant when specific cause(s) unknown)
CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3970	Distributive Control System (DCS) - process computer
CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3971	DCS - data highway
CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3972	DCS - hardware problems (including card failure)
CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3973	DCS - internal and termination wiring
CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3974	DCS - logic problems
CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3975	DCS - upgrades
CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3979	Other DCS problems
CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3980	Programmable Logic Controller (PLC)
CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3981	PLC - data highway
CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3982	PLC - hardware problems (including card failure)
CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3983	PLC - internal and termination wiring
CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3984	PLC - logic problems
CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3985	PLC - upgrades
CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3989	Other PLC problems
CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3995	Powerhouse heating and ventilating systems
CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3996	Air conditioning systems - rooms and areas
CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3998	Balance of plant overhaul/outage
CC GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3999	Other miscellaneous balance of plant problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-26 Balance of Plant: Power Station Switchyard

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Power Station Switchyard		3700	Power Station switchyard (non generating unit equipment)
CC GT units	Balance of Plant	Power Station Switchyard		3710	Transmission line (connected to powerhouse switchyard to 1st Substation)

CC GT units	Balance of Plant	Power Station Switchyard		3720	Transmission equipment at the 1st substation (see code 9300 if applicable)
CC GT units	Balance of Plant	Power Station Switchyard		3730	Transmission equipment beyond the 1st substation (see code 9300 if applicable)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-27 Balance of Plant: Waste Water (zero discharge) Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Balance of Plant	Waste Water (zero discharge) Systems		3290	Waste water (zero discharge) tanks, pumps, and motors
CC GT units	Balance of Plant	Waste Water (zero discharge) Systems		3291	Waste water (zero discharge) system fouling
CC GT units	Balance of Plant	Waste Water (zero discharge) Systems		3292	Waste water (zero discharge) piping
CC GT units	Balance of Plant	Waste Water (zero discharge) Systems		3293	Waste water (zero discharge) valves
CC GT units	Balance of Plant	Waste Water (zero discharge) Systems		3294	Waste water (zero discharge) controls and instrumentation
CC GT units	Balance of Plant	Waste Water (zero discharge) Systems		3295	Other waste water (zero discharge) problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

EXPANDER TURBINE

TABLE B01-28 Expander Turbine: Expander Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Expander Turbine	Expander Turbine		7800	Couplings
CC GT units	Expander Turbine	Expander Turbine		7810	Shaft
CC GT units	Expander Turbine	Expander Turbine		7820	Bearings
CC GT units	Expander Turbine	Expander Turbine		7830	Blades
CC GT units	Expander Turbine	Expander Turbine		7840	Discs
CC GT units	Expander Turbine	Expander Turbine		7850	Spacers
CC GT units	Expander Turbine	Expander Turbine		7860	Nozzles/vanes
CC GT units	Expander Turbine	Expander Turbine		7870	Heat shields

CC GT units	Expander Turbine	Expander Turbine		7880	Exhaust diffusers
CC GT units	Expander Turbine	Expander Turbine		7890	Seal oil system and seals
CC GT units	Expander Turbine	Expander Turbine		7900	Inner casing
CC GT units	Expander Turbine	Expander Turbine		7910	Outer exhaust casing
CC GT units	Expander Turbine	Expander Turbine		7920	Lube oil system
CC GT units	Expander Turbine	Expander Turbine		7930	Controls and instrumentation
CC GT units	Expander Turbine	Expander Turbine		7940	Evactor
CC GT units	Expander Turbine	Expander Turbine		7950	Major overhaul
CC GT units	Expander Turbine	Expander Turbine		7960	Other expander turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

EXTERNAL

Use this set of codes to report events caused by external factors (flood, lightning, etc.); economic factors (lack of fuel, labor strikes, etc.); operator training; and transmission system problems external to the plant.

TABLE B01-29 External: Catastrophe

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	External	Catastrophe		9000	Flood
CC GT units	External	Catastrophe		9001	Drought
CC GT units	External	Catastrophe		9010	Fire including wildfires, not related to a specific component
CC GT units	External	Catastrophe		9020	Lightning
CC GT units	External	Catastrophe		9025	Geomagnetic disturbance
CC GT units	External	Catastrophe		9030	Earthquake
CC GT units	External	Catastrophe		9031	Tornado
CC GT units	External	Catastrophe		9035	Hurricane
CC GT units	External	Catastrophe		9036	Storms (ice, snow, etc)
CC GT units	External	Catastrophe		9040	Other catastrophe
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-30 External: Economic

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	External	Economic		0000	Reserve shutdown
CC GT units	External	Economic		9130	Failure of fuel supplier to fulfill contractual obligations or a pre-

					arranged deal due to physical fuel disruptions or operational impairments (e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)
CC GT units	External	Economic		9131	Lack of fuel – due to contractual or tariff provisions that allow for service interruption or price fluctuations during peak demand periods.
CC GT units	External	Economic		9134	Fuel conservation
CC GT units	External	Economic		9136	Problems with Primary Fuel for Units with Secondary Fuel Operation
CC GT units	External	Economic		9137	Ground water or other water supply problems
CC GT units	External	Economic		9140	Plant modifications to burn different fuel that are not regulatory mandated
CC GT units	External	Economic		9150	Labor strikes company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.
CC GT units	External	Economic		9151	Labor strikes direct plant management grievances that result in a walkout or strike are under plant management control.
CC GT units	External	Economic		9160	Other economic problems
CC GT units	External	Economic		9180	Economic (for internal use at plants only)
CC GT units	External	Economic		9181	Economic (for internal use at plants only)
CC GT units	External	Economic		9182	Economic (for internal use at plants only)
CC GT units	External	Economic		9183	Economic (for internal use at plants only)
CC GT units	External	Economic		9184	Economic (for internal use at plants only)
CC GT units	External	Economic		9185	Economic (for internal use at plants only)

CC GT units	External	Economic		9186	Economic (for internal use at plants only)
CC GT units	External	Economic		9187	Economic (for internal use at plants only)
CC GT units	External	Economic		9188	Economic (for internal use at plants only)
CC GT units	External	Economic		9189	Economic (for internal use at plants only)
CC GT units	External	Economic		9190	Economic (for internal use at plants only)
CC GT units	External	Economic		9191	Economic (for internal use at plants only)
CC GT units	External	Economic		9192	Economic (for internal use at plants only)
CC GT units	External	Economic		9193	Economic (for internal use at plants only)
CC GT units	External	Economic		9194	Economic (for internal use at plants only)
CC GT units	External	Economic		9195	Economic (for internal use at plants only)
CC GT units	External	Economic		9196	Economic (for internal use at plants only)
CC GT units	External	Economic		9197	Economic (for internal use at plants only)
CC GT units	External	Economic		9198	Economic (for internal use at plants only)
CC GT units	External	Economic		9199	Economic (for internal use at plants only)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-31 External: Fuel Quality					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC GT units	External	Fuel Quality		9200	High ash content (OMC)
CC GT units	External	Fuel Quality		9201	High ash content (not OMC)
CC GT units	External	Fuel Quality		9205	Poor quality natural gas fuel, low heat content
CC GT units	External	Fuel Quality		9220	High sulfur content (OMC)
CC GT units	External	Fuel Quality		9221	High sulfur content (not OMC)
CC GT units	External	Fuel Quality		9230	High vanadium content (OMC)
CC GT units	External	Fuel Quality		9231	High vanadium content (not OMC)
CC GT units	External	Fuel Quality		9240	High sodium content (OMC)
CC GT units	External	Fuel Quality		9241	High sodium content (not OMC)
CC GT units	External	Fuel Quality		9260	Low BTU oil (OMC)
CC GT units	External	Fuel Quality		9261	Low BTU oil (not OMC)
CC GT units	External	Fuel Quality		9290	Other fuel quality problems (OMC)
CC GT units	External	Fuel Quality		9291	Other fuel quality problems (not OMC)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use code 9600 to 9650 if the fuel quality results in excess stack emissions through no fault in the pollution control equipment. Use the appropriate equipment code to report fouling and slagging.					

TABLE B01-32 External: Miscellaneous (External)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC GT units	External	Miscellaneous (External)		9300	Transmission system problems other than catastrophes (do not include switchyard problems in this category; see codes 3600 to 3629, 3720 to 3730)
CC GT units	External	Miscellaneous (External)		9310	Operator training
CC GT units	External	Miscellaneous (External)		9320	Other miscellaneous external problems
CC GT units	External	Miscellaneous (External)		9340	Synchronous Condenser Operation
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

GAS TURBINE

TABLE B01-33 Gas Turbine: Auxiliary Systems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC GT units	Gas Turbine	Auxiliary Systems		5110	Lube oil system - general

CC GT units	Gas Turbine	Auxiliary Systems		5111	Lube oil pumps
CC GT units	Gas Turbine	Auxiliary Systems		5112	Lube oil coolers
CC GT units	Gas Turbine	Auxiliary Systems		5113	Lube oil valves/piping
CC GT units	Gas Turbine	Auxiliary Systems		5114	Lube oil filters
CC GT units	Gas Turbine	Auxiliary Systems		5115	Oil vapor extractor
CC GT units	Gas Turbine	Auxiliary Systems		5116	Power Augmentation System Equipment
CC GT units	Gas Turbine	Auxiliary Systems		5117	Power augmentation piping
CC GT units	Gas Turbine	Auxiliary Systems		5118	Power augmentation valves
CC GT units	Gas Turbine	Auxiliary Systems		5119	Power augmentation controls
CC GT units	Gas Turbine	Auxiliary Systems		5120	Hydraulic oil system
CC GT units	Gas Turbine	Auxiliary Systems		5121	Hydraulic oil system pumps
CC GT units	Gas Turbine	Auxiliary Systems		5122	Hydraulic oil system piping/valves
CC GT units	Gas Turbine	Auxiliary Systems		5130	Starting system (including motor)
CC GT units	Gas Turbine	Auxiliary Systems		5140	Battery and charger system
CC GT units	Gas Turbine	Auxiliary Systems		5150	Turning gear and motor
CC GT units	Gas Turbine	Auxiliary Systems		5151	Load gear compartment
CC GT units	Gas Turbine	Auxiliary Systems		5160	Cooling and seal air system
CC GT units	Gas Turbine	Auxiliary Systems		5170	Cooling water system
CC GT units	Gas Turbine	Auxiliary Systems		5180	Anti-icing system
CC GT units	Gas Turbine	Auxiliary Systems		5190	Other auxiliary system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-34 Gas Turbine: Exhaust Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Gas Turbine	Exhaust Systems		5100	Chamber
CC GT units	Gas Turbine	Exhaust Systems		5101	Hoods
CC GT units	Gas Turbine	Exhaust Systems		5102	Vanes/nozzles
CC GT units	Gas Turbine	Exhaust Systems		5103	Silencer
CC GT units	Gas Turbine	Exhaust Systems		5104	Cones
CC GT units	Gas Turbine	Exhaust Systems		5105	Diverter Dampers
CC GT units	Gas Turbine	Exhaust Systems		5106	Exhaust Stack
CC GT units	Gas Turbine	Exhaust Systems		5108	High engine exhaust temperature
CC GT units	Gas Turbine	Exhaust Systems		5109	Other exhaust problems (including high exhaust system temperature not attributable to a specific problem)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-35 Gas Turbine: Fuel, Ignition, and Combustion Systems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5040	Fuel tanks
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5041	Fuel piping and valves
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5042	Fuel nozzles/vanes
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5043	Fuel filters
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5044	Liquid fuel oil pump
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5046	Liquid fuel oil transfer/forwarding pump
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5047	Liquid fuel purge system
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5048	Gas fuel system including controls and instrumentation
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5049	Other fuel system problems
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5050	Ignition system
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5051	Pilot fuel piping and valves
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5052	Pilot fuel nozzles/vanes
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5053	Pilot fuel filters
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5054	Water injection system
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5060	Atomizing air system
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5065	NOx water injection system including pump
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5066	NOx steam injection system

CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5070	Combustor casing
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5071	Combustor liner
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5072	Combustor caps
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5073	Flame scanners
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5074	Flashback including instrumentation
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5075	Blade path temperature spread
CC GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5079	Other combustor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-36 Gas Turbine: Inlet Air System and Compressors - Compressors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5010	High pressure shaft
CC GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5011	High pressure bearings
CC GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5012	High pressure blades/buckets
CC GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5013	Compressor casing and bolts
CC GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5014	Compressor diaphragms
CC GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5015	Compressor seals
CC GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5016	High pressure compressor bleed valves
CC GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5017	Low pressure compressor bleed valves
CC GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5019	Other high pressure problems
CC GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5020	Low pressure shaft
CC GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5021	Low pressure bearings
CC GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5022	Low pressure blades/buckets
CC GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5029	Other low pressure problems
CC GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5030	Supercharging fans
CC GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5035	Compressor washing
CC GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5036	Compressor shaft and bearings for two-shaft machines
CC GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5037	Inlet bleed heat valve

CC GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5039	Other compressor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-37 Gas Turbine: Inlet Air System and Compressors - Ducts and Filters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5000	Inlet air ducts
CC GT units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5001	Inlet air vanes/nozzles
CC GT units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5002	Inlet air filters
CC GT units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5003	Inlet cone
CC GT units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5004	Inlet air chillers
CC GT units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5005	Inlet air evaporative coolers
CC GT units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5006	Inlet air foggers
CC GT units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5009	Other inlet air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-38 Gas Turbine: Miscellaneous (Gas Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5200	Reduction gear
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5201	Load shaft and bearings
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5205	Main coupling between the turbine and generator
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5206	Clutch
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5210	Intercoolers
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5220	Regenerators
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5230	Heat shields
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5240	Fire detection and extinguishing system (including hazardous gas detection system)
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5241	Fire in unit
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5245	Gas Turbine Control System - data highway
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5246	Gas Turbine Control System - hardware problems (including card failure)
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5247	Gas Turbine Control System - internal and termination wiring

CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5248	Gas Turbine Control System - logic problems
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5249	Gas Turbine Control System - upgrades
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5250	Other controls and instrumentation problems
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5255	Computer
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5260	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5261	Gas turbine/compressor washing
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5262	Gas turbine exchange
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5269	Combustion Inspection (CI)
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5270	Hot end inspection
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5272	Boroscope inspection
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5274	General unit inspection
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5280	Vibration (not engine) in unit not attributable to bearings or other components
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5285	Gas turbine vibration
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5286	Gas turbine lockout
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5290	Gas turbine performance testing - individual engines (use code 9999 for total unit performance testing)
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5292	Turbine Overspeed Trip Test - Gas Turbine
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5295	Synchronous condenser equipment
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5298	Main gas filter
CC GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5299	Other miscellaneous gas turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-39 Gas Turbine: Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Gas Turbine	Turbine		5080	High pressure shaft
CC GT units	Gas Turbine	Turbine		5081	High pressure bearings
CC GT units	Gas Turbine	Turbine		5082	High pressure blades/buckets
CC GT units	Gas Turbine	Turbine		5083	High pressure nozzles/vanes
CC GT units	Gas Turbine	Turbine		5084	High pressure casing/expansion joints

CC GT units	Gas Turbine	Turbine		5085	Interstage gas passages - HP
CC GT units	Gas Turbine	Turbine		5086	High pressure shaft seals
CC GT units	Gas Turbine	Turbine		5087	Thrust bearing
CC GT units	Gas Turbine	Turbine		5088	Gas turbine cooling system
CC GT units	Gas Turbine	Turbine		5089	Other high pressure problems
CC GT units	Gas Turbine	Turbine		5090	Low pressure shaft
CC GT units	Gas Turbine	Turbine		5091	Low pressure bearings
CC GT units	Gas Turbine	Turbine		5092	Low pressure blades/buckets
CC GT units	Gas Turbine	Turbine		5093	Low pressure nozzles/vanes
CC GT units	Gas Turbine	Turbine		5094	Low pressure casing/expansion joints
CC GT units	Gas Turbine	Turbine		5095	Interstage gas passages - LP
CC GT units	Gas Turbine	Turbine		5096	Low pressure shaft seals
CC GT units	Gas Turbine	Turbine		5097	Other low pressure problems
CC GT units	Gas Turbine	Turbine		5098	Expansion joints
CC GT units	Gas Turbine	Turbine		5099	HP to LP coupling
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP if only one.					

GENERATOR

This set of codes contains the generator, exciter, generator cooling systems, and generator controls. Note the main leads up to and includes the generator output breaker in this set of codes.

TABLE B01-40 Generator: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Generator	Controls		4700	Generator voltage control
CC GT units	Generator	Controls		4710	Generator metering devices
CC GT units	Generator	Controls		4720	Generator synchronization equipment
CC GT units	Generator	Controls		4730	Generator current and potential transformers
CC GT units	Generator	Controls		4740	Emergency generator trip devices
CC GT units	Generator	Controls		4750	Other generator controls and metering problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-41 Generator: Cooling System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

CC GT units	Generator	Cooling System		4610	Hydrogen cooling system piping and valves
CC GT units	Generator	Cooling System		4611	Hydrogen coolers
CC GT units	Generator	Cooling System		4612	Hydrogen storage system
CC GT units	Generator	Cooling System		4613	Hydrogen seals
CC GT units	Generator	Cooling System		4619	Other hydrogen system problems
CC GT units	Generator	Cooling System		4620	Air cooling system
CC GT units	Generator	Cooling System		4630	Liquid cooling system
CC GT units	Generator	Cooling System		4640	Seal oil system and seals
CC GT units	Generator	Cooling System		4650	Other cooling system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Report failures caused by water leaks into generator as codes 4500, 4510, etc.					

TABLE B01-42 Generator: Exciter

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Generator	Exciter		4600	Exciter drive - motor
CC GT units	Generator	Exciter		4601	Exciter field rheostat
CC GT units	Generator	Exciter		4602	Exciter commutator and brushes
CC GT units	Generator	Exciter		4603	Solid state exciter element
CC GT units	Generator	Exciter		4604	Exciter drive - shaft
CC GT units	Generator	Exciter		4605	Exciter transformer
CC GT units	Generator	Exciter		4609	Other exciter problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-43 Generator: Generator

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Generator	Generator		4500	Rotor windings (including damper windings and fan blades on hydro units)
CC GT units	Generator	Generator		4510	Rotor collector rings
CC GT units	Generator	Generator		4511	Rotor, General
CC GT units	Generator	Generator		4512	Retaining Rings
CC GT units	Generator	Generator		4520	Stator windings, bushings, and terminals
CC GT units	Generator	Generator		4530	Stator core iron
CC GT units	Generator	Generator		4535	Stator, General

CC GT units	Generator	Generator		4536	Generator Heaters
CC GT units	Generator	Generator		4540	Brushes and brush rigging
CC GT units	Generator	Generator		4550	Generator bearings and lube oil system (including thrust bearings on hydro units)
CC GT units	Generator	Generator		4551	Generator bearings
CC GT units	Generator	Generator		4552	Generator lube oil system
CC GT units	Generator	Generator		4555	Bearing cooling system
CC GT units	Generator	Generator		4560	Generator vibration (excluding vibration due to failed bearing and other components)
CC GT units	Generator	Generator		4570	Generator casing
CC GT units	Generator	Generator		4580	Generator end bells and bolting
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-44 Generator: Miscellaneous (Generator)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Generator	Miscellaneous (Generator)		4800	Generator main leads
CC GT units	Generator	Miscellaneous (Generator)		4805	Generator Bus Duct Cooling System
CC GT units	Generator	Miscellaneous (Generator)		4810	Generator output breaker
CC GT units	Generator	Miscellaneous (Generator)		4830	Major generator overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
CC GT units	Generator	Miscellaneous (Generator)		4831	Minor generator overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
CC GT units	Generator	Miscellaneous (Generator)		4840	Inspection
CC GT units	Generator	Miscellaneous (Generator)		4841	Generator doble testing
CC GT units	Generator	Miscellaneous (Generator)		4842	Reactive and capability testing
CC GT units	Generator	Miscellaneous (Generator)		4850	Core monitor alarm
CC GT units	Generator	Miscellaneous (Generator)		4860	Generator neutral grounding equipment
CC GT units	Generator	Miscellaneous (Generator)		4899	Other miscellaneous generator problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

HEAT RECOVERY STEAM GENERATOR (HRSG)

(Waste Heat Boiler)

TABLE B01-45 Heat Recovery Steam Generator (HRSG): HRSG Boiler Air and Gas Systems - Air Supply

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1400	Forced draft fans
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1401	Forced draft fan dampers
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1407	Forced draft fan lubrication system
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1410	Forced draft fan motors
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1411	Forced draft fan motors - variable speed
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1412	Forced draft fan drives (other than motor)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1415	Forced draft fan controls
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1420	Other forced draft fan problems
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1456	Induced draft fan dampers

Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.

TABLE B01-46 Heat Recovery Steam Generator (HRSG): HRSG Boiler Air and Gas Systems - Miscellaneous (Boiler Air and Gas Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1590	Stacks (use code 8430 for stack problems due to pollution control equipment)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1591	Stack damper and linkage
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1592	Stack damper linkage motors
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1599	Other miscellaneous boiler air and gas system problems

Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.

TABLE B01-47 Heat Recovery Steam Generator (HRSG): HRSG Boiler Control Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1700	Feedwater controls (report local controls - feedwater pump, feedwater regulator valve, etc., - with component or system)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1710	Combustion/steam condition controls (report local controls - burners, pulverizers, etc., - with component or system)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1720	Desuperheater/attemperator controls
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1730	Boiler explosion or implosion
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1740	Boiler drum gage glasses / level indicator
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1750	Burner management system
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1760	Feedwater instrumentation (not local controls)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1761	Combustion/Steam condition instrumentation (not local controls)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1762	Desuperheater/attemperator instrumentation (not local controls)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1799	Other boiler instrumentation and control problems

Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Iincluding instruments which input to the controls.

TABLE B01-48 Heat Recovery Steam Generator (HRSG): HRSG Boiler Design Limitations					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Design Limitations		1900	Improper balance between tube sections not due to fouling or plugging
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Design Limitations		1910	Inadequate air not due to equipment problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-49 Heat Recovery Steam Generator (HRSG): HRSG Boiler Fuel Supply - Burners (Duct Burners)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	358	Oil burner piping and valves
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	359	Gas burner piping and valves
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	360	Burners
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	361	Burner orifices
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	370	Burner instruments and controls (except light off)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	380	Light off (igniter) systems (including fuel supply)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	385	Igniters
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	410	Other burner problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-50 Heat Recovery Steam Generator (HRSG): HRSG Boiler Fuel Supply - Oil and Gas Systems (except light off)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	440	Fuel oil pumps (general)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	441	Fuel oil pumps (burner supply)

CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	442	Fuel oil pumps (forwarding/transfer)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	443	Fuel oil (burner supply) pump drives
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	444	Fuel oil (forwarding/transfer) pump drives
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	450	Fuel oil heaters
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	460	Fuel oil atomizers
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	470	Oil and gas fires
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	480	Other oil and gas fuel supply problems (see codes 0360-0410 for burner problems)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-51 Heat Recovery Steam Generator (HRSG): HRSG Boiler Internals and Structures

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		800	Drums and drum internals (single drum only)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		801	HP Drum (including drum level trips not attributable to other causes)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		802	IP Drum (including drum level trips not attributable to other causes)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		803	LP Drum (including drum level trips not attributable to other causes)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		810	Boiler supports and structures (use code 1320 for tube supports)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		820	Casing
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		830	Doors

CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		840	Refractory and insulation
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		845	Windbox expansion joints
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		847	Other expansion joints
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		848	Inlet panel
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		850	Other internal or structural problems
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		855	Drum relief/safety valves (single drum only)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		856	HP Drum relief/safety valves
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		857	IP Drum relief/safety valves
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		858	LP Drum relief/safety valves
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		859	Tube external fins/membranes
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-52 Heat Recovery Steam Generator (HRSG): HRSG Boiler Overhaul and Inspections

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1800	Major boiler overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1801	Minor boiler overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1810	Other boiler inspections
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1811	Boiler Inspections - problem identification / investigation
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1812	Boiler Inspections - scheduled or routine

CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1820	Chemical cleaning/steam blows
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-53 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - Boiler Recirculation

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	740	Boiler recirculation pumps
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	741	Boiler recirculation pumps - motors
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	750	Boiler recirculation piping including downcomers
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	760	Boiler recirculation valves
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	770	Other boiler recirculation problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-54 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - Feedwater and Blowdown

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	670	Feedwater piping downstream of feedwater regulating valve
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	680	Feedwater valves (not feedwater regulating valve)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	690	Other feedwater problems downstream of feedwater regulating valve (use codes 3401 to 3499 for remainder of feedwater system)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	700	Blowdown system valves
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	710	Blowdown system piping
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	720	Blowdown system controls / instrumentation
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	730	Other blowdown system problems

Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.

TABLE B01-55 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Cold and Hot Reheat Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	540	Hot reheat steam piping up to turbine stop valves
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	541	Cold reheat steam piping up to boiler
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	550	Reheat steam relief/safety valves
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	560	Other hot reheat steam valves (not including turbine stop or intercept valves)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	561	Other cold reheat steam valves (not including turbine stop or intercept valves)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	570	Other reheat steam problems

Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.

TABLE B01-56 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Desuperheaters/Attemperators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6140	HP Desuperheater/attemperator piping - Greater than 600 PSIG.
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6141	HP Desuperheater/attemperator valves
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6142	HP Desuperheater/attemperator spray nozzles
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6143	HP Desuperheater/attemperator drums
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6144	Other HP desuperheater/attemperator problems
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6145	IP Desuperheater/attemperator piping - Between 200-600 PSIG
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6146	IP Desuperheater/attemperator valves

CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6147	IP Desuperheater/attemperator spray nozzles
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6148	IP Desuperheater/attemperator drums
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6149	Other IP desuperheater/attemperator problems
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6150	LP Desuperheater/attemperator piping - Less than 200 PSIG
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6151	LP Desuperheater/attemperator valves
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6152	LP Desuperheater/attemperator spray nozzles
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6153	LP Desuperheater/attemperator drums
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6154	Other LP desuperheater/attemperator problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-57 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Main Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	500	Main steam piping up to turbine stop valves
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	510	Main steam relief/safety valves off superheater
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	520	Other main steam valves (including vent and drain valves but not including the turbine stop valves)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	530	Other main steam system problems
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6110	HP steam piping up to turbine stop valves - Greater than 600 PSIG (see 0790 for piping supports)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6111	HP steam relief/safety valves

CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6112	Other HP steam valves (including vent and drain valves but not including the turbine stop valves)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6113	Other HP steam system problems
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6114	HP steam isolation/boundary valves
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6120	IP steam piping up to turbine stop valves - Between 200 & 600 PSIG (see 0790 for piping supports)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6121	IP steam relief/safety valves
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6122	Other IP steam valves (including vent and drain valves but not including the turbine stop valves)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6123	Other IP steam system problems
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6124	IP steam isolation/boundary valves
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6130	LP steam piping up to turbine stop valves - Less than 200 PSIG (see 0790 for piping supports)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6131	LP steam relief/safety valves
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6132	Other LP steam valves (including vent and drain valves but not including the turbine stop valves)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6133	Other LP steam system problems
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6134	Other main steam valves (including vent and drain valves but not including the turbine stop valves)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6135	LP steam isolation/boundary valves

Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.

TABLE B01-58 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Startup Bypass					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6160	HP Startup bypass system piping (including drain lines up to heaters or condenser) - Greater than 600 PSIG
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6161	HP Startup bypass system valves
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6162	HP Startup bypass tanks or flash tanks
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6163	Other HP startup bypass system problems
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6164	HP startup bypass instrumentation and controls
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6170	IP Startup bypass system piping (including drain lines up to heaters or condenser) - Between 200-600 PSIG
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6171	IP Startup bypass system valves
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6172	IP Startup bypass tanks or flash tanks
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6173	Other IP startup bypass system problems
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6174	IP startup bypass instrumentation and controls
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6180	LP Startup bypass system piping (including drain lines up to heaters or condenser) - Less than 200 PSIG
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6181	LP Startup bypass system valves
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6182	LP Startup bypass tanks or flash tanks

CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6183	Other LP startup bypass system problems
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6184	LP startup bypass instrumentation and controls
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-59 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - Miscellaneous (Piping)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	775	Economizer piping
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	780	Headers between tube bundles
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	782	Headers and caps
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	790	Pipe hangers, brackets, supports (general)
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	799	Other miscellaneous piping system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-60 Heat Recovery Steam Generator (HRSG): HRSG Boiler Tube Leaks

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6005	HP Evaporator tubes
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6006	IP Evaporator tubes
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6007	LP Evaporator tubes
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6010	HP superheater
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6011	HP reheater
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6012	HP economizer
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6020	IP superheater

CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6021	IP reheater
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6022	IP economizer
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6030	LP reheater
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6031	LP superheater
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6032	LP economizer
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6090	Other HRSG tube problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use code 0859 for tube/membrane failures.					

TABLE B01-61 Heat Recovery Steam Generator (HRSG): HRSG Boiler Water Condition

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Water Condition		1850	Boiler water condition (not feedwater water quality)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-62 Heat Recovery Steam Generator (HRSG): Miscellaneous (HRSG Boiler)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		1980	Boiler safety valve test
CC GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		1990	Boiler performance testing (use code 9999 for total unit performance testing)
CC GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		1999	Boiler, miscellaneous
CC GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		6000	Heat recovery steam generator to gas turbine connecting equipment. For additional codes, use Fossil Steam Cause Codes 0010 to 1999.
CC GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		6100	Steam turbine to gas turbine coupling. For additional codes,

					use Fossil Steam Cause Codes 4000 to 4499.
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use more specific codes - other slagging and fouling problems, other control problems, etc. whenever possible. Describe miscellaneous problems in the verbal description.					

TABLE B01-63 Heat Recovery Steam Generator (HRSG): Miscellaneous HRSG Boiler Tube Problems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1300	Water side fouling
CC GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1305	Fireside cleaning (which requires a full outage) Use code 1200 for cleanings that cause deratings.
CC GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1310	Water side cleaning (acid cleaning)
CC GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1320	Tube supports/attachments
CC GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1330	Slag fall damage
CC GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1340	Tube modifications (including addition and removal of tubes)
CC GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1350	Other miscellaneous boiler tube problems
CC GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1360	Boiler drains system
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

INACTIVE STATES

TABLE B01-64 Inactive States: Inactive States

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Inactive States	Inactive States		2	Inactive Reserve Shutdown
CC GT units	Inactive States	Inactive States		9990	Retired unit
CC GT units	Inactive States	Inactive States		9991	Mothballed unit
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

JET ENGINE

TABLE B01-65 Jet Engine: Auxiliary Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Jet Engine	Auxiliary Systems		5510	Lube oil system
CC GT units	Jet Engine	Auxiliary Systems		5516	Power Augmentation System Equipment
CC GT units	Jet Engine	Auxiliary Systems		5520	Hydraulic oil system
CC GT units	Jet Engine	Auxiliary Systems		5530	Starting system (including motor)
CC GT units	Jet Engine	Auxiliary Systems		5540	Battery and charger system
CC GT units	Jet Engine	Auxiliary Systems		5550	Turning gear and motor
CC GT units	Jet Engine	Auxiliary Systems		5551	Load gear compartment
CC GT units	Jet Engine	Auxiliary Systems		5560	Cooling and seal air system
CC GT units	Jet Engine	Auxiliary Systems		5570	Cooling water system
CC GT units	Jet Engine	Auxiliary Systems		5580	Anti-icing system
CC GT units	Jet Engine	Auxiliary Systems		5590	Other auxiliary system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-66 Jet Engine: Exhaust Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Jet Engine	Exhaust Systems		5500	Chamber
CC GT units	Jet Engine	Exhaust Systems		5501	Hoods
CC GT units	Jet Engine	Exhaust Systems		5502	Vanes/nozzles
CC GT units	Jet Engine	Exhaust Systems		5503	Silencer
CC GT units	Jet Engine	Exhaust Systems		5504	Cones
CC GT units	Jet Engine	Exhaust Systems		5505	Diverter Dampers
CC GT units	Jet Engine	Exhaust Systems		5508	High engine exhaust temperature
CC GT units	Jet Engine	Exhaust Systems		5509	Other exhaust problems (including high exhaust temperature not attributable to a specific problem)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-67 Jet Engine: Fuel, Ignition, and Combustion Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5440	Fuel tanks
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5441	Fuel piping and valves

CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5442	Fuel nozzles/vanes
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5443	Fuel filters
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5444	Liquid fuel oil pump
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5445	Liquid fuel oil transfer/forwarding pump
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5446	Liquid fuel purge system
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5447	Gas fuel system including controls and instrumentation
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5449	Other fuel system problems
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5450	Ignition system
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5451	Pilot fuel piping and valves
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5452	Pilot fuel nozzles/vanes
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5453	Pilot fuel filters
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5454	Water injection system
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5455	Fuel nozzle/vane cooling air system
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5460	Atomizing air system
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5470	Combustor casing
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5471	Combustor liner
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5472	Combustor caps
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5473	Flame scanners
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5474	Flashback (including instrumentation)

CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5475	Blade path temperature spread
CC GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5479	Other combustor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-68 Jet Engine: Inlet Air System and Compressors - Compressors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5410	High pressure shaft
CC GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5411	High pressure bearings
CC GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5412	High pressure blades/buckets
CC GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5413	Other high pressure problems
CC GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5414	Compressor diaphragms/vanes
CC GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5420	Low pressure shaft
CC GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5421	Low pressure bearings
CC GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5422	Low pressure blades/buckets
CC GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5429	Other low pressure problems
CC GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5430	Supercharging fans
CC GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5435	Compressor washing
CC GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5436	Compressor shaft and bearings for two-shaft machines
CC GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5439	Other compressor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP compressor if only one.					

TABLE B01-69 Jet Engine: Inlet Air System and Compressors - Ducts and Filters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5400	Inlet air ducts
CC GT units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5401	Inlet air vanes/nozzles
CC GT units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5402	Inlet air filters
CC GT units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5403	Inlet and exhaust cones
CC GT units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5404	Inlet air chillers
CC GT units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5405	Inlet air evaporative coolers
CC GT units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5406	Inlet air foggers
CC GT units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5409	Other inlet air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP compressor if only one.					

TABLE B01-70 Jet Engine: Miscellaneous (Jet Engine)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5600	Reduction gear
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5601	Load shaft and bearings
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5605	Main coupling between the turbine and generator
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5606	Clutch
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5610	Intercoolers
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5620	Regenerators
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5630	Heat shields
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5640	Fire detection and extinguishing system
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5641	Fire in unit
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5645	Jet Engine Control System - data highway
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5646	Jet Engine Control System - hardware problems (including card failure)
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5647	Jet Engine Control System - internal and termination wiring
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5648	Jet Engine Control System - logic problems
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5649	Jet Engine Control System - upgrades
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5650	Other controls and instrumentation problems
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5660	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5661	Engine/compressor washing
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5662	Engine exchange
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5665	Engine shafts and bearings
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5670	Hot end inspection
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5672	Boroscope inspection
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5674	General unit inspection
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5680	Vibration (not engine) in unit not attributable to bearings or other components
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5685	Engine vibration
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5686	Jet engine lockout

CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5690	Engine performance testing - individual engines (use code 9999 for total unit performance testing)
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5692	Turbine Overspeed Trip Test - Jet Engine
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5695	Synchronous condenser equipment
CC GT units	Jet Engine	Miscellaneous (Jet Engine)		5699	Other miscellaneous jet engine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-71 Jet Engine: Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Jet Engine	Turbine		5480	High pressure shaft
CC GT units	Jet Engine	Turbine		5481	High pressure bearings
CC GT units	Jet Engine	Turbine		5482	High pressure blades/buckets
CC GT units	Jet Engine	Turbine		5483	High pressure nozzles/vanes
CC GT units	Jet Engine	Turbine		5484	High pressure casing/expansion joint
CC GT units	Jet Engine	Turbine		5485	Interstage gas passages
CC GT units	Jet Engine	Turbine		5486	High pressure shaft seals
CC GT units	Jet Engine	Turbine		5487	Thrust bearing
CC GT units	Jet Engine	Turbine		5489	Other high pressure problems
CC GT units	Jet Engine	Turbine		5490	Low pressure shaft
CC GT units	Jet Engine	Turbine		5491	Low pressure bearings
CC GT units	Jet Engine	Turbine		5492	Low pressure blades/buckets
CC GT units	Jet Engine	Turbine		5493	Low pressure nozzles/vanes
CC GT units	Jet Engine	Turbine		5494	Low pressure casing/expansion joints
CC GT units	Jet Engine	Turbine		5497	Other low pressure problems
CC GT units	Jet Engine	Turbine		5498	Expansion joints
CC GT units	Jet Engine	Turbine		5499	Shaft seals
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP if only one.					

MISCELLANEOUS

TABLE B01-72 Miscellaneous: Instruments and Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

CC GT units	Miscellaneous	Instruments and Controls		6200	Combined cycle instruments and controls. (Report instruments and controls specific to the gas turbine, steam turbine, boiler, generator, or balance of plant using the codes for the appropriate piece of equipment.)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

PERFORMANCE

TABLE B01-73 Performance: Performance					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC GT units	Performance	Performance		9997	NERC Reliability Standard Requirement
CC GT units	Performance	Performance		9998	Black start testing
CC GT units	Performance	Performance		9999	Total unit performance testing (use appropriate codes for individual component testing)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

PERSONNEL OR PROCEDURAL ERRORS

TABLE B01-74 Personnel or Procedural Errors: Personnel or Procedural Errors					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC GT units	Personnel or Procedural Errors	Personnel or Procedural Errors		9900	Operator error
CC GT units	Personnel or Procedural Errors	Personnel or Procedural Errors		9910	Maintenance personnel error
CC GT units	Personnel or Procedural Errors	Personnel or Procedural Errors		9920	Contractor error
CC GT units	Personnel or Procedural Errors	Personnel or Procedural Errors		9930	Operating procedure error
CC GT units	Personnel or Procedural Errors	Personnel or Procedural Errors		9940	Maintenance procedure error
CC GT units	Personnel or Procedural Errors	Personnel or Procedural Errors		9950	Contractor procedure error
CC GT units	Personnel or Procedural Errors	Personnel or Procedural Errors		9960	Staff shortage
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

POLLUTION CONTROL EQUIPMENT

TABLE B01-75 Pollution Control Equipment: CO Reduction					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC GT units	Pollution Control Equipment	CO Reduction		8840	CO Active catalyst

CC GT units	Pollution Control Equipment	CO Reduction		8841	CO Support materials
CC GT units	Pollution Control Equipment	CO Reduction		8842	CO Plugging
CC GT units	Pollution Control Equipment	CO Reduction		8845	Other CO reduction problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-76 Pollution Control Equipment: Continuous Emissions Monitoring Systems (CEMS)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8700	CEMS Certification and Recertification
CC GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8710	SO2 analyzer problems
CC GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8720	NOx analyzer problems
CC GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8730	CO analyzer problems
CC GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8740	CO2 analyzer problems
CC GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8750	O2 analyzer problems
CC GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8760	Opacity monitor problems
CC GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8770	Flow monitor problems
CC GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8780	Data acquisition system problems
CC GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8790	Miscellaneous CEMS problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-77 Pollution Control Equipment: NOx Reduction Systems - Catalytic Air Heaters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8830	CAH NOx Active catalyst
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8831	CAH NOx Support materials
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8832	CAH NOx Plugging
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8835	Other CAH problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-78 Pollution Control Equipment: NOx Reduction Systems - Selective Catalytic Reduction Systems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8810	SCR NOx Reactor
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8811	SCR NOx Reagent
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8812	SCR NOx Catalyst
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8813	SCR NOx Injection grid piping/valves
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8814	SCR NOx Catalyst support material
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8815	SCR NOx Soot blowers
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8816	SCR NOx Plugging
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8817	SCR NOx Control system
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8820	SCR NOx Ammonia injection grid piping/valves
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8821	SCR NOx Ammonia tanks, piping and valves (not injection)
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8822	SCR NOx Ammonia air blowers
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8823	SCR NOx Other ammonia system problems
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8825	Other SCR NOx problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-79 Pollution Control Equipment: NOx Reduction Systems - Selective Non-Catalytic Reduction Systems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8800	SNCR NOx Reagent
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8801	SNCR NOx Carrier gas

CC GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8802	SNCR NOx Control system
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8803	SNCR Performance Testing
CC GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8809	Other SNCR NOx problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use code 0360 for Low NOx Burners.					

REGULATORY, SAFETY, ENVIRONMENTAL

Use these codes only for events not directly attributable to equipment failures. Inspections or testing of certain equipment due to regulation are reported using the appropriate equipment cause codes, and the fact that it was a regulatory requirement noted in the verbal description section.

TABLE B01-80 Regulatory, Safety, Environmental: Other Operating Environmental Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9660	Thermal discharge limits - fossil and nuclear
CC GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9663	Thermal discharge limits - gas turbines
CC GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9664	Thermal discharge limits - jet engines
CC GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9670	Noise limits (not for personnel safety) - fossil and nuclear
CC GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9673	Noise limits (not for personnel safety) - gas turbines
CC GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9674	Noise limits (not for personnel safety) - jet engines
CC GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9677	Noise limits testing - fossil
CC GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9678	Noise limits testing - gas turbines
CC GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9679	Noise limits testing - jet engines
CC GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9680	Fish kill - fossil and nuclear
CC GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9683	Fish kill - gas turbines

CC GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9684	Fish kill - jet engines
CC GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9690	Other miscellaneous operational environmental limits - fossil and nuclear
CC GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9693	Other miscellaneous operational environmental limits - gas turbines
CC GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9694	Other miscellaneous operational environmental limits - jet engines
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-81 Regulatory, Safety, Environmental: Regulatory

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Regulatory, Safety, Environmental	Regulatory		9504	Regulatory (environmental) proceedings and hearings - regulatory agency initiated
CC GT units	Regulatory, Safety, Environmental	Regulatory		9506	Regulatory (environmental) proceedings and hearings - intervenor initiated
CC GT units	Regulatory, Safety, Environmental	Regulatory		9510	Plant modifications strictly for compliance with new or changed regulatory requirements (scrubbers, cooling towers, etc.)
CC GT units	Regulatory, Safety, Environmental	Regulatory		9520	Oil spill in Gulf of Mexico (OMC)
CC GT units	Regulatory, Safety, Environmental	Regulatory		9590	Miscellaneous regulatory (this code is primarily intended for use with event contribution code 2 to indicate that a regulatory-related factor contributed to the primary cause of the event)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-82 Regulatory, Safety, Environmental: Safety

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

CC GT units	Regulatory, Safety, Environmental	Safety		9700	OSHA-related retrofit or inspection
CC GT units	Regulatory, Safety, Environmental	Safety		9720	Other safety problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-83 Regulatory, Safety, Environmental: Stack Emission

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Regulatory, Safety, Environmental	Stack Emission		9600	SO2 stack emissions - fossil
CC GT units	Regulatory, Safety, Environmental	Stack Emission		9603	SO2 stack emissions - gas turbines
CC GT units	Regulatory, Safety, Environmental	Stack Emission		9604	SO2 stack emissions - jet engines
CC GT units	Regulatory, Safety, Environmental	Stack Emission		9610	NOx stack emissions - fossil
CC GT units	Regulatory, Safety, Environmental	Stack Emission		9613	NOx stack emissions - gas turbines
CC GT units	Regulatory, Safety, Environmental	Stack Emission		9614	NOx stack emissions - jet engines
CC GT units	Regulatory, Safety, Environmental	Stack Emission		9616	CO stack emissions - fossil
CC GT units	Regulatory, Safety, Environmental	Stack Emission		9620	Particulate stack emissions - fossil
CC GT units	Regulatory, Safety, Environmental	Stack Emission		9623	Particulate stack emissions - gas turbines
CC GT units	Regulatory, Safety, Environmental	Stack Emission		9624	Particulate stack emissions - jet engines
CC GT units	Regulatory, Safety, Environmental	Stack Emission		9630	Opacity - fossil
CC GT units	Regulatory, Safety, Environmental	Stack Emission		9633	Opacity - gas turbines
CC GT units	Regulatory, Safety, Environmental	Stack Emission		9634	Opacity - jet engines
CC GT units	Regulatory, Safety, Environmental	Stack Emission		9650	Other stack/exhaust emissions - fossil (use codes 9200 to 9290 if fuel quality causes pollution

					control equipment problems that result in excess stack emissions)
CC GT units	Regulatory, Safety, Environmental	Stack Emission		9653	Other stack or exhaust emissions - gas turbines (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
CC GT units	Regulatory, Safety, Environmental	Stack Emission		9654	Other stack or exhaust emissions - jet engines (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
CC GT units	Regulatory, Safety, Environmental	Stack Emission		9656	Other stack or exhaust emissions testing - fossil
CC GT units	Regulatory, Safety, Environmental	Stack Emission		9657	Other stack or exhaust emissions testing - gas turbines
CC GT units	Regulatory, Safety, Environmental	Stack Emission		9658	Other stack or exhaust emissions testing - jet engines
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Include exhaust emissions.					

STEAM TURBINE

Besides the turbine, this set includes the steam stop/control valves, turbine control system, and the turbine auxiliaries. The extraction steam codes are contained in the Balance of Plant set.

TABLE B01-84 Steam Turbine: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Steam Turbine	Controls		4290	Hydraulic system pumps
CC GT units	Steam Turbine	Controls		4291	Hydraulic system coolers
CC GT units	Steam Turbine	Controls		4292	Hydraulic system filters
CC GT units	Steam Turbine	Controls		4293	Hydraulic system pipes and valves
CC GT units	Steam Turbine	Controls		4299	Other hydraulic system problems
CC GT units	Steam Turbine	Controls		4300	Turbine supervisory system (use codes 4290 to 4299 for hydraulic oil)
CC GT units	Steam Turbine	Controls		4301	Turbine governing system

CC GT units	Steam Turbine	Controls		4302	Turbine trip devices (including instruments)
CC GT units	Steam Turbine	Controls		4303	Exhaust hood and spray controls
CC GT units	Steam Turbine	Controls		4304	Automatic turbine control systems - mechanical
CC GT units	Steam Turbine	Controls		4305	Automatic turbine control systems - mechanical - hydraulic
CC GT units	Steam Turbine	Controls		4306	Automatic turbine control systems - electro-hydraulic - analog
CC GT units	Steam Turbine	Controls		4307	Automatic turbine control systems - electro-hydraulic - digital
CC GT units	Steam Turbine	Controls		4308	Automatic turbine control systems - digital control and monitoring
CC GT units	Steam Turbine	Controls		4309	Other turbine instrument and control problems
CC GT units	Steam Turbine	Controls		4310	Steam Turbine Control System - data highway
CC GT units	Steam Turbine	Controls		4311	Steam Turbine Control System - hardware problems (including card failure)
CC GT units	Steam Turbine	Controls		4312	Steam Turbine Control System - internal and termination wiring
CC GT units	Steam Turbine	Controls		4313	Steam Turbine Control System - logic problems
CC GT units	Steam Turbine	Controls		4314	Steam Turbine Control System - upgrades
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-85 Steam Turbine: High Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Steam Turbine	High Pressure Turbine		4000	Outer casing
CC GT units	Steam Turbine	High Pressure Turbine		4001	Inner casing
CC GT units	Steam Turbine	High Pressure Turbine		4009	Nozzle bolting
CC GT units	Steam Turbine	High Pressure Turbine		4010	Nozzles and nozzle blocks
CC GT units	Steam Turbine	High Pressure Turbine		4011	Diaphragms
CC GT units	Steam Turbine	High Pressure Turbine		4012	Buckets or blades
CC GT units	Steam Turbine	High Pressure Turbine		4013	Diaphragms unit and shroud type
CC GT units	Steam Turbine	High Pressure Turbine		4014	Bucket or blade fouling

CC GT units	Steam Turbine	High Pressure Turbine		4015	Wheels or spindles
CC GT units	Steam Turbine	High Pressure Turbine		4020	Shaft seals
CC GT units	Steam Turbine	High Pressure Turbine		4021	Dummy rings
CC GT units	Steam Turbine	High Pressure Turbine		4022	Gland rings
CC GT units	Steam Turbine	High Pressure Turbine		4030	Rotor shaft
CC GT units	Steam Turbine	High Pressure Turbine		4040	Bearings
CC GT units	Steam Turbine	High Pressure Turbine		4041	Thrust bearings
CC GT units	Steam Turbine	High Pressure Turbine		4099	Other high pressure turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-86 Steam Turbine: Intermediate Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Steam Turbine	Intermediate Pressure Turbine		4100	Outer casing
CC GT units	Steam Turbine	Intermediate Pressure Turbine		4101	Inner casing
CC GT units	Steam Turbine	Intermediate Pressure Turbine		4109	Nozzle bolting
CC GT units	Steam Turbine	Intermediate Pressure Turbine		4110	Nozzles and nozzle blocks
CC GT units	Steam Turbine	Intermediate Pressure Turbine		4111	Diaphragms
CC GT units	Steam Turbine	Intermediate Pressure Turbine		4112	Buckets or blades
CC GT units	Steam Turbine	Intermediate Pressure Turbine		4113	Bucket or blade fouling
CC GT units	Steam Turbine	Intermediate Pressure Turbine		4115	Wheels or spindles
CC GT units	Steam Turbine	Intermediate Pressure Turbine		4120	Shaft seals
CC GT units	Steam Turbine	Intermediate Pressure Turbine		4121	Dummy rings
CC GT units	Steam Turbine	Intermediate Pressure Turbine		4122	Gland rings
CC GT units	Steam Turbine	Intermediate Pressure Turbine		4130	Rotor shaft
CC GT units	Steam Turbine	Intermediate Pressure Turbine		4140	Bearings
CC GT units	Steam Turbine	Intermediate Pressure Turbine		4141	Thrust bearings
CC GT units	Steam Turbine	Intermediate Pressure Turbine		4199	Other intermediate pressure turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-87 Steam Turbine: Low Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Steam Turbine	Low Pressure Turbine		4200	Outer casing
CC GT units	Steam Turbine	Low Pressure Turbine		4201	Inner casing
CC GT units	Steam Turbine	Low Pressure Turbine		4209	Nozzle bolting
CC GT units	Steam Turbine	Low Pressure Turbine		4210	Nozzles and nozzle blocks

CC GT units	Steam Turbine	Low Pressure Turbine		4211	Diaphragms
CC GT units	Steam Turbine	Low Pressure Turbine		4212	Buckets or blades
CC GT units	Steam Turbine	Low Pressure Turbine		4213	Bucket or blade fouling
CC GT units	Steam Turbine	Low Pressure Turbine		4215	Wheels or spindles
CC GT units	Steam Turbine	Low Pressure Turbine		4220	Shaft seals
CC GT units	Steam Turbine	Low Pressure Turbine		4221	Dummy rings
CC GT units	Steam Turbine	Low Pressure Turbine		4222	Gland rings
CC GT units	Steam Turbine	Low Pressure Turbine		4230	Rotor shaft
CC GT units	Steam Turbine	Low Pressure Turbine		4240	Bearings
CC GT units	Steam Turbine	Low Pressure Turbine		4241	Thrust bearings
CC GT units	Steam Turbine	Low Pressure Turbine		4250	Other low pressure turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-88 Steam Turbine: Lube Oil

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Steam Turbine	Lube Oil		4280	Lube oil pumps
CC GT units	Steam Turbine	Lube Oil		4281	Lube oil coolers
CC GT units	Steam Turbine	Lube Oil		4282	Lube oil conditioners
CC GT units	Steam Turbine	Lube Oil		4283	Lube oil system valves and piping
CC GT units	Steam Turbine	Lube Oil		4284	Lube oil pump drive
CC GT units	Steam Turbine	Lube Oil		4289	Other lube oil system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Do not include bearing failures due to lube oil.					

TABLE B01-89 Steam Turbine: Miscellaneous (Steam Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4400	Major turbine overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
CC GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4401	Inspection
CC GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4402	Minor turbine overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
CC GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4410	Turning gear and motor
CC GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4411	Steam turbine gear box (single shaft configuration)

CC GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4412	Steam turbine clutch (single shaft configuration)
CC GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4415	Shaft coupling mechanism
CC GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4420	Vibration of the turbine generator unit that cannot be attributed to a specific cause such as bearings or blades (use this code for balance moves)
CC GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4430	Gland seal system
CC GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4450	Water induction
CC GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4460	Turbine overspeed trip test
CC GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4470	Differential expansion
CC GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4490	Turbine performance testing (use code 9999 for total unit performance testing)
CC GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4499	Other miscellaneous steam turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-90 Steam Turbine: Piping

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Steam Turbine	Piping		4270	Crossover or under piping
CC GT units	Steam Turbine	Piping		4279	Miscellaneous turbine piping
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B01-91 Steam Turbine: Valves

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC GT units	Steam Turbine	Valves		4260	Main stop valves
CC GT units	Steam Turbine	Valves		4261	Control valves
CC GT units	Steam Turbine	Valves		4262	Intercept valves
CC GT units	Steam Turbine	Valves		4263	Reheat stop valves
CC GT units	Steam Turbine	Valves		4264	Combined intercept valves
CC GT units	Steam Turbine	Valves		4265	Miscellaneous drain and vent valves
CC GT units	Steam Turbine	Valves		4266	Main stop valve testing
CC GT units	Steam Turbine	Valves		4267	Control valve testing
CC GT units	Steam Turbine	Valves		4268	Reheat/intercept valve testing

CC GT units	Steam Turbine	Valves		4269	Other turbine valves (including LP steam admission valves)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

Appendix B02: Index to Combined Cycle Steam Turbine Unit Cause Codes

COMBINED CYCLE STEAM TURBINE UNITS

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B02-1	Balance of Plant	Auxiliary Systems	Auxiliary Steam
B02-2	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems
B02-3	Balance of Plant	Auxiliary Systems	Fire Protection System
B02-4	Balance of Plant	Auxiliary Systems	Instrument Air
B02-5	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System
B02-6	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)
B02-7	Balance of Plant	Auxiliary Systems	Open Cooling Water System
B02-8	Balance of Plant	Auxiliary Systems	Seal Air Fans
B02-9	Balance of Plant	Auxiliary Systems	Service Air
B02-10	Balance of Plant	Auxiliary Systems	Service Water (Open System)
B02-11	Balance of Plant	Circulating Water Systems	
B02-12	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators
B02-13	Balance of Plant	Condensate System	Miscellaneous (Condensate System)
B02-14	Balance of Plant	Condensate System	Polishers/Chemical Addition
B02-15	Balance of Plant	Condensate System	Pumps, Piping, and Valves
B02-16	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals
B02-17	Balance of Plant	Condensing System	Condenser Controls
B02-18	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment
B02-19	Balance of Plant	Condensing System	Miscellaneous (Condensing System)
B02-20	Balance of Plant	Condensing System	Vacuum Equipment
B02-21	Balance of Plant	Electrical	
B02-22	Balance of Plant	Extraction Steam	
B02-23	Balance of Plant	Feedwater System	
B02-24	Balance of Plant	Heater Drain Systems	
B02-25	Balance of Plant	Miscellaneous (Balance of Plant)	
B02-26	Balance of Plant	Power Station Switchyard	
B02-27	Balance of Plant	Waste Water (zero discharge) Systems	
B02-28	Expander Turbine	Expander Turbine	
B02-29	External	Catastrophe	
B02-30	External	Economic	
B02-31	External	Fuel Quality	
B02-32	External	Miscellaneous (External)	

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B02-33	Gas Turbine	Auxiliary Systems	
B02-34	Gas Turbine	Exhaust Systems	
B02-35	Gas Turbine	Fuel, Ignition, and Combustion Systems	
B02-36	Gas Turbine	Inlet Air System and Compressors	Compressors
B02-37	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters
B02-38	Gas Turbine	Miscellaneous (Gas Turbine)	
B02-39	Gas Turbine	Turbine	
B02-40	Generator	Controls	
B02-41	Generator	Cooling System	
B02-42	Generator	Exciter	
B02-43	Generator	Generator	
B02-44	Generator	Miscellaneous (Generator)	
B02-45	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply
B02-46	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)
B02-47	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems	
B02-48	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Design Limitations	
B02-49	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)
B02-50	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)
B02-51	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures	
B02-52	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections	
B02-53	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation
B02-54	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown
B02-55	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam
B02-56	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators
B02-57	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam
B02-58	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass
B02-59	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)
B02-60	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks	
B02-61	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Water Condition	
B02-62	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)	
B02-63	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems	
B02-64	Inactive States	Inactive States	
B02-65	Jet Engine	Auxiliary Systems	
B02-66	Jet Engine	Exhaust Systems	
B02-67	Jet Engine	Fuel, Ignition, and Combustion Systems	
B02-68	Jet Engine	Inlet Air System and Compressors	Compressors

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B02-69	Jet Engine	Inlet Air System and Compressors	Ducts and Filters
B02-70	Jet Engine	Miscellaneous (Jet Engine)	
B02-71	Jet Engine	Turbine	
B02-72	Miscellaneous	Instruments and Controls	
B02-73	Performance	Performance	
B02-74	Personnel or Procedural Errors	Personnel or Procedural Errors	
B02-75	Pollution Control Equipment	CO Reduction	
B02-76	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)	
B02-77	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters
B02-78	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems
B02-79	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems
B02-80	Regulatory, Safety, Environmental	Other Operating Environmental Limitations	
B02-81	Regulatory, Safety, Environmental	Regulatory	
B02-82	Regulatory, Safety, Environmental	Safety	
B02-83	Regulatory, Safety, Environmental	Stack Emission	
B02-84	Steam Turbine	Controls	
B02-85	Steam Turbine	High Pressure Turbine	
B02-86	Steam Turbine	Intermediate Pressure Turbine	
B02-87	Steam Turbine	Low Pressure Turbine	
B02-88	Steam Turbine	Lube Oil	
B02-89	Steam Turbine	Miscellaneous (Steam Turbine)	
B02-90	Steam Turbine	Piping	
B02-91	Steam Turbine	Valves	

BALANCE OF PLANT

TABLE B02-1 Balance of Plant: Auxiliary Systems - Auxiliary Steam					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC steam units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3830	Auxiliary boiler
CC steam units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3831	Auxiliary steam piping
CC steam units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3832	Auxiliary steam valves
CC steam units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3833	Auxiliary steam controls and instruments
CC steam units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3834	Auxiliary boiler tube leaks
CC steam units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3835	Auxiliary boiler burner management system

CC steam units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3836	Steam transfer to other unit
CC steam units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3839	Other auxiliary steam problems (also see extraction steam codes 3520 to 3529; startup bypass codes 0630 to 0660; and soot blower steam code 0870)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-2 Balance of Plant: Auxiliary Systems - Closed Cooling Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3820	Closed cooling water pumps and motors
CC steam units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3821	Closed cooling water piping
CC steam units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3822	Closed cooling water valves
CC steam units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3823	Closed cooling water heat exchangers
CC steam units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3824	Closed cooling water system fouling
CC steam units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3825	Closed cooling water instrumentation
CC steam units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3826	Closed cooling water strainer
CC steam units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3829	Other closed cooling water system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-3 Balance of Plant: Auxiliary Systems - Fire Protection System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Auxiliary Systems	Fire Protection System	3860	Fire protection system pumps
CC steam units	Balance of Plant	Auxiliary Systems	Fire Protection System	3861	Fire protection system piping
CC steam units	Balance of Plant	Auxiliary Systems	Fire Protection System	3862	Fire protection system valves
CC steam units	Balance of Plant	Auxiliary Systems	Fire Protection System	3863	Fire protection system fouling
CC steam units	Balance of Plant	Auxiliary Systems	Fire Protection System	3864	Fire protection system instrumentation and controls
CC steam units	Balance of Plant	Auxiliary Systems	Fire Protection System	3869	Other fire protection system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-4 Balance of Plant: Auxiliary Systems - Instrument Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

CC steam units	Balance of Plant	Auxiliary Systems	Instrument Air	3850	Instrument air compressors
CC steam units	Balance of Plant	Auxiliary Systems	Instrument Air	3851	Instrument air piping
CC steam units	Balance of Plant	Auxiliary Systems	Instrument Air	3852	Instrument air valves
CC steam units	Balance of Plant	Auxiliary Systems	Instrument Air	3853	Instrument air dryers
CC steam units	Balance of Plant	Auxiliary Systems	Instrument Air	3854	N2 backup to instrument air
CC steam units	Balance of Plant	Auxiliary Systems	Instrument Air	3859	Other instrument air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-5 Balance of Plant: Auxiliary Systems - Low-pressure Gas Compression System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3870	Fuel Gas Compressor and Motors
CC steam units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3871	Fuel Gas Compressor Piping
CC steam units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3872	Fuel Gas Compressor Valves
CC steam units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3873	Fuel Gas Compressor Heat Exchangers
CC steam units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3874	Fuel Gas Compressor Controls and Instrumentation
CC steam units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3875	Fuel Gas Compressor Filters
CC steam units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3876	Fuel Gas Compressor Fire System
CC steam units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3879	Fuel Gas Compressor - other
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-6 Balance of Plant: Auxiliary Systems - Miscellaneous (Auxiliary Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3898	Miscellaneous plant auxiliary process and services instrumentation and controls
CC steam units	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3899	Other miscellaneous auxiliary system problems

CC steam units	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	6299	Other combined cycle block problems (Use other gas turbine problem codes, other steam turbine codes, etc., whenever appropriate.)
CC steam units	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	6399	Other coal gasification equipment problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-7 Balance of Plant: Auxiliary Systems - Open Cooling Water System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3800	Open cooling water pumps and motors
CC steam units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3801	Open cooling water piping
CC steam units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3802	Open cooling water valves
CC steam units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3803	Open cooling water heat exchangers
CC steam units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3804	Open cooling water system fouling
CC steam units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3805	Open cooling water system instrumentation
CC steam units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3806	Open cooling water strainer
CC steam units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3809	Other open cooling water problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-8 Balance of Plant: Auxiliary Systems - Seal Air Fans

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3880	Seal air fan
CC steam units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3881	Seal air fan drive - motor
CC steam units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3882	Seal air control dampers and drives
CC steam units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3883	Seal air filters
CC steam units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3889	Other seal air fan problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-9 Balance of Plant: Auxiliary Systems - Service Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Auxiliary Systems	Service Air	3840	Service air compressors
CC steam units	Balance of Plant	Auxiliary Systems	Service Air	3841	Service air piping

CC steam units	Balance of Plant	Auxiliary Systems	Service Air	3842	Service air valves
CC steam units	Balance of Plant	Auxiliary Systems	Service Air	3843	Service air dryers
CC steam units	Balance of Plant	Auxiliary Systems	Service Air	3849	Other service air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-10 Balance of Plant: Auxiliary Systems - Service Water (Open System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3810	Service water pumps and motors
CC steam units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3811	Service water piping
CC steam units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3812	Service water valves
CC steam units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3813	Service water heat exchangers
CC steam units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3814	Service water system fouling
CC steam units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3815	Service water strainer
CC steam units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3819	Other service water problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-11 Balance of Plant: Circulating Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Circulating Water Systems		3210	Circulating water pumps
CC steam units	Balance of Plant	Circulating Water Systems		3211	Circulating water pump motors
CC steam units	Balance of Plant	Circulating Water Systems		3220	Circulating water piping
CC steam units	Balance of Plant	Circulating Water Systems		3221	Circulating water piping fouling
CC steam units	Balance of Plant	Circulating Water Systems		3230	Circulating water valves
CC steam units	Balance of Plant	Circulating Water Systems		3231	Waterbox
CC steam units	Balance of Plant	Circulating Water Systems		3232	Condenser tube cleaning system including debris filter
CC steam units	Balance of Plant	Circulating Water Systems		3233	Circulating water priming system
CC steam units	Balance of Plant	Circulating Water Systems		3235	Cooling tower booster pump
CC steam units	Balance of Plant	Circulating Water Systems		3236	Cooling tower booster motor
CC steam units	Balance of Plant	Circulating Water Systems		3238	Cooling tower fan motors
CC steam units	Balance of Plant	Circulating Water Systems		3239	Cooling tower fan motors - variable speed
CC steam units	Balance of Plant	Circulating Water Systems		3240	Cooling tower fans
CC steam units	Balance of Plant	Circulating Water Systems		3241	Cooling tower efficiency below design
CC steam units	Balance of Plant	Circulating Water Systems		3242	Cooling tower fill damage
CC steam units	Balance of Plant	Circulating Water Systems		3243	Cooling tower icing

CC steam units	Balance of Plant	Circulating Water Systems		3244	Cooling tower fires
CC steam units	Balance of Plant	Circulating Water Systems		3245	Other cooling tower problems
CC steam units	Balance of Plant	Circulating Water Systems		3246	Cooling tower fouling
CC steam units	Balance of Plant	Circulating Water Systems		3247	Cooling tower instrumentation
CC steam units	Balance of Plant	Circulating Water Systems		3248	Cooling Tower Overhaul
CC steam units	Balance of Plant	Circulating Water Systems		3250	Circulating water system instruments and controls
CC steam units	Balance of Plant	Circulating Water Systems		3260	Traveling screens
CC steam units	Balance of Plant	Circulating Water Systems		3261	Traveling screen fouling
CC steam units	Balance of Plant	Circulating Water Systems		3269	Circulating water biological conditions (ie, zebra mussels)
CC steam units	Balance of Plant	Circulating Water Systems		3270	Intake system problems other than traveling screens
CC steam units	Balance of Plant	Circulating Water Systems		3271	Intake grating fouling
CC steam units	Balance of Plant	Circulating Water Systems		3272	Circulating water screenwash system
CC steam units	Balance of Plant	Circulating Water Systems		3273	Debris in circulating water from outside sources (leaves, mud, etc.)
CC steam units	Balance of Plant	Circulating Water Systems		3280	High circulating water temperature (not due to season, tower efficiency below design, or other listed equipment problem)
CC steam units	Balance of Plant	Circulating Water Systems		3281	Circulating water tempering system
CC steam units	Balance of Plant	Circulating Water Systems		3282	Circulating water cooling ponds
CC steam units	Balance of Plant	Circulating Water Systems		3285	Circulating water chemistry
CC steam units	Balance of Plant	Circulating Water Systems		3299	Other circulating water system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-12 Balance of Plant: Condensate System - Low/Intermediate Pressure Heater and Deaerators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3339	LP heater head leaks
CC steam units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3340	LP heater tube leaks
CC steam units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3341	Other LP heater - general

CC steam units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3342	IP heater tube leaks
CC steam units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3343	Other IP heater - general
CC steam units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3344	Deaerator (including level control)
CC steam units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3345	IP heater head leaks
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-13 Balance of Plant: Condensate System - Miscellaneous (Condensate System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3360	Condensate makeup and return (including storage tanks)
CC steam units	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3370	Condensate system controls and instrumentation (not hotwell level, heater level, or deaerator level controls; see codes 3150-3159, 3344, 3502).
CC steam units	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3380	Condensate coolers
CC steam units	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3399	Other miscellaneous condensate system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-14 Balance of Plant: Condensate System - Polishers/Chemical Addition

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Condensate System	Polishers/Chemical Addition	3350	Condensate polishing and filtering systems
CC steam units	Balance of Plant	Condensate System	Polishers/Chemical Addition	3351	Chemical addition systems
CC steam units	Balance of Plant	Condensate System	Polishers/Chemical Addition	3352	Feedwater chemistry (not specific to condenser, polishers, or chemical addition)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-15 Balance of Plant: Condensate System - Pumps, Piping, and Valves

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3300	Condensate water pre-treatment
CC steam units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3310	Condensate/hotwell pumps
CC steam units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3311	Condensate/hotwell pump motor
CC steam units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3312	Condensate booster pump
CC steam units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3313	Condensate booster pump motor
CC steam units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3314	Condensate booster pump motor - variable speed
CC steam units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3315	Condensate booster pump drive (other than 3313 and 3314)
CC steam units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3320	Condensate piping
CC steam units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3330	Condensate valves
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-16 Balance of Plant: Condensing System - Condenser Casing or Shell and Internals

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3120	Tube sheets
CC steam units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3121	Expansion joint
CC steam units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3122	Gaskets and seals
CC steam units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3123	Hot well
CC steam units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3124	Tube sheet fouling
CC steam units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3129	Other condenser casing or shell and internal problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-17 Balance of Plant: Condensing System - Condenser Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Condensing System	Condenser Controls	3150	Hot well level controls
CC steam units	Balance of Plant	Condensing System	Condenser Controls	3151	Vacuum pump and air ejector controls
CC steam units	Balance of Plant	Condensing System	Condenser Controls	3152	Air-cooled condenser controls

CC steam units	Balance of Plant	Condensing System	Condenser Controls	3159	Other condensing system controls and instruments
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-18 Balance of Plant: Condensing System - Condenser Tubes and Support Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3110	Condenser tube leaks
CC steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3111	Condenser tube fouling shell side
CC steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3112	Condenser tube fouling tube side
CC steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3113	Condenser tube and water box cleaning (including circulating water flow reversal)
CC steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3114	Air-cooled condenser tubes
CC steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3115	Air-cooled condenser pumps
CC steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3116	Air-cooled condenser fans
CC steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3117	Air-cooled condenser fan motors
CC steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3118	Other Air-cooled condenser problems
CC steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3119	Other condenser tube casing or shell and internal problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-19 Balance of Plant: Condensing System - Miscellaneous (Condensing System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3170	Condenser inspection (use code 3110 to report looking for tube leaks)
CC steam units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3171	Air-cooled condenser inspections
CC steam units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3180	Major condenser overhaul
CC steam units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3185	Water side cathodic protection

CC steam units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3186	Auxiliary condenser and associated equipment
CC steam units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3190	Air leakage (for losses not attributable to previously noted equipment related codes)
CC steam units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3199	Other miscellaneous condensing system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-20 Balance of Plant: Condensing System - Vacuum Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Condensing System	Vacuum Equipment	3130	Air ejectors
CC steam units	Balance of Plant	Condensing System	Vacuum Equipment	3131	Air ejector piping and valves
CC steam units	Balance of Plant	Condensing System	Vacuum Equipment	3132	Inter and after condensers
CC steam units	Balance of Plant	Condensing System	Vacuum Equipment	3133	Vacuum pumps
CC steam units	Balance of Plant	Condensing System	Vacuum Equipment	3134	Vacuum pump piping and valves
CC steam units	Balance of Plant	Condensing System	Vacuum Equipment	3135	Vacuum pump motor and auxiliaries
CC steam units	Balance of Plant	Condensing System	Vacuum Equipment	3139	Other air extraction system problems - general
CC steam units	Balance of Plant	Condensing System	Vacuum Equipment	3149	Loss of vacuum not attributable to a particular component such as air ejectors or valves, or high back pressure not attributable to high circulating water temperature, or vacuum losses from a known cause.
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-21 Balance of Plant: Electrical

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Electrical		3600	Switchyard transformers and associated cooling systems - external (OMC)
CC steam units	Balance of Plant	Electrical		3601	Switchyard transformers and associated cooling systems - external (not OMC)
CC steam units	Balance of Plant	Electrical		3610	Switchyard circuit breakers - external (not OMC)

CC steam units	Balance of Plant	Electrical		3611	Switchyard circuit breakers - external (OMC)
CC steam units	Balance of Plant	Electrical		3612	Switchyard system protection devices - external (OMC)
CC steam units	Balance of Plant	Electrical		3613	Switchyard system protection devices - external (not OMC)
CC steam units	Balance of Plant	Electrical		3618	Other switchyard equipment - external (not OMC)
CC steam units	Balance of Plant	Electrical		3619	Other switchyard equipment - external (OMC)
CC steam units	Balance of Plant	Electrical		3620	Main transformer
CC steam units	Balance of Plant	Electrical		3621	Unit auxiliaries transformer
CC steam units	Balance of Plant	Electrical		3622	Station service startup transformer
CC steam units	Balance of Plant	Electrical		3623	Auxiliary generators
CC steam units	Balance of Plant	Electrical		3624	Auxiliary generator voltage supply system
CC steam units	Balance of Plant	Electrical		3629	Other switchyard or high voltage system problems - external
CC steam units	Balance of Plant	Electrical		3630	400-700 volt transformers
CC steam units	Balance of Plant	Electrical		3631	400-700 volt circuit breakers
CC steam units	Balance of Plant	Electrical		3632	400-700 volt conductors and buses
CC steam units	Balance of Plant	Electrical		3633	400-700 volt insulators
CC steam units	Balance of Plant	Electrical		3634	400-700 volt protection devices
CC steam units	Balance of Plant	Electrical		3639	Other 400-700 volt problems
CC steam units	Balance of Plant	Electrical		3640	AC instrument power transformers
CC steam units	Balance of Plant	Electrical		3641	AC Circuit breakers
CC steam units	Balance of Plant	Electrical		3642	AC Conductors and buses
CC steam units	Balance of Plant	Electrical		3643	AC Inverters
CC steam units	Balance of Plant	Electrical		3644	AC Protection devices
CC steam units	Balance of Plant	Electrical		3649	Other AC instrument power problems
CC steam units	Balance of Plant	Electrical		3650	DC instrument power battery chargers
CC steam units	Balance of Plant	Electrical		3651	DC circuit breakers
CC steam units	Balance of Plant	Electrical		3652	DC conductors and buses
CC steam units	Balance of Plant	Electrical		3653	DC protection devices
CC steam units	Balance of Plant	Electrical		3659	Other DC power problems
CC steam units	Balance of Plant	Electrical		3660	4000-7000 volt transformers
CC steam units	Balance of Plant	Electrical		3661	4000-7000 volt circuit breakers
CC steam units	Balance of Plant	Electrical		3662	4000-7000 volt conductors and buses

CC steam units	Balance of Plant	Electrical		3663	4000-7000 volt insulators
CC steam units	Balance of Plant	Electrical		3664	4000-7000 volt protection devices
CC steam units	Balance of Plant	Electrical		3669	Other 4000-7000 volt problems
CC steam units	Balance of Plant	Electrical		3670	12-15kV transformers
CC steam units	Balance of Plant	Electrical		3671	12-15kV circuit breakers
CC steam units	Balance of Plant	Electrical		3672	12-15kV conductors and buses
CC steam units	Balance of Plant	Electrical		3673	12-15kV insulators
CC steam units	Balance of Plant	Electrical		3674	12-15kV protection devices
CC steam units	Balance of Plant	Electrical		3679	Other 12-15kV problems
CC steam units	Balance of Plant	Electrical		3680	Other voltage transformers
CC steam units	Balance of Plant	Electrical		3681	Other voltage circuit breakers
CC steam units	Balance of Plant	Electrical		3682	Other voltage conductors and buses
CC steam units	Balance of Plant	Electrical		3683	Other voltage insulators
CC steam units	Balance of Plant	Electrical		3684	Other voltage protection devices
CC steam units	Balance of Plant	Electrical		3689	Other voltage problems
CC steam units	Balance of Plant	Electrical		3690	Station Service Power Distribution System, General
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-22 Balance of Plant: Extraction Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Extraction Steam		3520	HP Extraction steam piping
CC steam units	Balance of Plant	Extraction Steam		3521	HP Extraction steam valves
CC steam units	Balance of Plant	Extraction Steam		3522	HP Extraction steam instruments and controls
CC steam units	Balance of Plant	Extraction Steam		3529	Other HP extraction steam system problems
CC steam units	Balance of Plant	Extraction Steam		3530	IP Extraction steam piping
CC steam units	Balance of Plant	Extraction Steam		3531	IP Extraction steam valves
CC steam units	Balance of Plant	Extraction Steam		3532	IP Extraction steam instruments and controls
CC steam units	Balance of Plant	Extraction Steam		3539	Other IP extraction steam system problems
CC steam units	Balance of Plant	Extraction Steam		3540	LP Extraction steam piping
CC steam units	Balance of Plant	Extraction Steam		3541	LP Extraction steam valves
CC steam units	Balance of Plant	Extraction Steam		3542	LP Extraction steam instruments and controls

CC steam units	Balance of Plant	Extraction Steam		3549	Other LP extraction steam system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-23 Balance of Plant: Feedwater System					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC steam units	Balance of Plant	Feedwater System		3401	Startup feedwater pump
CC steam units	Balance of Plant	Feedwater System		3402	Startup feedwater pump drives - all types
CC steam units	Balance of Plant	Feedwater System		3407	Feedwater pump suction screens
CC steam units	Balance of Plant	Feedwater System		3408	Feedwater pump drive - local controls
CC steam units	Balance of Plant	Feedwater System		3409	Feedwater pump drive motor - variable speed
CC steam units	Balance of Plant	Feedwater System		3410	Feedwater pump
CC steam units	Balance of Plant	Feedwater System		3411	Feedwater pump drive - motor
CC steam units	Balance of Plant	Feedwater System		3412	Feedwater pump drive - steam turbine
CC steam units	Balance of Plant	Feedwater System		3413	Feedwater pump coupling and drive shaft
CC steam units	Balance of Plant	Feedwater System		3414	Feedwater pump local controls
CC steam units	Balance of Plant	Feedwater System		3415	Feedwater pump/drive lube oil system
CC steam units	Balance of Plant	Feedwater System		3416	Other feedwater pump problems
CC steam units	Balance of Plant	Feedwater System		3417	Feedwater pump drive - main shaft
CC steam units	Balance of Plant	Feedwater System		3418	Feedwater pump drive - other
CC steam units	Balance of Plant	Feedwater System		3419	Feedwater pump drive - gear
CC steam units	Balance of Plant	Feedwater System		3420	Feedwater piping and supports
CC steam units	Balance of Plant	Feedwater System		3430	Feedwater regulating (boiler level control) valve
CC steam units	Balance of Plant	Feedwater System		3431	Other feedwater valves
CC steam units	Balance of Plant	Feedwater System		3439	HP heater head leaks
CC steam units	Balance of Plant	Feedwater System		3440	High pressure heater tube leaks
CC steam units	Balance of Plant	Feedwater System		3441	Other high pressure heater problems (see condensate system for LP and IP heater codes)
CC steam units	Balance of Plant	Feedwater System		3451	Feedwater booster pump suction screens
CC steam units	Balance of Plant	Feedwater System		3452	Feedwater booster pump drive - local controls

CC steam units	Balance of Plant	Feedwater System		3453	Feedwater booster pump drive motor - variable speed
CC steam units	Balance of Plant	Feedwater System		3454	Feedwater booster pump
CC steam units	Balance of Plant	Feedwater System		3455	Feedwater booster pump drive - motor
CC steam units	Balance of Plant	Feedwater System		3456	Feedwater booster pump drive - steam turbine
CC steam units	Balance of Plant	Feedwater System		3457	Feedwater booster pump coupling and drive shaft
CC steam units	Balance of Plant	Feedwater System		3458	Feedwater booster pump local controls
CC steam units	Balance of Plant	Feedwater System		3459	Feedwater booster pump/drive lube oil system
CC steam units	Balance of Plant	Feedwater System		3460	Other feedwater booster pump problems
CC steam units	Balance of Plant	Feedwater System		3461	Feedwater booster pump drive - main shaft
CC steam units	Balance of Plant	Feedwater System		3462	Feedwater booster pump drive - other
CC steam units	Balance of Plant	Feedwater System		3463	Feedwater booster pump drive - gear
CC steam units	Balance of Plant	Feedwater System		3499	Other feedwater system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Excluding extraction or drain systems.					

TABLE B02-24 Balance of Plant: Heater Drain Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Heater Drain Systems		3501	Heater drain pumps
CC steam units	Balance of Plant	Heater Drain Systems		3502	Heater level control
CC steam units	Balance of Plant	Heater Drain Systems		3503	Heater drain piping
CC steam units	Balance of Plant	Heater Drain Systems		3504	Heater drain valves
CC steam units	Balance of Plant	Heater Drain Systems		3505	Heater drain pump drive
CC steam units	Balance of Plant	Heater Drain Systems		3509	Other heater drain system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-25 Balance of Plant: Miscellaneous (Balance of Plant)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3950	Process computer

CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3960	Thermal derating (thermal efficiency losses in balance of plant when specific cause(s) unknown)
CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3970	Distributive Control System (DCS) - process computer
CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3971	DCS - data highway
CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3972	DCS - hardware problems (including card failure)
CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3973	DCS - internal and termination wiring
CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3974	DCS - logic problems
CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3975	DCS - upgrades
CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3979	Other DCS problems
CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3980	Programmable Logic Controller (PLC)
CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3981	PLC - data highway
CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3982	PLC - hardware problems (including card failure)
CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3983	PLC - internal and termination wiring
CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3984	PLC - logic problems
CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3985	PLC - upgrades
CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3989	Other PLC problems
CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3995	Powerhouse heating and ventilating systems
CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3996	Air conditioning systems - rooms and areas
CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3998	Balance of plant overhaul/outage
CC steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3999	Other miscellaneous balance of plant problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-26 Balance of Plant: Power Station Switchyard

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Power Station Switchyard		3700	Power Station switchyard (non generating unit equipment)
CC steam units	Balance of Plant	Power Station Switchyard		3710	Transmission line (connected to powerhouse switchyard to 1st Substation)

CC steam units	Balance of Plant	Power Station Switchyard		3720	Transmission equipment at the 1st substation (see code 9300 if applicable)
CC steam units	Balance of Plant	Power Station Switchyard		3730	Transmission equipment beyond the 1st substation (see code 9300 if applicable)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-27 Balance of Plant: Waste Water (zero discharge) Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Balance of Plant	Waste Water (zero discharge) Systems		3290	Waste water (zero discharge) tanks, pumps, and motors
CC steam units	Balance of Plant	Waste Water (zero discharge) Systems		3291	Waste water (zero discharge) system fouling
CC steam units	Balance of Plant	Waste Water (zero discharge) Systems		3292	Waste water (zero discharge) piping
CC steam units	Balance of Plant	Waste Water (zero discharge) Systems		3293	Waste water (zero discharge) valves
CC steam units	Balance of Plant	Waste Water (zero discharge) Systems		3294	Waste water (zero discharge) controls and instrumentation
CC steam units	Balance of Plant	Waste Water (zero discharge) Systems		3295	Other waste water (zero discharge) problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

EXPANDER TURBINE

TABLE B02-28 Expander Turbine: Expander Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Expander Turbine	Expander Turbine		7800	Couplings
CC steam units	Expander Turbine	Expander Turbine		7810	Shaft
CC steam units	Expander Turbine	Expander Turbine		7820	Bearings
CC steam units	Expander Turbine	Expander Turbine		7830	Blades
CC steam units	Expander Turbine	Expander Turbine		7840	Discs
CC steam units	Expander Turbine	Expander Turbine		7850	Spacers
CC steam units	Expander Turbine	Expander Turbine		7860	Nozzles/vanes
CC steam units	Expander Turbine	Expander Turbine		7870	Heat shields
CC steam units	Expander Turbine	Expander Turbine		7880	Exhaust diffusers

CC steam units	Expander Turbine	Expander Turbine		7890	Seal oil system and seals
CC steam units	Expander Turbine	Expander Turbine		7900	Inner casing
CC steam units	Expander Turbine	Expander Turbine		7910	Outer exhaust casing
CC steam units	Expander Turbine	Expander Turbine		7920	Lube oil system
CC steam units	Expander Turbine	Expander Turbine		7930	Controls and instrumentation
CC steam units	Expander Turbine	Expander Turbine		7940	Evactor
CC steam units	Expander Turbine	Expander Turbine		7950	Major overhaul
CC steam units	Expander Turbine	Expander Turbine		7960	Other expander turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

EXTERNAL

Use this set of codes to report events caused by external factors (flood, lightning, etc.); economic factors (lack of fuel, labor strikes, etc.); operator training; and transmission system problems external to the plant.

TABLE B02-29 External: Catastrophe

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	External	Catastrophe		9000	Flood
CC steam units	External	Catastrophe		9001	Drought
CC steam units	External	Catastrophe		9010	Fire including wildfires, not related to a specific component
CC steam units	External	Catastrophe		9020	Lightning
CC steam units	External	Catastrophe		9025	Geomagnetic disturbance
CC steam units	External	Catastrophe		9030	Earthquake
CC steam units	External	Catastrophe		9031	Tornado
CC steam units	External	Catastrophe		9035	Hurricane
CC steam units	External	Catastrophe		9036	Storms (ice, snow, etc)
CC steam units	External	Catastrophe		9040	Other catastrophe
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-30 External: Economic

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	External	Economic		0	Reserve shutdown
CC steam units	External	Economic		9130	Failure of fuel supplier to fulfill contractual obligations or a pre-

					arranged deal due to physical fuel disruptions or operational impairments (e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)
CC steam units	External	Economic		9131	Lack of fuel – due to contractual or tariff provisions that allow for service interruption or price fluctuations during peak demand periods.
CC steam units	External	Economic		9134	Fuel conservation
CC steam units	External	Economic		9136	Problems with Primary Fuel for Units with Secondary Fuel Operation
CC steam units	External	Economic		9137	Ground water or other water supply problems
CC steam units	External	Economic		9140	Plant modifications to burn different fuel that are not regulatory mandated
CC steam units	External	Economic		9150	Labor strikes company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.
CC steam units	External	Economic		9151	Labor strikes direct plant management grievances that result in a walkout or strike are under plant management control.
CC steam units	External	Economic		9160	Other economic problems
CC steam units	External	Economic		9180	Economic (for internal use at plants only)
CC steam units	External	Economic		9181	Economic (for internal use at plants only)
CC steam units	External	Economic		9182	Economic (for internal use at plants only)
CC steam units	External	Economic		9183	Economic (for internal use at plants only)
CC steam units	External	Economic		9184	Economic (for internal use at plants only)
CC steam units	External	Economic		9185	Economic (for internal use at plants only)

CC steam units	External	Economic		9186	Economic (for internal use at plants only)
CC steam units	External	Economic		9187	Economic (for internal use at plants only)
CC steam units	External	Economic		9188	Economic (for internal use at plants only)
CC steam units	External	Economic		9189	Economic (for internal use at plants only)
CC steam units	External	Economic		9190	Economic (for internal use at plants only)
CC steam units	External	Economic		9191	Economic (for internal use at plants only)
CC steam units	External	Economic		9192	Economic (for internal use at plants only)
CC steam units	External	Economic		9193	Economic (for internal use at plants only)
CC steam units	External	Economic		9194	Economic (for internal use at plants only)
CC steam units	External	Economic		9195	Economic (for internal use at plants only)
CC steam units	External	Economic		9196	Economic (for internal use at plants only)
CC steam units	External	Economic		9197	Economic (for internal use at plants only)
CC steam units	External	Economic		9198	Economic (for internal use at plants only)
CC steam units	External	Economic		9199	Economic (for internal use at plants only)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-31 External: Fuel Quality

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	External	Fuel Quality		9200	High ash content (OMC)
CC steam units	External	Fuel Quality		9201	High ash content (not OMC)
CC steam units	External	Fuel Quality		9205	Poor quality natural gas fuel, low heat content
CC steam units	External	Fuel Quality		9220	High sulfur content (OMC)
CC steam units	External	Fuel Quality		9221	High sulfur content (not OMC)

CC steam units	External	Fuel Quality		9230	High vanadium content (OMC)
CC steam units	External	Fuel Quality		9231	High vanadium content (not OMC)
CC steam units	External	Fuel Quality		9240	High sodium content (OMC)
CC steam units	External	Fuel Quality		9241	High sodium content (not OMC)
CC steam units	External	Fuel Quality		9260	Low BTU oil (OMC)
CC steam units	External	Fuel Quality		9261	Low BTU oil (not OMC)
CC steam units	External	Fuel Quality		9290	Other fuel quality problems (OMC)
CC steam units	External	Fuel Quality		9291	Other fuel quality problems (not OMC)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use code 9600 to 9650 if the fuel quality results in excess stack emissions through no fault in the pollution control equipment. Use the appropriate equipment code to report fouling and slagging.					

TABLE B02-32 External: Miscellaneous (External)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	External	Miscellaneous (External)		9300	Transmission system problems other than catastrophes (do not include switchyard problems in this category; see codes 3600 to 3629, 3720 to 3730)
CC steam units	External	Miscellaneous (External)		9310	Operator training
CC steam units	External	Miscellaneous (External)		9320	Other miscellaneous external problems
CC steam units	External	Miscellaneous (External)		9340	Synchronous Condenser Operation
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

GAS TURBINE

TABLE B02-33 Gas Turbine: Auxiliary Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Gas Turbine	Auxiliary Systems		5110	Lube oil system - general
CC steam units	Gas Turbine	Auxiliary Systems		5111	Lube oil pumps
CC steam units	Gas Turbine	Auxiliary Systems		5112	Lube oil coolers
CC steam units	Gas Turbine	Auxiliary Systems		5113	Lube oil valves/piping
CC steam units	Gas Turbine	Auxiliary Systems		5114	Lube oil filters
CC steam units	Gas Turbine	Auxiliary Systems		5115	Oil vapor extractor
CC steam units	Gas Turbine	Auxiliary Systems		5116	Power Augmentation System Equipment
CC steam units	Gas Turbine	Auxiliary Systems		5117	Power augmentation piping
CC steam units	Gas Turbine	Auxiliary Systems		5118	Power augmentation valves

CC steam units	Gas Turbine	Auxiliary Systems		5119	Power augmentation controls
CC steam units	Gas Turbine	Auxiliary Systems		5120	Hydraulic oil system
CC steam units	Gas Turbine	Auxiliary Systems		5121	Hydraulic oil system pumps
CC steam units	Gas Turbine	Auxiliary Systems		5122	Hydraulic oil system piping/valves
CC steam units	Gas Turbine	Auxiliary Systems		5130	Starting system (including motor)
CC steam units	Gas Turbine	Auxiliary Systems		5140	Battery and charger system
CC steam units	Gas Turbine	Auxiliary Systems		5150	Turning gear and motor
CC steam units	Gas Turbine	Auxiliary Systems		5151	Load gear compartment
CC steam units	Gas Turbine	Auxiliary Systems		5160	Cooling and seal air system
CC steam units	Gas Turbine	Auxiliary Systems		5170	Cooling water system
CC steam units	Gas Turbine	Auxiliary Systems		5180	Anti-icing system
CC steam units	Gas Turbine	Auxiliary Systems		5190	Other auxiliary system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-34 Gas Turbine: Exhaust Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Gas Turbine	Exhaust Systems		5100	Chamber
CC steam units	Gas Turbine	Exhaust Systems		5101	Hoods
CC steam units	Gas Turbine	Exhaust Systems		5102	Vanes/nozzles
CC steam units	Gas Turbine	Exhaust Systems		5103	Silencer
CC steam units	Gas Turbine	Exhaust Systems		5104	Cones
CC steam units	Gas Turbine	Exhaust Systems		5105	Diverter Dampers
CC steam units	Gas Turbine	Exhaust Systems		5106	Exhaust Stack
CC steam units	Gas Turbine	Exhaust Systems		5108	High engine exhaust temperature
CC steam units	Gas Turbine	Exhaust Systems		5109	Other exhaust problems (including high exhaust system temperature not attributable to a specific problem)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-35 Gas Turbine: Fuel, Ignition, and Combustion Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5040	Fuel tanks
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5041	Fuel piping and valves

CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5042	Fuel nozzles/vanes
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5043	Fuel filters
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5044	Liquid fuel oil pump
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5046	Liquid fuel oil transfer/forwarding pump
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5047	Liquid fuel purge system
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5048	Gas fuel system including controls and instrumentation
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5049	Other fuel system problems
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5050	Ignition system
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5051	Pilot fuel piping and valves
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5052	Pilot fuel nozzles/vanes
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5053	Pilot fuel filters
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5054	Water injection system
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5060	Atomizing air system
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5065	NOx water injection system including pump
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5066	NOx steam injection system
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5070	Combustor casing
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5071	Combustor liner
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5072	Combustor caps
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5073	Flame scanners

CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5074	Flashback including instrumentation
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5075	Blade path temperature spread
CC steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5079	Other combustor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-36 Gas Turbine: Inlet Air System and Compressors - Compressors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5010	High pressure shaft
CC steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5011	High pressure bearings
CC steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5012	High pressure blades/buckets
CC steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5013	Compressor casing and bolts
CC steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5014	Compressor diaphragms
CC steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5015	Compressor seals
CC steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5016	High pressure compressor bleed valves
CC steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5017	Low pressure compressor bleed valves
CC steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5019	Other high pressure problems
CC steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5020	Low pressure shaft
CC steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5021	Low pressure bearings
CC steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5022	Low pressure blades/buckets
CC steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5029	Other low pressure problems
CC steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5030	Supercharging fans
CC steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5035	Compressor washing
CC steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5036	Compressor shaft and bearings for two-shaft machines
CC steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5037	Inlet bleed heat valve
CC steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5039	Other compressor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-37 Gas Turbine: Inlet Air System and Compressors - Ducts and Filters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5000	Inlet air ducts

CC steam units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5001	Inlet air vanes/nozzles
CC steam units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5002	Inlet air filters
CC steam units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5003	Inlet cone
CC steam units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5004	Inlet air chillers
CC steam units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5005	Inlet air evaporative coolers
CC steam units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5006	Inlet air foggers
CC steam units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5009	Other inlet air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-38 Gas Turbine: Miscellaneous (Gas Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5200	Reduction gear
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5201	Load shaft and bearings
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5205	Main coupling between the turbine and generator
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5206	Clutch
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5210	Intercoolers
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5220	Regenerators
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5230	Heat shields
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5240	Fire detection and extinguishing system (including hazardous gas detection system)
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5241	Fire in unit
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5245	Gas Turbine Control System - data highway
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5246	Gas Turbine Control System - hardware problems (including card failure)
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5247	Gas Turbine Control System - internal and termination wiring
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5248	Gas Turbine Control System - logic problems
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5249	Gas Turbine Control System - upgrades
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5250	Other controls and instrumentation problems
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5255	Computer

CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5260	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5261	Gas turbine/compressor washing
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5262	Gas turbine exchange
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5269	Combustion Inspection (CI)
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5270	Hot end inspection
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5272	Boroscope inspection
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5274	General unit inspection
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5280	Vibration (not engine) in unit not attributable to bearings or other components
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5285	Gas turbine vibration
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5286	Gas turbine lockout
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5290	Gas turbine performance testing - individual engines (use code 9999 for total unit performance testing)
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5292	Turbine Overspeed Trip Test - Gas Turbine
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5295	Synchronous condenser equipment
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5298	Main gas filter
CC steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5299	Other miscellaneous gas turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-39 Gas Turbine: Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Gas Turbine	Turbine		5080	High pressure shaft
CC steam units	Gas Turbine	Turbine		5081	High pressure bearings
CC steam units	Gas Turbine	Turbine		5082	High pressure blades/buckets
CC steam units	Gas Turbine	Turbine		5083	High pressure nozzles/vanes
CC steam units	Gas Turbine	Turbine		5084	High pressure casing/expansion joints
CC steam units	Gas Turbine	Turbine		5085	Interstage gas passages - HP
CC steam units	Gas Turbine	Turbine		5086	High pressure shaft seals
CC steam units	Gas Turbine	Turbine		5087	Thrust bearing
CC steam units	Gas Turbine	Turbine		5088	Gas turbine cooling system
CC steam units	Gas Turbine	Turbine		5089	Other high pressure problems
CC steam units	Gas Turbine	Turbine		5090	Low pressure shaft

CC steam units	Gas Turbine	Turbine		5091	Low pressure bearings
CC steam units	Gas Turbine	Turbine		5092	Low pressure blades/buckets
CC steam units	Gas Turbine	Turbine		5093	Low pressure nozzles/vanes
CC steam units	Gas Turbine	Turbine		5094	Low pressure casing/expansion joints
CC steam units	Gas Turbine	Turbine		5095	Interstage gas passages - LP
CC steam units	Gas Turbine	Turbine		5096	Low pressure shaft seals
CC steam units	Gas Turbine	Turbine		5097	Other low pressure problems
CC steam units	Gas Turbine	Turbine		5098	Expansion joints
CC steam units	Gas Turbine	Turbine		5099	HP to LP coupling
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP if only one.					

GENERATOR

This set of codes contains the generator, exciter, generator cooling systems, and generator controls. Note the main leads up to and includes the generator output breaker in this set of codes.

TABLE B02-40 Generator: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Generator	Controls		4700	Generator voltage control
CC steam units	Generator	Controls		4710	Generator metering devices
CC steam units	Generator	Controls		4720	Generator synchronization equipment
CC steam units	Generator	Controls		4730	Generator current and potential transformers
CC steam units	Generator	Controls		4740	Emergency generator trip devices
CC steam units	Generator	Controls		4750	Other generator controls and metering problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-41 Generator: Cooling System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Generator	Cooling System		4610	Hydrogen cooling system piping and valves
CC steam units	Generator	Cooling System		4611	Hydrogen coolers
CC steam units	Generator	Cooling System		4612	Hydrogen storage system
CC steam units	Generator	Cooling System		4613	Hydrogen seals
CC steam units	Generator	Cooling System		4619	Other hydrogen system problems
CC steam units	Generator	Cooling System		4620	Air cooling system

CC steam units	Generator	Cooling System		4630	Liquid cooling system
CC steam units	Generator	Cooling System		4640	Seal oil system and seals
CC steam units	Generator	Cooling System		4650	Other cooling system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Report failures caused by water leaks into generator as codes 4500, 4510, etc.					

TABLE B02-42 Generator: Exciter

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Generator	Exciter		4600	Exciter drive - motor
CC steam units	Generator	Exciter		4601	Exciter field rheostat
CC steam units	Generator	Exciter		4602	Exciter commutator and brushes
CC steam units	Generator	Exciter		4603	Solid state exciter element
CC steam units	Generator	Exciter		4604	Exciter drive - shaft
CC steam units	Generator	Exciter		4605	Exciter transformer
CC steam units	Generator	Exciter		4609	Other exciter problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-43 Generator: Generator

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Generator	Generator		4500	Rotor windings (including damper windings and fan blades on hydro units)
CC steam units	Generator	Generator		4510	Rotor collector rings
CC steam units	Generator	Generator		4511	Rotor, General
CC steam units	Generator	Generator		4512	Retaining Rings
CC steam units	Generator	Generator		4520	Stator windings, bushings, and terminals
CC steam units	Generator	Generator		4530	Stator core iron
CC steam units	Generator	Generator		4535	Stator, General
CC steam units	Generator	Generator		4536	Generator Heaters
CC steam units	Generator	Generator		4540	Brushes and brush rigging
CC steam units	Generator	Generator		4550	Generator bearings and lube oil system (including thrust bearings on hydro units)
CC steam units	Generator	Generator		4551	Generator bearings
CC steam units	Generator	Generator		4552	Generator lube oil system

CC steam units	Generator	Generator		4555	Bearing cooling system
CC steam units	Generator	Generator		4560	Generator vibration (excluding vibration due to failed bearing and other components)
CC steam units	Generator	Generator		4570	Generator casing
CC steam units	Generator	Generator		4580	Generator end bells and bolting
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-44 Generator: Miscellaneous (Generator)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Generator	Miscellaneous (Generator)		4800	Generator main leads
CC steam units	Generator	Miscellaneous (Generator)		4805	Generator Bus Duct Cooling System
CC steam units	Generator	Miscellaneous (Generator)		4810	Generator output breaker
CC steam units	Generator	Miscellaneous (Generator)		4830	Major generator overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
CC steam units	Generator	Miscellaneous (Generator)		4831	Minor generator overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
CC steam units	Generator	Miscellaneous (Generator)		4840	Inspection
CC steam units	Generator	Miscellaneous (Generator)		4841	Generator doble testing
CC steam units	Generator	Miscellaneous (Generator)		4842	Reactive and capability testing
CC steam units	Generator	Miscellaneous (Generator)		4850	Core monitor alarm
CC steam units	Generator	Miscellaneous (Generator)		4860	Generator neutral grounding equipment
CC steam units	Generator	Miscellaneous (Generator)		4899	Other miscellaneous generator problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

HEAT RECOVERY STEAM GENERATOR (HRSG)

(Waste Heat Boiler)

TABLE B02-45 Heat Recovery Steam Generator (HRSG): HRSG Boiler Air and Gas Systems - Air Supply

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1400	Forced draft fans

CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1401	Forced draft fan dampers
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1407	Forced draft fan lubrication system
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1410	Forced draft fan motors
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1411	Forced draft fan motors - variable speed
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1412	Forced draft fan drives (other than motor)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1415	Forced draft fan controls
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1420	Other forced draft fan problems
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1456	Induced draft fan dampers
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-46 Heat Recovery Steam Generator (HRSG): HRSG Boiler Air and Gas Systems - Miscellaneous (Boiler Air and Gas Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1590	Stacks (use code 8430 for stack problems due to pollution control equipment)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1591	Stack damper and linkage
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1592	Stack damper linkage motors
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1599	Other miscellaneous boiler air and gas system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-47 Heat Recovery Steam Generator (HRSG): HRSG Boiler Control Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1700	Feedwater controls (report local controls - feedwater pump, feedwater regulator valve, etc., - with component or system)

CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1710	Combustion/steam condition controls (report local controls - burners, pulverizers, etc., - with component or system)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1720	Desuperheater/attemperator controls
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1730	Boiler explosion or implosion
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1740	Boiler drum gage glasses / level indicator
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1750	Burner management system
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1760	Feedwater instrumentation (not local controls)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1761	Combustion/Steam condition instrumentation (not local controls)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1762	Desuperheater/attemperator instrumentation (not local controls)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1799	Other boiler instrumentation and control problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Iincluding instruments which input to the controls.					

TABLE B02-48 Heat Recovery Steam Generator (HRSG): HRSG Boiler Design Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Design Limitations		1900	Improper balance between tube sections not due to fouling or plugging
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Design Limitations		1910	Inadequate air not due to equipment problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-49 Heat Recovery Steam Generator (HRSG): HRSG Boiler Fuel Supply - Burners (Duct Burners)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	358	Oil burner piping and valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	359	Gas burner piping and valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	360	Burners
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	361	Burner orifices
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	370	Burner instruments and controls (except light off)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	380	Light off (igniter) systems (including fuel supply)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	385	Igniters
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	410	Other burner problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-50 Heat Recovery Steam Generator (HRSG): HRSG Boiler Fuel Supply - Oil and Gas Systems (except light off)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	440	Fuel oil pumps (general)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	441	Fuel oil pumps (burner supply)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	442	Fuel oil pumps (forwarding/transfer)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	443	Fuel oil (burner supply) pump drives
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	444	Fuel oil (forwarding/transfer) pump drives
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	450	Fuel oil heaters
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	460	Fuel oil atomizers
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	470	Oil and gas fires

CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	480	Other oil and gas fuel supply problems (see codes 0360-0410 for burner problems)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-51 Heat Recovery Steam Generator (HRSG): HRSG Boiler Internals and Structures

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		800	Drums and drum internals (single drum only)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		801	HP Drum (including drum level trips not attributable to other causes)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		802	IP Drum (including drum level trips not attributable to other causes)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		803	LP Drum (including drum level trips not attributable to other causes)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		810	Boiler supports and structures (use code 1320 for tube supports)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		820	Casing
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		830	Doors
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		840	Refractory and insulation
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		845	Windbox expansion joints
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		847	Other expansion joints
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		848	Inlet panel
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		850	Other internal or structural problems
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		855	Drum relief/safety valves (single drum only)

CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		856	HP Drum relief/safety valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		857	IP Drum relief/safety valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		858	LP Drum relief/safety valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		859	Tube external fins/membranes
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-52 Heat Recovery Steam Generator (HRSG): HRSG Boiler Overhaul and Inspections

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1800	Major boiler overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1801	Minor boiler overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1810	Other boiler inspections
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1811	Boiler Inspections - problem identification / investigation
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1812	Boiler Inspections - scheduled or routine
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1820	Chemical cleaning/steam blows
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-53 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - Boiler Recirculation

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	740	Boiler recirculation pumps

CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	741	Boiler recirculation pumps - motors
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	750	Boiler recirculation piping including downcomers
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	760	Boiler recirculation valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	770	Other boiler recirculation problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-54 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - Feedwater and Blowdown

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	670	Feedwater piping downstream of feedwater regulating valve
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	680	Feedwater valves (not feedwater regulating valve)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	690	Other feedwater problems downstream of feedwater regulating valve (use codes 3401 to 3499 for remainder of feedwater system)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	700	Blowdown system valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	710	Blowdown system piping
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	720	Blowdown system controls / instrumentation
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	730	Other blowdown system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-55 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Cold and Hot Reheat Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	540	Hot reheat steam piping up to turbine stop valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	541	Cold reheat steam piping up to boiler
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	550	Reheat steam relief/safety valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	560	Other hot reheat steam valves (not including turbine stop or intercept valves)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	561	Other cold reheat steam valves (not including turbine stop or intercept valves)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	570	Other reheat steam problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-56 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Desuperheaters/Attemperators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6140	HP Desuperheater/attemperator piping - Greater than 600 PSIG.
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6141	HP Desuperheater/attemperator valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6142	HP Desuperheater/attemperator spray nozzles
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6143	HP Desuperheater/attemperator drums
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6144	Other HP desuperheater/attemperator problems
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6145	IP Desuperheater/attemperator piping - Between 200-600 PSIG
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6146	IP Desuperheater/attemperator valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6147	IP Desuperheater/attemperator spray nozzles
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6148	IP Desuperheater/attemperator drums

CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6149	Other IP desuperheater/attemperator problems
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6150	LP Desuperheater/attemperator piping - Less than 200 PSIG
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6151	LP Desuperheater/attemperator valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6152	LP Desuperheater/attemperator spray nozzles
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6153	LP Desuperheater/attemperator drums
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6154	Other LP desuperheater/attemperator problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-57 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Main Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	500	Main steam piping up to turbine stop valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	510	Main steam relief/safety valves off superheater
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	520	Other main steam valves (including vent and drain valves but not including the turbine stop valves)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	530	Other main steam system problems
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6110	HP steam piping up to turbine stop valves - Greater than 600 PSIG (see 0790 for piping supports)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6111	HP steam relief/safety valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6112	Other HP steam valves (including vent and drain valves but not

					including the turbine stop valves)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6113	Other HP steam system problems
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6114	HP steam isolation/boundary valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6120	IP steam piping up to turbine stop valves - Between 200 & 600 PSIG (see 0790 for piping supports)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6121	IP steam relief/safety valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6122	Other IP steam valves (including vent and drain valves but not including the turbine stop valves)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6123	Other IP steam system problems
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6124	IP steam isolation/boundary valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6130	LP steam piping up to turbine stop valves - Less than 200 PSIG (see 0790 for piping supports)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6131	LP steam relief/safety valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6132	Other LP steam valves (including vent and drain valves but not including the turbine stop valves)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6133	Other LP steam system problems
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6134	Other main steam valves (including vent and drain valves but not including the turbine stop valves)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6135	LP steam isolation/boundary valves
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-58 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Startup Bypass					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6160	HP Startup bypass system piping (including drain lines up to heaters or condenser) - Greater than 600 PSIG
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6161	HP Startup bypass system valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6162	HP Startup bypass tanks or flash tanks
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6163	Other HP startup bypass system problems
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6164	HP startup bypass instrumentation and controls
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6170	IP Startup bypass system piping (including drain lines up to heaters or condenser) - Between 200-600 PSIG
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6171	IP Startup bypass system valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6172	IP Startup bypass tanks or flash tanks
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6173	Other IP startup bypass system problems
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6174	IP startup bypass instrumentation and controls
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6180	LP Startup bypass system piping (including drain lines up to heaters or condenser) - Less than 200 PSIG
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6181	LP Startup bypass system valves
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6182	LP Startup bypass tanks or flash tanks
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6183	Other LP startup bypass system problems
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6184	LP startup bypass instrumentation and controls

Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.

TABLE B02-59 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - Miscellaneous (Piping)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	775	Economizer piping
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	780	Headers between tube bundles
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	782	Headers and caps
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	790	Pipe hangers, brackets, supports (general)
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	799	Other miscellaneous piping system problems

Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.

TABLE B02-60 Heat Recovery Steam Generator (HRSG): HRSG Boiler Tube Leaks

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6005	HP Evaporator tubes
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6006	IP Evaporator tubes
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6007	LP Evaporator tubes
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6010	HP superheater
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6011	HP reheater
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6012	HP economizer
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6020	IP superheater
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6021	IP reheater

CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6022	IP economizer
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6030	LP reheater
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6031	LP superheater
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6032	LP economizer
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6090	Other HRSG tube problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use code 0859 for tube/membrane failures.					

TABLE B02-61 Heat Recovery Steam Generator (HRSG): HRSG Boiler Water Condition

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Water Condition		1850	Boiler water condition (not feedwater water quality)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-62 Heat Recovery Steam Generator (HRSG): Miscellaneous (HRSG Boiler)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		1980	Boiler safety valve test
CC steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		1990	Boiler performance testing (use code 9999 for total unit performance testing)
CC steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		1999	Boiler, miscellaneous
CC steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		6000	Heat recovery steam generator to gas turbine connecting equipment. For additional codes, use Fossil Steam Cause Codes 0010 to 1999.
CC steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		6100	Steam turbine to gas turbine coupling. For additional codes, use Fossil Steam Cause Codes 4000 to 4499.

Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use more specific codes - other slagging and fouling problems, other control problems, etc. whenever possible. Describe miscellaneous problems in the verbal description.

TABLE B02-63 Heat Recovery Steam Generator (HRSG): Miscellaneous HRSG Boiler Tube Problems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1300	Water side fouling
CC steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1305	Fireside cleaning (which requires a full outage) Use code 1200 for cleanings that cause deratings.
CC steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1310	Water side cleaning (acid cleaning)
CC steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1320	Tube supports/attachments
CC steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1330	Slag fall damage
CC steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1340	Tube modifications (including addition and removal of tubes)
CC steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1350	Other miscellaneous boiler tube problems
CC steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1360	Boiler drains system

Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.

INACTIVE STATES

TABLE B02-64 Inactive States: Inactive States

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Inactive States	Inactive States		2	Inactive Reserve Shutdown
CC steam units	Inactive States	Inactive States		9990	Retired unit
CC steam units	Inactive States	Inactive States		9991	Mothballed unit

Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.

JET ENGINE

TABLE B02-65 Jet Engine: Auxiliary Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

CC steam units	Jet Engine	Auxiliary Systems		5510	Lube oil system
CC steam units	Jet Engine	Auxiliary Systems		5516	Power Augmentation System Equipment
CC steam units	Jet Engine	Auxiliary Systems		5520	Hydraulic oil system
CC steam units	Jet Engine	Auxiliary Systems		5530	Starting system (including motor)
CC steam units	Jet Engine	Auxiliary Systems		5540	Battery and charger system
CC steam units	Jet Engine	Auxiliary Systems		5550	Turning gear and motor
CC steam units	Jet Engine	Auxiliary Systems		5551	Load gear compartment
CC steam units	Jet Engine	Auxiliary Systems		5560	Cooling and seal air system
CC steam units	Jet Engine	Auxiliary Systems		5570	Cooling water system
CC steam units	Jet Engine	Auxiliary Systems		5580	Anti-icing system
CC steam units	Jet Engine	Auxiliary Systems		5590	Other auxiliary system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-66 Jet Engine: Exhaust Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Jet Engine	Exhaust Systems		5500	Chamber
CC steam units	Jet Engine	Exhaust Systems		5501	Hoods
CC steam units	Jet Engine	Exhaust Systems		5502	Vanes/nozzles
CC steam units	Jet Engine	Exhaust Systems		5503	Silencer
CC steam units	Jet Engine	Exhaust Systems		5504	Cones
CC steam units	Jet Engine	Exhaust Systems		5505	Diverter Dampers
CC steam units	Jet Engine	Exhaust Systems		5508	High engine exhaust temperature
CC steam units	Jet Engine	Exhaust Systems		5509	Other exhaust problems (including high exhaust temperature not attributable to a specific problem)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-67 Jet Engine: Fuel, Ignition, and Combustion Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5440	Fuel tanks
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5441	Fuel piping and valves
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5442	Fuel nozzles/vanes

CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5443	Fuel filters
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5444	Liquid fuel oil pump
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5445	Liquid fuel oil transfer/forwarding pump
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5446	Liquid fuel purge system
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5447	Gas fuel system including controls and instrumentation
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5449	Other fuel system problems
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5450	Ignition system
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5451	Pilot fuel piping and valves
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5452	Pilot fuel nozzles/vanes
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5453	Pilot fuel filters
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5454	Water injection system
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5455	Fuel nozzle/vane cooling air system
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5460	Atomizing air system
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5470	Combustor casing
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5471	Combustor liner
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5472	Combustor caps
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5473	Flame scanners
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5474	Flashback (including instrumentation)
CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5475	Blade path temperature spread

CC steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5479	Other combustor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-68 Jet Engine: Inlet Air System and Compressors - Compressors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5410	High pressure shaft
CC steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5411	High pressure bearings
CC steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5412	High pressure blades/buckets
CC steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5413	Other high pressure problems
CC steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5414	Compressor diaphragms/vanes
CC steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5420	Low pressure shaft
CC steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5421	Low pressure bearings
CC steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5422	Low pressure blades/buckets
CC steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5429	Other low pressure problems
CC steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5430	Supercharging fans
CC steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5435	Compressor washing
CC steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5436	Compressor shaft and bearings for two-shaft machines
CC steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5439	Other compressor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP compressor if only one.					

TABLE B02-69 Jet Engine: Inlet Air System and Compressors - Ducts and Filters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5400	Inlet air ducts
CC steam units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5401	Inlet air vanes/nozzles
CC steam units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5402	Inlet air filters
CC steam units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5403	Inlet and exhaust cones
CC steam units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5404	Inlet air chillers
CC steam units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5405	Inlet air evaporative coolers
CC steam units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5406	Inlet air foggers
CC steam units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5409	Other inlet air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP compressor if only one.					

TABLE B02-70 Jet Engine: Miscellaneous (Jet Engine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5600	Reduction gear
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5601	Load shaft and bearings
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5605	Main coupling between the turbine and generator
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5606	Clutch
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5610	Intercoolers
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5620	Regenerators
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5630	Heat shields
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5640	Fire detection and extinguishing system
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5641	Fire in unit
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5645	Jet Engine Control System - data highway
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5646	Jet Engine Control System - hardware problems (including card failure)
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5647	Jet Engine Control System - internal and termination wiring
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5648	Jet Engine Control System - logic problems
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5649	Jet Engine Control System - upgrades
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5650	Other controls and instrumentation problems
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5660	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5661	Engine/compressor washing
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5662	Engine exchange
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5665	Engine shafts and bearings
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5670	Hot end inspection
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5672	Boroscope inspection
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5674	General unit inspection
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5680	Vibration (not engine) in unit not attributable to bearings or other components
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5685	Engine vibration
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5686	Jet engine lockout

CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5690	Engine performance testing - individual engines (use code 9999 for total unit performance testing)
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5692	Turbine Overspeed Trip Test - Jet Engine
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5695	Synchronous condenser equipment
CC steam units	Jet Engine	Miscellaneous (Jet Engine)		5699	Other miscellaneous jet engine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-71 Jet Engine: Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Jet Engine	Turbine		5480	High pressure shaft
CC steam units	Jet Engine	Turbine		5481	High pressure bearings
CC steam units	Jet Engine	Turbine		5482	High pressure blades/buckets
CC steam units	Jet Engine	Turbine		5483	High pressure nozzles/vanes
CC steam units	Jet Engine	Turbine		5484	High pressure casing/expansion joint
CC steam units	Jet Engine	Turbine		5485	Interstage gas passages
CC steam units	Jet Engine	Turbine		5486	High pressure shaft seals
CC steam units	Jet Engine	Turbine		5487	Thrust bearing
CC steam units	Jet Engine	Turbine		5489	Other high pressure problems
CC steam units	Jet Engine	Turbine		5490	Low pressure shaft
CC steam units	Jet Engine	Turbine		5491	Low pressure bearings
CC steam units	Jet Engine	Turbine		5492	Low pressure blades/buckets
CC steam units	Jet Engine	Turbine		5493	Low pressure nozzles/vanes
CC steam units	Jet Engine	Turbine		5494	Low pressure casing/expansion joints
CC steam units	Jet Engine	Turbine		5497	Other low pressure problems
CC steam units	Jet Engine	Turbine		5498	Expansion joints
CC steam units	Jet Engine	Turbine		5499	Shaft seals
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP if only one.					

MISCELLANEOUS

TABLE B02-72 Miscellaneous: Instruments and Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

CC steam units	Miscellaneous	Instruments and Controls		6200	Combined cycle instruments and controls. (Report instruments and controls specific to the gas turbine, steam turbine, boiler, generator, or balance of plant using the codes for the appropriate piece of equipment.)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

PERFORMANCE

TABLE B02-73 Performance: Performance

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Performance	Performance		9997	NERC Reliability Standard Requirement
CC steam units	Performance	Performance		9998	Black start testing
CC steam units	Performance	Performance		9999	Total unit performance testing (use appropriate codes for individual component testing)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

PERSONNEL OR PROCEDURAL ERRORS

TABLE B02-74 Personnel or Procedural Errors: Personnel or Procedural Errors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Personnel or Procedural Errors	Personnel or Procedural Errors		9900	Operator error
CC steam units	Personnel or Procedural Errors	Personnel or Procedural Errors		9910	Maintenance personnel error
CC steam units	Personnel or Procedural Errors	Personnel or Procedural Errors		9920	Contractor error
CC steam units	Personnel or Procedural Errors	Personnel or Procedural Errors		9930	Operating procedure error
CC steam units	Personnel or Procedural Errors	Personnel or Procedural Errors		9940	Maintenance procedure error
CC steam units	Personnel or Procedural Errors	Personnel or Procedural Errors		9950	Contractor procedure error
CC steam units	Personnel or Procedural Errors	Personnel or Procedural Errors		9960	Staff shortage
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

POLLUTION CONTROL EQUIPMENT

TABLE B02-75 Pollution Control Equipment: CO Reduction					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC steam units	Pollution Control Equipment	CO Reduction		8840	CO Active catalyst
CC steam units	Pollution Control Equipment	CO Reduction		8841	CO Support materials
CC steam units	Pollution Control Equipment	CO Reduction		8842	CO Plugging
CC steam units	Pollution Control Equipment	CO Reduction		8845	Other CO reduction problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-76 Pollution Control Equipment: Continuous Emissions Monitoring Systems (CEMS)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8700	CEMS Certification and Recertification
CC steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8710	SO2 analyzer problems
CC steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8720	NOx analyzer problems
CC steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8730	CO analyzer problems
CC steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8740	CO2 analyzer problems
CC steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8750	O2 analyzer problems
CC steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8760	Opacity monitor problems
CC steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8770	Flow monitor problems
CC steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8780	Data acquisition system problems
CC steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8790	Miscellaneous CEMS problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-77 Pollution Control Equipment: NOx Reduction Systems - Catalytic Air Heaters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8830	CAH NOx Active catalyst
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8831	CAH NOx Support materials
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8832	CAH NOx Plugging
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8835	Other CAH problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-78 Pollution Control Equipment: NOx Reduction Systems - Selective Catalytic Reduction Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8810	SCR NOx Reactor
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8811	SCR NOx Reagent
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8812	SCR NOx Catalyst
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8813	SCR NOx Injection grid piping/valves
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8814	SCR NOx Catalyst support material
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8815	SCR NOx Soot blowers
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8816	SCR NOx Plugging
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8817	SCR NOx Control system
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8820	SCR NOx Ammonia injection grid piping/valves
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8821	SCR NOx Ammonia tanks, piping and valves (not injection)
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8822	SCR NOx Ammonia air blowers
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8823	SCR NOx Other ammonia system problems
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8825	Other SCR NOx problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-79 Pollution Control Equipment: NOx Reduction Systems - Selective Non-Catalytic Reduction Systems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8800	SNCR NOx Reagent
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8801	SNCR NOx Carrier gas
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8802	SNCR NOx Control system
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8803	SNCR Performance Testing
CC steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8809	Other SNCR NOx problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use code 0360 for Low NOx Burners.					

REGULATORY, SAFETY, ENVIRONMENTAL

Use these codes only for events not directly attributable to equipment failures. Inspections or testing of certain equipment due to regulation are reported using the appropriate equipment cause codes, and the fact that it was a regulatory requirement noted in the verbal description section.

TABLE B02-80 Regulatory, Safety, Environmental: Other Operating Environmental Limitations					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9660	Thermal discharge limits - fossil and nuclear
CC steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9663	Thermal discharge limits - gas turbines
CC steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9664	Thermal discharge limits - jet engines
CC steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9670	Noise limits (not for personnel safety) - fossil and nuclear
CC steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9673	Noise limits (not for personnel safety) - gas turbines
CC steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9674	Noise limits (not for personnel safety) - jet engines
CC steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9677	Noise limits testing - fossil

CC steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9678	Noise limits testing - gas turbines
CC steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9679	Noise limits testing - jet engines
CC steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9680	Fish kill - fossil and nuclear
CC steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9683	Fish kill - gas turbines
CC steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9684	Fish kill - jet engines
CC steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9690	Other miscellaneous operational environmental limits - fossil and nuclear
CC steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9693	Other miscellaneous operational environmental limits - gas turbines
CC steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9694	Other miscellaneous operational environmental limits - jet engines
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-81 Regulatory, Safety, Environmental: Regulatory

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Regulatory, Safety, Environmental	Regulatory		9504	Regulatory (environmental) proceedings and hearings - regulatory agency initiated
CC steam units	Regulatory, Safety, Environmental	Regulatory		9506	Regulatory (environmental) proceedings and hearings - intervenor initiated
CC steam units	Regulatory, Safety, Environmental	Regulatory		9510	Plant modifications strictly for compliance with new or changed regulatory requirements (scrubbers, cooling towers, etc.)
CC steam units	Regulatory, Safety, Environmental	Regulatory		9520	Oil spill in Gulf of Mexico (OMC)
CC steam units	Regulatory, Safety, Environmental	Regulatory		9590	Miscellaneous regulatory (this code is primarily intended for use with event contribution code 2 to indicate that a regulatory-related

					factor contributed to the primary cause of the event)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-82 Regulatory, Safety, Environmental: Safety

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Regulatory, Safety, Environmental	Safety		9700	OSHA-related retrofit or inspection
CC steam units	Regulatory, Safety, Environmental	Safety		9720	Other safety problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-83 Regulatory, Safety, Environmental: Stack Emission

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Regulatory, Safety, Environmental	Stack Emission		9600	SO2 stack emissions - fossil
CC steam units	Regulatory, Safety, Environmental	Stack Emission		9603	SO2 stack emissions - gas turbines
CC steam units	Regulatory, Safety, Environmental	Stack Emission		9604	SO2 stack emissions - jet engines
CC steam units	Regulatory, Safety, Environmental	Stack Emission		9610	NOx stack emissions - fossil
CC steam units	Regulatory, Safety, Environmental	Stack Emission		9613	NOx stack emissions - gas turbines
CC steam units	Regulatory, Safety, Environmental	Stack Emission		9614	NOx stack emissions - jet engines
CC steam units	Regulatory, Safety, Environmental	Stack Emission		9616	CO stack emissions - fossil
CC steam units	Regulatory, Safety, Environmental	Stack Emission		9620	Particulate stack emissions - fossil
CC steam units	Regulatory, Safety, Environmental	Stack Emission		9623	Particulate stack emissions - gas turbines
CC steam units	Regulatory, Safety, Environmental	Stack Emission		9624	Particulate stack emissions - jet engines

CC steam units	Regulatory, Safety, Environmental	Stack Emission		9630	Opacity - fossil
CC steam units	Regulatory, Safety, Environmental	Stack Emission		9633	Opacity - gas turbines
CC steam units	Regulatory, Safety, Environmental	Stack Emission		9634	Opacity - jet engines
CC steam units	Regulatory, Safety, Environmental	Stack Emission		9650	Other stack/exhaust emissions - fossil (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
CC steam units	Regulatory, Safety, Environmental	Stack Emission		9653	Other stack or exhaust emissions - gas turbines (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
CC steam units	Regulatory, Safety, Environmental	Stack Emission		9654	Other stack or exhaust emissions - jet engines (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
CC steam units	Regulatory, Safety, Environmental	Stack Emission		9656	Other stack or exhaust emissions testing - fossil
CC steam units	Regulatory, Safety, Environmental	Stack Emission		9657	Other stack or exhaust emissions testing - gas turbines
CC steam units	Regulatory, Safety, Environmental	Stack Emission		9658	Other stack or exhaust emissions testing - jet engines
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Include exhaust emissions.					

STEAM TURBINE

Besides the turbine, this set includes the steam stop/control valves, turbine control system, and the turbine auxiliaries. The extraction steam codes are contained in the Balance of Plant set.

TABLE B02-84 Steam Turbine: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Steam Turbine	Controls		4290	Hydraulic system pumps

CC steam units	Steam Turbine	Controls		4291	Hydraulic system coolers
CC steam units	Steam Turbine	Controls		4292	Hydraulic system filters
CC steam units	Steam Turbine	Controls		4293	Hydraulic system pipes and valves
CC steam units	Steam Turbine	Controls		4299	Other hydraulic system problems
CC steam units	Steam Turbine	Controls		4300	Turbine supervisory system (use codes 4290 to 4299 for hydraulic oil)
CC steam units	Steam Turbine	Controls		4301	Turbine governing system
CC steam units	Steam Turbine	Controls		4302	Turbine trip devices (including instruments)
CC steam units	Steam Turbine	Controls		4303	Exhaust hood and spray controls
CC steam units	Steam Turbine	Controls		4304	Automatic turbine control systems - mechanical
CC steam units	Steam Turbine	Controls		4305	Automatic turbine control systems - mechanical - hydraulic
CC steam units	Steam Turbine	Controls		4306	Automatic turbine control systems - electro-hydraulic - analog
CC steam units	Steam Turbine	Controls		4307	Automatic turbine control systems - electro-hydraulic - digital
CC steam units	Steam Turbine	Controls		4308	Automatic turbine control systems - digital control and monitoring
CC steam units	Steam Turbine	Controls		4309	Other turbine instrument and control problems
CC steam units	Steam Turbine	Controls		4310	Steam Turbine Control System - data highway
CC steam units	Steam Turbine	Controls		4311	Steam Turbine Control System - hardware problems (including card failure)
CC steam units	Steam Turbine	Controls		4312	Steam Turbine Control System - internal and termination wiring
CC steam units	Steam Turbine	Controls		4313	Steam Turbine Control System - logic problems
CC steam units	Steam Turbine	Controls		4314	Steam Turbine Control System - upgrades
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-85 Steam Turbine: High Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Steam Turbine	High Pressure Turbine		4000	Outer casing

CC steam units	Steam Turbine	High Pressure Turbine		4001	Inner casing
CC steam units	Steam Turbine	High Pressure Turbine		4009	Nozzle bolting
CC steam units	Steam Turbine	High Pressure Turbine		4010	Nozzles and nozzle blocks
CC steam units	Steam Turbine	High Pressure Turbine		4011	Diaphragms
CC steam units	Steam Turbine	High Pressure Turbine		4012	Buckets or blades
CC steam units	Steam Turbine	High Pressure Turbine		4013	Diaphragms unit and shroud type
CC steam units	Steam Turbine	High Pressure Turbine		4014	Bucket or blade fouling
CC steam units	Steam Turbine	High Pressure Turbine		4015	Wheels or spindles
CC steam units	Steam Turbine	High Pressure Turbine		4020	Shaft seals
CC steam units	Steam Turbine	High Pressure Turbine		4021	Dummy rings
CC steam units	Steam Turbine	High Pressure Turbine		4022	Gland rings
CC steam units	Steam Turbine	High Pressure Turbine		4030	Rotor shaft
CC steam units	Steam Turbine	High Pressure Turbine		4040	Bearings
CC steam units	Steam Turbine	High Pressure Turbine		4041	Thrust bearings
CC steam units	Steam Turbine	High Pressure Turbine		4099	Other high pressure turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-86 Steam Turbine: Intermediate Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Steam Turbine	Intermediate Pressure Turbine		4100	Outer casing
CC steam units	Steam Turbine	Intermediate Pressure Turbine		4101	Inner casing
CC steam units	Steam Turbine	Intermediate Pressure Turbine		4109	Nozzle bolting
CC steam units	Steam Turbine	Intermediate Pressure Turbine		4110	Nozzles and nozzle blocks
CC steam units	Steam Turbine	Intermediate Pressure Turbine		4111	Diaphragms
CC steam units	Steam Turbine	Intermediate Pressure Turbine		4112	Buckets or blades
CC steam units	Steam Turbine	Intermediate Pressure Turbine		4113	Bucket or blade fouling
CC steam units	Steam Turbine	Intermediate Pressure Turbine		4115	Wheels or spindles
CC steam units	Steam Turbine	Intermediate Pressure Turbine		4120	Shaft seals
CC steam units	Steam Turbine	Intermediate Pressure Turbine		4121	Dummy rings
CC steam units	Steam Turbine	Intermediate Pressure Turbine		4122	Gland rings
CC steam units	Steam Turbine	Intermediate Pressure Turbine		4130	Rotor shaft
CC steam units	Steam Turbine	Intermediate Pressure Turbine		4140	Bearings
CC steam units	Steam Turbine	Intermediate Pressure Turbine		4141	Thrust bearings
CC steam units	Steam Turbine	Intermediate Pressure Turbine		4199	Other intermediate pressure turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-87 Steam Turbine: Low Pressure Turbine					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC steam units	Steam Turbine	Low Pressure Turbine		4200	Outer casing
CC steam units	Steam Turbine	Low Pressure Turbine		4201	Inner casing
CC steam units	Steam Turbine	Low Pressure Turbine		4209	Nozzle bolting
CC steam units	Steam Turbine	Low Pressure Turbine		4210	Nozzles and nozzle blocks
CC steam units	Steam Turbine	Low Pressure Turbine		4211	Diaphragms
CC steam units	Steam Turbine	Low Pressure Turbine		4212	Buckets or blades
CC steam units	Steam Turbine	Low Pressure Turbine		4213	Bucket or blade fouling
CC steam units	Steam Turbine	Low Pressure Turbine		4215	Wheels or spindles
CC steam units	Steam Turbine	Low Pressure Turbine		4220	Shaft seals
CC steam units	Steam Turbine	Low Pressure Turbine		4221	Dummy rings
CC steam units	Steam Turbine	Low Pressure Turbine		4222	Gland rings
CC steam units	Steam Turbine	Low Pressure Turbine		4230	Rotor shaft
CC steam units	Steam Turbine	Low Pressure Turbine		4240	Bearings
CC steam units	Steam Turbine	Low Pressure Turbine		4241	Thrust bearings
CC steam units	Steam Turbine	Low Pressure Turbine		4250	Other low pressure turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-88 Steam Turbine: Lube Oil					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC steam units	Steam Turbine	Lube Oil		4280	Lube oil pumps
CC steam units	Steam Turbine	Lube Oil		4281	Lube oil coolers
CC steam units	Steam Turbine	Lube Oil		4282	Lube oil conditioners
CC steam units	Steam Turbine	Lube Oil		4283	Lube oil system valves and piping
CC steam units	Steam Turbine	Lube Oil		4284	Lube oil pump drive
CC steam units	Steam Turbine	Lube Oil		4289	Other lube oil system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Do not include bearing failures due to lube oil.					

TABLE B02-89 Steam Turbine: Miscellaneous (Steam Turbine)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CC steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4400	Major turbine overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)

CC steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4401	Inspection
CC steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4402	Minor turbine overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
CC steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4410	Turning gear and motor
CC steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4411	Steam turbine gear box (single shaft configuration)
CC steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4412	Steam turbine clutch (single shaft configuration)
CC steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4415	Shaft coupling mechanism
CC steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4420	Vibration of the turbine generator unit that cannot be attributed to a specific cause such as bearings or blades (use this code for balance moves)
CC steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4430	Gland seal system
CC steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4450	Water induction
CC steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4460	Turbine overspeed trip test
CC steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4470	Differential expansion
CC steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4490	Turbine performance testing (use code 9999 for total unit performance testing)
CC steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4499	Other miscellaneous steam turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-90 Steam Turbine: Piping

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Steam Turbine	Piping		4270	Crossover or under piping
CC steam units	Steam Turbine	Piping		4279	Miscellaneous turbine piping
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B02-91 Steam Turbine: Valves

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CC steam units	Steam Turbine	Valves		4260	Main stop valves
CC steam units	Steam Turbine	Valves		4261	Control valves
CC steam units	Steam Turbine	Valves		4262	Intercept valves
CC steam units	Steam Turbine	Valves		4263	Reheat stop valves

CC steam units	Steam Turbine	Valves		4264	Combined intercept valves
CC steam units	Steam Turbine	Valves		4265	Miscellaneous drain and vent valves
CC steam units	Steam Turbine	Valves		4266	Main stop valve testing
CC steam units	Steam Turbine	Valves		4267	Control valve testing
CC steam units	Steam Turbine	Valves		4268	Reheat/intercept valve testing
CC steam units	Steam Turbine	Valves		4269	Other turbine valves (including LP steam admission valves)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

Appendix B03: Index to Co-Generator Gas Turbine Unit Cause Codes

CO-GENERATOR GAS TURBINE UNITS

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
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B03-2	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems
B03-3	Balance of Plant	Auxiliary Systems	Fire Protection System
B03-4	Balance of Plant	Auxiliary Systems	Instrument Air
B03-5	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System
B03-6	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)
B03-7	Balance of Plant	Auxiliary Systems	Open Cooling Water System
B03-8	Balance of Plant	Auxiliary Systems	Seal Air Fans
B03-9	Balance of Plant	Auxiliary Systems	Service Air
B03-10	Balance of Plant	Auxiliary Systems	Service Water (Open System)
B03-11	Balance of Plant	Circulating Water Systems	
B03-12	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators
B03-13	Balance of Plant	Condensate System	Miscellaneous (Condensate System)
B03-14	Balance of Plant	Condensate System	Polishers/Chemical Addition
B03-15	Balance of Plant	Condensate System	Pumps, Piping, and Valves
B03-16	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals
B03-17	Balance of Plant	Condensing System	Condenser Controls
B03-18	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment
B03-19	Balance of Plant	Condensing System	Miscellaneous (Condensing System)
B03-20	Balance of Plant	Condensing System	Vacuum Equipment
B03-21	Balance of Plant	Electrical	
B03-22	Balance of Plant	Extraction Steam	
B03-23	Balance of Plant	Feedwater System	
B03-24	Balance of Plant	Heater Drain Systems	
B03-25	Balance of Plant	Miscellaneous (Balance of Plant)	
B03-26	Balance of Plant	Power Station Switchyard	
B03-27	Balance of Plant	Waste Water (zero discharge) Systems	
B03-28	Expander Turbine	Expander Turbine	
B03-29	External	Catastrophe	
B03-30	External	Economic	
B03-31	External	Fuel Quality	
B03-32	External	Miscellaneous (External)	

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TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B03-33	Gas Turbine	Auxiliary Systems	
B03-34	Gas Turbine	Exhaust Systems	
B03-35	Gas Turbine	Fuel, Ignition, and Combustion Systems	
B03-36	Gas Turbine	Inlet Air System and Compressors	Compressors
B03-37	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters
B03-38	Gas Turbine	Miscellaneous (Gas Turbine)	
B03-39	Gas Turbine	Turbine	
B03-40	Generator	Controls	
B03-41	Generator	Cooling System	
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B03-43	Generator	Generator	
B03-44	Generator	Miscellaneous (Generator)	
B03-45	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply
B03-46	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)
B03-47	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems	
B03-48	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Design Limitations	
B03-49	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)
B03-50	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)
B03-51	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures	
B03-52	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections	
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B03-54	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown
B03-55	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam
B03-56	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators
B03-57	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam
B03-58	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass
B03-59	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)
B03-60	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks	
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B03-64	Inactive States	Inactive States	
B03-65	Jet Engine	Auxiliary Systems	
B03-66	Jet Engine	Exhaust Systems	
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B03-68	Jet Engine	Inlet Air System and Compressors	Compressors

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
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B03-70	Jet Engine	Miscellaneous (Jet Engine)	
B03-71	Jet Engine	Turbine	
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B03-73	Performance	Performance	
B03-74	Personnel or Procedural Errors	Personnel or Procedural Errors	
B03-75	Pollution Control Equipment	CO Reduction	
B03-76	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)	
B03-77	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters
B03-78	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems
B03-79	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems
B03-80	Regulatory, Safety, Environmental	Other Operating Environmental Limitations	
B03-81	Regulatory, Safety, Environmental	Regulatory	
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B03-84	Steam Turbine	Controls	
B03-85	Steam Turbine	High Pressure Turbine	
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B03-88	Steam Turbine	Lube Oil	
B03-89	Steam Turbine	Miscellaneous (Steam Turbine)	
B03-90	Steam Turbine	Piping	
B03-91	Steam Turbine	Valves	

BALANCE OF PLANT

TABLE B03-1 Balance of Plant: Auxiliary Systems - Auxiliary Steam					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG GT units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3830	Auxiliary boiler
CoG GT units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3831	Auxiliary steam piping
CoG GT units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3832	Auxiliary steam valves
CoG GT units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3833	Auxiliary steam controls and instruments
CoG GT units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3834	Auxiliary boiler tube leaks
CoG GT units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3835	Auxiliary boiler burner management system

CoG GT units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3836	Steam transfer to other unit
CoG GT units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3839	Other auxiliary steam problems (also see extraction steam codes 3520 to 3529; startup bypass codes 0630 to 0660; and soot blower steam code 0870)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-2 Balance of Plant: Auxiliary Systems - Closed Cooling Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3820	Closed cooling water pumps and motors
CoG GT units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3821	Closed cooling water piping
CoG GT units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3822	Closed cooling water valves
CoG GT units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3823	Closed cooling water heat exchangers
CoG GT units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3824	Closed cooling water system fouling
CoG GT units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3825	Closed cooling water instrumentation
CoG GT units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3826	Closed cooling water strainer
CoG GT units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3829	Other closed cooling water system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-3 Balance of Plant: Auxiliary Systems - Fire Protection System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Auxiliary Systems	Fire Protection System	3860	Fire protection system pumps
CoG GT units	Balance of Plant	Auxiliary Systems	Fire Protection System	3861	Fire protection system piping
CoG GT units	Balance of Plant	Auxiliary Systems	Fire Protection System	3862	Fire protection system valves
CoG GT units	Balance of Plant	Auxiliary Systems	Fire Protection System	3863	Fire protection system fouling
CoG GT units	Balance of Plant	Auxiliary Systems	Fire Protection System	3864	Fire protection system instrumentation and controls
CoG GT units	Balance of Plant	Auxiliary Systems	Fire Protection System	3869	Other fire protection system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-4 Balance of Plant: Auxiliary Systems - Instrument Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

CoG GT units	Balance of Plant	Auxiliary Systems	Instrument Air	3850	Instrument air compressors
CoG GT units	Balance of Plant	Auxiliary Systems	Instrument Air	3851	Instrument air piping
CoG GT units	Balance of Plant	Auxiliary Systems	Instrument Air	3852	Instrument air valves
CoG GT units	Balance of Plant	Auxiliary Systems	Instrument Air	3853	Instrument air dryers
CoG GT units	Balance of Plant	Auxiliary Systems	Instrument Air	3854	N2 backup to instrument air
CoG GT units	Balance of Plant	Auxiliary Systems	Instrument Air	3859	Other instrument air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-5 Balance of Plant: Auxiliary Systems - Low-pressure Gas Compression System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3870	Fuel Gas Compressor and Motors
CoG GT units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3871	Fuel Gas Compressor Piping
CoG GT units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3872	Fuel Gas Compressor Valves
CoG GT units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3873	Fuel Gas Compressor Heat Exchangers
CoG GT units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3874	Fuel Gas Compressor Controls and Instrumentation
CoG GT units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3875	Fuel Gas Compressor Filters
CoG GT units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3876	Fuel Gas Compressor Fire System
CoG GT units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3879	Fuel Gas Compressor - other
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-6 Balance of Plant: Auxiliary Systems - Miscellaneous (Auxiliary Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3898	Miscellaneous plant auxiliary process and services instrumentation and controls
CoG GT units	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3899	Other miscellaneous auxiliary system problems

CoG GT units	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	6299	Other combined cycle block problems (Use other gas turbine problem codes, other steam turbine codes, etc., whenever appropriate.)
CoG GT units	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	6399	Other coal gasification equipment problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-7 Balance of Plant: Auxiliary Systems - Open Cooling Water System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3800	Open cooling water pumps and motors
CoG GT units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3801	Open cooling water piping
CoG GT units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3802	Open cooling water valves
CoG GT units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3803	Open cooling water heat exchangers
CoG GT units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3804	Open cooling water system fouling
CoG GT units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3805	Open cooling water system instrumentation
CoG GT units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3806	Open cooling water strainer
CoG GT units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3809	Other open cooling water problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-8 Balance of Plant: Auxiliary Systems - Seal Air Fans

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3880	Seal air fan
CoG GT units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3881	Seal air fan drive - motor
CoG GT units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3882	Seal air control dampers and drives
CoG GT units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3883	Seal air filters
CoG GT units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3889	Other seal air fan problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-9 Balance of Plant: Auxiliary Systems - Service Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Auxiliary Systems	Service Air	3840	Service air compressors
CoG GT units	Balance of Plant	Auxiliary Systems	Service Air	3841	Service air piping

CoG GT units	Balance of Plant	Auxiliary Systems	Service Air	3842	Service air valves
CoG GT units	Balance of Plant	Auxiliary Systems	Service Air	3843	Service air dryers
CoG GT units	Balance of Plant	Auxiliary Systems	Service Air	3849	Other service air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-10 Balance of Plant: Auxiliary Systems - Service Water (Open System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3810	Service water pumps and motors
CoG GT units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3811	Service water piping
CoG GT units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3812	Service water valves
CoG GT units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3813	Service water heat exchangers
CoG GT units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3814	Service water system fouling
CoG GT units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3815	Service water strainer
CoG GT units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3819	Other service water problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-11 Balance of Plant: Circulating Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Circulating Water Systems		3210	Circulating water pumps
CoG GT units	Balance of Plant	Circulating Water Systems		3211	Circulating water pump motors
CoG GT units	Balance of Plant	Circulating Water Systems		3220	Circulating water piping
CoG GT units	Balance of Plant	Circulating Water Systems		3221	Circulating water piping fouling
CoG GT units	Balance of Plant	Circulating Water Systems		3230	Circulating water valves
CoG GT units	Balance of Plant	Circulating Water Systems		3231	Waterbox
CoG GT units	Balance of Plant	Circulating Water Systems		3232	Condenser tube cleaning system including debris filter
CoG GT units	Balance of Plant	Circulating Water Systems		3233	Circulating water priming system
CoG GT units	Balance of Plant	Circulating Water Systems		3235	Cooling tower booster pump
CoG GT units	Balance of Plant	Circulating Water Systems		3236	Cooling tower booster motor
CoG GT units	Balance of Plant	Circulating Water Systems		3238	Cooling tower fan motors
CoG GT units	Balance of Plant	Circulating Water Systems		3239	Cooling tower fan motors - variable speed
CoG GT units	Balance of Plant	Circulating Water Systems		3240	Cooling tower fans
CoG GT units	Balance of Plant	Circulating Water Systems		3241	Cooling tower efficiency below design
CoG GT units	Balance of Plant	Circulating Water Systems		3242	Cooling tower fill damage
CoG GT units	Balance of Plant	Circulating Water Systems		3243	Cooling tower icing

CoG GT units	Balance of Plant	Circulating Water Systems		3244	Cooling tower fires
CoG GT units	Balance of Plant	Circulating Water Systems		3245	Other cooling tower problems
CoG GT units	Balance of Plant	Circulating Water Systems		3246	Cooling tower fouling
CoG GT units	Balance of Plant	Circulating Water Systems		3247	Cooling tower instrumentation
CoG GT units	Balance of Plant	Circulating Water Systems		3248	Cooling Tower Overhaul
CoG GT units	Balance of Plant	Circulating Water Systems		3250	Circulating water system instruments and controls
CoG GT units	Balance of Plant	Circulating Water Systems		3260	Traveling screens
CoG GT units	Balance of Plant	Circulating Water Systems		3261	Traveling screen fouling
CoG GT units	Balance of Plant	Circulating Water Systems		3269	Circulating water biological conditions (ie, zebra mussels)
CoG GT units	Balance of Plant	Circulating Water Systems		3270	Intake system problems other than traveling screens
CoG GT units	Balance of Plant	Circulating Water Systems		3271	Intake grating fouling
CoG GT units	Balance of Plant	Circulating Water Systems		3272	Circulating water screenwash system
CoG GT units	Balance of Plant	Circulating Water Systems		3273	Debris in circulating water from outside sources (leaves, mud, etc.)
CoG GT units	Balance of Plant	Circulating Water Systems		3280	High circulating water temperature (not due to season, tower efficiency below design, or other listed equipment problem)
CoG GT units	Balance of Plant	Circulating Water Systems		3281	Circulating water tempering system
CoG GT units	Balance of Plant	Circulating Water Systems		3282	Circulating water cooling ponds
CoG GT units	Balance of Plant	Circulating Water Systems		3285	Circulating water chemistry
CoG GT units	Balance of Plant	Circulating Water Systems		3299	Other circulating water system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-12 Balance of Plant: Condensate System - Low/Intermediate Pressure Heater and Deaerators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3339	LP heater head leaks
CoG GT units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3340	LP heater tube leaks
CoG GT units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3341	Other LP heater - general

CoG GT units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3342	IP heater tube leaks
CoG GT units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3343	Other IP heater - general
CoG GT units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3344	Deaerator (including level control)
CoG GT units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3345	IP heater head leaks
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-13 Balance of Plant: Condensate System - Miscellaneous (Condensate System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3360	Condensate makeup and return (including storage tanks)
CoG GT units	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3370	Condensate system controls and instrumentation (not hotwell level, heater level, or deaerator level controls; see codes 3150-3159, 3344, 3502).
CoG GT units	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3380	Condensate coolers
CoG GT units	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3399	Other miscellaneous condensate system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-14 Balance of Plant: Condensate System - Polishers/Chemical Addition

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Condensate System	Polishers/Chemical Addition	3350	Condensate polishing and filtering systems
CoG GT units	Balance of Plant	Condensate System	Polishers/Chemical Addition	3351	Chemical addition systems
CoG GT units	Balance of Plant	Condensate System	Polishers/Chemical Addition	3352	Feedwater chemistry (not specific to condenser, polishers, or chemical addition)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-15 Balance of Plant: Condensate System - Pumps, Piping, and Valves

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3300	Condensate water pre-treatment
CoG GT units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3310	Condensate/hotwell pumps
CoG GT units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3311	Condensate/hotwell pump motor
CoG GT units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3312	Condensate booster pump
CoG GT units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3313	Condensate booster pump motor
CoG GT units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3314	Condensate booster pump motor - variable speed
CoG GT units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3315	Condensate booster pump drive (other than 3313 and 3314)
CoG GT units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3320	Condensate piping
CoG GT units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3330	Condensate valves
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-16 Balance of Plant: Condensing System - Condenser Casing or Shell and Internals

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3120	Tube sheets
CoG GT units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3121	Expansion joint
CoG GT units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3122	Gaskets and seals
CoG GT units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3123	Hot well
CoG GT units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3124	Tube sheet fouling
CoG GT units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3129	Other condenser casing or shell and internal problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-17 Balance of Plant: Condensing System - Condenser Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Condensing System	Condenser Controls	3150	Hot well level controls
CoG GT units	Balance of Plant	Condensing System	Condenser Controls	3151	Vacuum pump and air ejector controls
CoG GT units	Balance of Plant	Condensing System	Condenser Controls	3152	Air-cooled condenser controls

CoG GT units	Balance of Plant	Condensing System	Condenser Controls	3159	Other condensing system controls and instruments
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-18 Balance of Plant: Condensing System - Condenser Tubes and Support Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3110	Condenser tube leaks
CoG GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3111	Condenser tube fouling shell side
CoG GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3112	Condenser tube fouling tube side
CoG GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3113	Condenser tube and water box cleaning (including circulating water flow reversal)
CoG GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3114	Air-cooled condenser tubes
CoG GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3115	Air-cooled condenser pumps
CoG GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3116	Air-cooled condenser fans
CoG GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3117	Air-cooled condenser fan motors
CoG GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3118	Other Air-cooled condenser problems
CoG GT units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3119	Other condenser tube casing or shell and internal problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-19 Balance of Plant: Condensing System - Miscellaneous (Condensing System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3170	Condenser inspection (use code 3110 to report looking for tube leaks)
CoG GT units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3171	Air-cooled condenser inspections
CoG GT units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3180	Major condenser overhaul
CoG GT units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3185	Water side cathodic protection

CoG GT units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3186	Auxiliary condenser and associated equipment
CoG GT units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3190	Air leakage (for losses not attributable to previously noted equipment related codes)
CoG GT units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3199	Other miscellaneous condensing system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-20 Balance of Plant: Condensing System - Vacuum Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Condensing System	Vacuum Equipment	3130	Air ejectors
CoG GT units	Balance of Plant	Condensing System	Vacuum Equipment	3131	Air ejector piping and valves
CoG GT units	Balance of Plant	Condensing System	Vacuum Equipment	3132	Inter and after condensers
CoG GT units	Balance of Plant	Condensing System	Vacuum Equipment	3133	Vacuum pumps
CoG GT units	Balance of Plant	Condensing System	Vacuum Equipment	3134	Vacuum pump piping and valves
CoG GT units	Balance of Plant	Condensing System	Vacuum Equipment	3135	Vacuum pump motor and auxiliaries
CoG GT units	Balance of Plant	Condensing System	Vacuum Equipment	3139	Other air extraction system problems - general
CoG GT units	Balance of Plant	Condensing System	Vacuum Equipment	3149	Loss of vacuum not attributable to a particular component such as air ejectors or valves, or high back pressure not attributable to high circulating water temperature, or vacuum losses from a known cause.
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-21 Balance of Plant: Electrical

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Electrical		3600	Switchyard transformers and associated cooling systems - external (OMC)
CoG GT units	Balance of Plant	Electrical		3601	Switchyard transformers and associated cooling systems - external (not OMC)
CoG GT units	Balance of Plant	Electrical		3610	Switchyard circuit breakers - external (not OMC)

CoG GT units	Balance of Plant	Electrical		3611	Switchyard circuit breakers - external (OMC)
CoG GT units	Balance of Plant	Electrical		3612	Switchyard system protection devices - external (OMC)
CoG GT units	Balance of Plant	Electrical		3613	Switchyard system protection devices - external (not OMC)
CoG GT units	Balance of Plant	Electrical		3618	Other switchyard equipment - external (not OMC)
CoG GT units	Balance of Plant	Electrical		3619	Other switchyard equipment - external (OMC)
CoG GT units	Balance of Plant	Electrical		3620	Main transformer
CoG GT units	Balance of Plant	Electrical		3621	Unit auxiliaries transformer
CoG GT units	Balance of Plant	Electrical		3622	Station service startup transformer
CoG GT units	Balance of Plant	Electrical		3623	Auxiliary generators
CoG GT units	Balance of Plant	Electrical		3624	Auxiliary generator voltage supply system
CoG GT units	Balance of Plant	Electrical		3629	Other switchyard or high voltage system problems - external
CoG GT units	Balance of Plant	Electrical		3630	400-700 volt transformers
CoG GT units	Balance of Plant	Electrical		3631	400-700 volt circuit breakers
CoG GT units	Balance of Plant	Electrical		3632	400-700 volt conductors and buses
CoG GT units	Balance of Plant	Electrical		3633	400-700 volt insulators
CoG GT units	Balance of Plant	Electrical		3634	400-700 volt protection devices
CoG GT units	Balance of Plant	Electrical		3639	Other 400-700 volt problems
CoG GT units	Balance of Plant	Electrical		3640	AC instrument power transformers
CoG GT units	Balance of Plant	Electrical		3641	AC Circuit breakers
CoG GT units	Balance of Plant	Electrical		3642	AC Conductors and buses
CoG GT units	Balance of Plant	Electrical		3643	AC Inverters
CoG GT units	Balance of Plant	Electrical		3644	AC Protection devices
CoG GT units	Balance of Plant	Electrical		3649	Other AC instrument power problems
CoG GT units	Balance of Plant	Electrical		3650	DC instrument power battery chargers
CoG GT units	Balance of Plant	Electrical		3651	DC circuit breakers
CoG GT units	Balance of Plant	Electrical		3652	DC conductors and buses
CoG GT units	Balance of Plant	Electrical		3653	DC protection devices
CoG GT units	Balance of Plant	Electrical		3659	Other DC power problems
CoG GT units	Balance of Plant	Electrical		3660	4000-7000 volt transformers
CoG GT units	Balance of Plant	Electrical		3661	4000-7000 volt circuit breakers
CoG GT units	Balance of Plant	Electrical		3662	4000-7000 volt conductors and buses

CoG GT units	Balance of Plant	Electrical		3663	4000-7000 volt insulators
CoG GT units	Balance of Plant	Electrical		3664	4000-7000 volt protection devices
CoG GT units	Balance of Plant	Electrical		3669	Other 4000-7000 volt problems
CoG GT units	Balance of Plant	Electrical		3670	12-15kV transformers
CoG GT units	Balance of Plant	Electrical		3671	12-15kV circuit breakers
CoG GT units	Balance of Plant	Electrical		3672	12-15kV conductors and buses
CoG GT units	Balance of Plant	Electrical		3673	12-15kV insulators
CoG GT units	Balance of Plant	Electrical		3674	12-15kV protection devices
CoG GT units	Balance of Plant	Electrical		3679	Other 12-15kV problems
CoG GT units	Balance of Plant	Electrical		3680	Other voltage transformers
CoG GT units	Balance of Plant	Electrical		3681	Other voltage circuit breakers
CoG GT units	Balance of Plant	Electrical		3682	Other voltage conductors and buses
CoG GT units	Balance of Plant	Electrical		3683	Other voltage insulators
CoG GT units	Balance of Plant	Electrical		3684	Other voltage protection devices
CoG GT units	Balance of Plant	Electrical		3689	Other voltage problems
CoG GT units	Balance of Plant	Electrical		3690	Station Service Power Distribution System, General
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-22 Balance of Plant: Extraction Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Extraction Steam		3520	HP Extraction steam piping
CoG GT units	Balance of Plant	Extraction Steam		3521	HP Extraction steam valves
CoG GT units	Balance of Plant	Extraction Steam		3522	HP Extraction steam instruments and controls
CoG GT units	Balance of Plant	Extraction Steam		3529	Other HP extraction steam system problems
CoG GT units	Balance of Plant	Extraction Steam		3530	IP Extraction steam piping
CoG GT units	Balance of Plant	Extraction Steam		3531	IP Extraction steam valves
CoG GT units	Balance of Plant	Extraction Steam		3532	IP Extraction steam instruments and controls
CoG GT units	Balance of Plant	Extraction Steam		3539	Other IP extraction steam system problems
CoG GT units	Balance of Plant	Extraction Steam		3540	LP Extraction steam piping
CoG GT units	Balance of Plant	Extraction Steam		3541	LP Extraction steam valves
CoG GT units	Balance of Plant	Extraction Steam		3542	LP Extraction steam instruments and controls

CoG GT units	Balance of Plant	Extraction Steam		3549	Other LP extraction steam system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					
TABLE B03-23 Balance of Plant: Feedwater System					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG GT units	Balance of Plant	Feedwater System		3401	Startup feedwater pump
CoG GT units	Balance of Plant	Feedwater System		3402	Startup feedwater pump drives - all types
CoG GT units	Balance of Plant	Feedwater System		3407	Feedwater pump suction screens
CoG GT units	Balance of Plant	Feedwater System		3408	Feedwater pump drive - local controls
CoG GT units	Balance of Plant	Feedwater System		3409	Feedwater pump drive motor - variable speed
CoG GT units	Balance of Plant	Feedwater System		3410	Feedwater pump
CoG GT units	Balance of Plant	Feedwater System		3411	Feedwater pump drive - motor
CoG GT units	Balance of Plant	Feedwater System		3412	Feedwater pump drive - steam turbine
CoG GT units	Balance of Plant	Feedwater System		3413	Feedwater pump coupling and drive shaft
CoG GT units	Balance of Plant	Feedwater System		3414	Feedwater pump local controls
CoG GT units	Balance of Plant	Feedwater System		3415	Feedwater pump/drive lube oil system
CoG GT units	Balance of Plant	Feedwater System		3416	Other feedwater pump problems
CoG GT units	Balance of Plant	Feedwater System		3417	Feedwater pump drive - main shaft
CoG GT units	Balance of Plant	Feedwater System		3418	Feedwater pump drive - other
CoG GT units	Balance of Plant	Feedwater System		3419	Feedwater pump drive - gear
CoG GT units	Balance of Plant	Feedwater System		3420	Feedwater piping and supports
CoG GT units	Balance of Plant	Feedwater System		3430	Feedwater regulating (boiler level control) valve
CoG GT units	Balance of Plant	Feedwater System		3431	Other feedwater valves
CoG GT units	Balance of Plant	Feedwater System		3439	HP heater head leaks
CoG GT units	Balance of Plant	Feedwater System		3440	High pressure heater tube leaks
CoG GT units	Balance of Plant	Feedwater System		3441	Other high pressure heater problems (see condensate system for LP and IP heater codes)
CoG GT units	Balance of Plant	Feedwater System		3451	Feedwater booster pump suction screens
CoG GT units	Balance of Plant	Feedwater System		3452	Feedwater booster pump drive - local controls

CoG GT units	Balance of Plant	Feedwater System		3453	Feedwater booster pump drive motor - variable speed
CoG GT units	Balance of Plant	Feedwater System		3454	Feedwater booster pump
CoG GT units	Balance of Plant	Feedwater System		3455	Feedwater booster pump drive - motor
CoG GT units	Balance of Plant	Feedwater System		3456	Feedwater booster pump drive - steam turbine
CoG GT units	Balance of Plant	Feedwater System		3457	Feedwater booster pump coupling and drive shaft
CoG GT units	Balance of Plant	Feedwater System		3458	Feedwater booster pump local controls
CoG GT units	Balance of Plant	Feedwater System		3459	Feedwater booster pump/drive lube oil system
CoG GT units	Balance of Plant	Feedwater System		3460	Other feedwater booster pump problems
CoG GT units	Balance of Plant	Feedwater System		3461	Feedwater booster pump drive - main shaft
CoG GT units	Balance of Plant	Feedwater System		3462	Feedwater booster pump drive - other
CoG GT units	Balance of Plant	Feedwater System		3463	Feedwater booster pump drive - gear
CoG GT units	Balance of Plant	Feedwater System		3499	Other feedwater system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Excluding extraction or drain systems.					

TABLE B03-24 Balance of Plant: Heater Drain Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Heater Drain Systems		3501	Heater drain pumps
CoG GT units	Balance of Plant	Heater Drain Systems		3502	Heater level control
CoG GT units	Balance of Plant	Heater Drain Systems		3503	Heater drain piping
CoG GT units	Balance of Plant	Heater Drain Systems		3504	Heater drain valves
CoG GT units	Balance of Plant	Heater Drain Systems		3505	Heater drain pump drive
CoG GT units	Balance of Plant	Heater Drain Systems		3509	Other heater drain system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-25 Balance of Plant: Miscellaneous (Balance of Plant)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3950	Process computer

CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3960	Thermal derating (thermal efficiency losses in balance of plant when specific cause(s) unknown)
CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3970	Distributive Control System (DCS) - process computer
CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3971	DCS - data highway
CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3972	DCS - hardware problems (including card failure)
CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3973	DCS - internal and termination wiring
CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3974	DCS - logic problems
CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3975	DCS - upgrades
CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3979	Other DCS problems
CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3980	Programmable Logic Controller (PLC)
CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3981	PLC - data highway
CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3982	PLC - hardware problems (including card failure)
CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3983	PLC - internal and termination wiring
CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3984	PLC - logic problems
CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3985	PLC - upgrades
CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3989	Other PLC problems
CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3995	Powerhouse heating and ventilating systems
CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3996	Air conditioning systems - rooms and areas
CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3998	Balance of plant overhaul/outage
CoG GT units	Balance of Plant	Miscellaneous (Balance of Plant)		3999	Other miscellaneous balance of plant problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-26 Balance of Plant: Power Station Switchyard

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Power Station Switchyard		3700	Power Station switchyard (non generating unit equipment)
CoG GT units	Balance of Plant	Power Station Switchyard		3710	Transmission line (connected to powerhouse switchyard to 1st Substation)

CoG GT units	Balance of Plant	Power Station Switchyard		3720	Transmission equipment at the 1st substation (see code 9300 if applicable)
CoG GT units	Balance of Plant	Power Station Switchyard		3730	Transmission equipment beyond the 1st substation (see code 9300 if applicable)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-27 Balance of Plant: Waste Water (zero discharge) Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Balance of Plant	Waste Water (zero discharge) Systems		3290	Waste water (zero discharge) tanks, pumps, and motors
CoG GT units	Balance of Plant	Waste Water (zero discharge) Systems		3291	Waste water (zero discharge) system fouling
CoG GT units	Balance of Plant	Waste Water (zero discharge) Systems		3292	Waste water (zero discharge) piping
CoG GT units	Balance of Plant	Waste Water (zero discharge) Systems		3293	Waste water (zero discharge) valves
CoG GT units	Balance of Plant	Waste Water (zero discharge) Systems		3294	Waste water (zero discharge) controls and instrumentation
CoG GT units	Balance of Plant	Waste Water (zero discharge) Systems		3295	Other waste water (zero discharge) problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

EXPANDER TURBINE

TABLE B03-28 Expander Turbine: Expander Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Expander Turbine	Expander Turbine		7800	Couplings
CoG GT units	Expander Turbine	Expander Turbine		7810	Shaft
CoG GT units	Expander Turbine	Expander Turbine		7820	Bearings
CoG GT units	Expander Turbine	Expander Turbine		7830	Blades
CoG GT units	Expander Turbine	Expander Turbine		7840	Discs
CoG GT units	Expander Turbine	Expander Turbine		7850	Spacers
CoG GT units	Expander Turbine	Expander Turbine		7860	Nozzles/vanes
CoG GT units	Expander Turbine	Expander Turbine		7870	Heat shields
CoG GT units	Expander Turbine	Expander Turbine		7880	Exhaust diffusers

CoG GT units	Expander Turbine	Expander Turbine		7890	Seal oil system and seals
CoG GT units	Expander Turbine	Expander Turbine		7900	Inner casing
CoG GT units	Expander Turbine	Expander Turbine		7910	Outer exhaust casing
CoG GT units	Expander Turbine	Expander Turbine		7920	Lube oil system
CoG GT units	Expander Turbine	Expander Turbine		7930	Controls and instrumentation
CoG GT units	Expander Turbine	Expander Turbine		7940	Evactor
CoG GT units	Expander Turbine	Expander Turbine		7950	Major overhaul
CoG GT units	Expander Turbine	Expander Turbine		7960	Other expander turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

EXTERNAL

Use this set of codes to report events caused by external factors (flood, lightning, etc.); economic factors (lack of fuel, labor strikes, etc.); operator training; and transmission system problems external to the plant.

TABLE B03-29 External: Catastrophe

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	External	Catastrophe		9000	Flood
CoG GT units	External	Catastrophe		9001	Drought
CoG GT units	External	Catastrophe		9010	Fire including wildfires, not related to a specific component
CoG GT units	External	Catastrophe		9020	Lightning
CoG GT units	External	Catastrophe		9025	Geomagnetic disturbance
CoG GT units	External	Catastrophe		9030	Earthquake
CoG GT units	External	Catastrophe		9031	Tornado
CoG GT units	External	Catastrophe		9035	Hurricane
CoG GT units	External	Catastrophe		9036	Storms (ice, snow, etc)
CoG GT units	External	Catastrophe		9040	Other catastrophe
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-30 External: Economic

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	External	Economic		0	Reserve shutdown
CoG GT units	External	Economic		9130	Failure of fuel supplier to fulfill contractual obligations or a pre-arranged deal due to physical fuel disruptions or operational impairments

					(e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)
CoG GT units	External	Economic		9131	Lack of fuel – due to contractual or tariff provisions that allow for service interruption or price fluctuations during peak demand periods.
CoG GT units	External	Economic		9134	Fuel conservation
CoG GT units	External	Economic		9136	Problems with Primary Fuel for Units with Secondary Fuel Operation
CoG GT units	External	Economic		9137	Ground water or other water supply problems
CoG GT units	External	Economic		9140	Plant modifications to burn different fuel that are not regulatory mandated
CoG GT units	External	Economic		9150	Labor strikes company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.
CoG GT units	External	Economic		9151	Labor strikes direct plant management grievances that result in a walkout or strike are under plant management control.
CoG GT units	External	Economic		9160	Other economic problems
CoG GT units	External	Economic		9180	Economic (for internal use at plants only)
CoG GT units	External	Economic		9181	Economic (for internal use at plants only)
CoG GT units	External	Economic		9182	Economic (for internal use at plants only)
CoG GT units	External	Economic		9183	Economic (for internal use at plants only)
CoG GT units	External	Economic		9184	Economic (for internal use at plants only)
CoG GT units	External	Economic		9185	Economic (for internal use at plants only)
CoG GT units	External	Economic		9186	Economic (for internal use at plants only)

CoG GT units	External	Economic		9187	Economic (for internal use at plants only)
CoG GT units	External	Economic		9188	Economic (for internal use at plants only)
CoG GT units	External	Economic		9189	Economic (for internal use at plants only)
CoG GT units	External	Economic		9190	Economic (for internal use at plants only)
CoG GT units	External	Economic		9191	Economic (for internal use at plants only)
CoG GT units	External	Economic		9192	Economic (for internal use at plants only)
CoG GT units	External	Economic		9193	Economic (for internal use at plants only)
CoG GT units	External	Economic		9194	Economic (for internal use at plants only)
CoG GT units	External	Economic		9195	Economic (for internal use at plants only)
CoG GT units	External	Economic		9196	Economic (for internal use at plants only)
CoG GT units	External	Economic		9197	Economic (for internal use at plants only)
CoG GT units	External	Economic		9198	Economic (for internal use at plants only)
CoG GT units	External	Economic		9199	Economic (for internal use at plants only)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-31 External: Fuel Quality

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	External	Fuel Quality		9200	High ash content (OMC)
CoG GT units	External	Fuel Quality		9201	High ash content (not OMC)
CoG GT units	External	Fuel Quality		9205	Poor quality natural gas fuel, low heat content
CoG GT units	External	Fuel Quality		9220	High sulfur content (OMC)
CoG GT units	External	Fuel Quality		9221	High sulfur content (not OMC)
CoG GT units	External	Fuel Quality		9230	High vanadium content (OMC)
CoG GT units	External	Fuel Quality		9231	High vanadium content (not OMC)

CoG GT units	External	Fuel Quality		9240	High sodium content (OMC)
CoG GT units	External	Fuel Quality		9241	High sodium content (not OMC)
CoG GT units	External	Fuel Quality		9260	Low BTU oil (OMC)
CoG GT units	External	Fuel Quality		9261	Low BTU oil (not OMC)
CoG GT units	External	Fuel Quality		9290	Other fuel quality problems (OMC)
CoG GT units	External	Fuel Quality		9291	Other fuel quality problems (not OMC)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use code 9600 to 9650 if the fuel quality results in excess stack emissions through no fault in the pollution control equipment. Use the appropriate equipment code to report fouling and slagging.					

TABLE B03-32 External: Miscellaneous (External)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	External	Miscellaneous (External)		9300	Transmission system problems other than catastrophes (do not include switchyard problems in this category; see codes 3600 to 3629, 3720 to 3730)
CoG GT units	External	Miscellaneous (External)		9310	Operator training
CoG GT units	External	Miscellaneous (External)		9320	Other miscellaneous external problems
CoG GT units	External	Miscellaneous (External)		9340	Synchronous Condenser Operation
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

GAS TURBINE

TABLE B03-33 Gas Turbine: Auxiliary Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Gas Turbine	Auxiliary Systems		5110	Lube oil system - general
CoG GT units	Gas Turbine	Auxiliary Systems		5111	Lube oil pumps
CoG GT units	Gas Turbine	Auxiliary Systems		5112	Lube oil coolers
CoG GT units	Gas Turbine	Auxiliary Systems		5113	Lube oil valves/piping
CoG GT units	Gas Turbine	Auxiliary Systems		5114	Lube oil filters
CoG GT units	Gas Turbine	Auxiliary Systems		5115	Oil vapor extractor
CoG GT units	Gas Turbine	Auxiliary Systems		5116	Power Augmentation System Equipment
CoG GT units	Gas Turbine	Auxiliary Systems		5117	Power augmentation piping
CoG GT units	Gas Turbine	Auxiliary Systems		5118	Power augmentation valves
CoG GT units	Gas Turbine	Auxiliary Systems		5119	Power augmentation controls
CoG GT units	Gas Turbine	Auxiliary Systems		5120	Hydraulic oil system

CoG GT units	Gas Turbine	Auxiliary Systems		5121	Hydraulic oil system pumps
CoG GT units	Gas Turbine	Auxiliary Systems		5122	Hydraulic oil system piping/valves
CoG GT units	Gas Turbine	Auxiliary Systems		5130	Starting system (including motor)
CoG GT units	Gas Turbine	Auxiliary Systems		5140	Battery and charger system
CoG GT units	Gas Turbine	Auxiliary Systems		5150	Turning gear and motor
CoG GT units	Gas Turbine	Auxiliary Systems		5151	Load gear compartment
CoG GT units	Gas Turbine	Auxiliary Systems		5160	Cooling and seal air system
CoG GT units	Gas Turbine	Auxiliary Systems		5170	Cooling water system
CoG GT units	Gas Turbine	Auxiliary Systems		5180	Anti-icing system
CoG GT units	Gas Turbine	Auxiliary Systems		5190	Other auxiliary system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-34 Gas Turbine: Exhaust Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Gas Turbine	Exhaust Systems		5100	Chamber
CoG GT units	Gas Turbine	Exhaust Systems		5101	Hoods
CoG GT units	Gas Turbine	Exhaust Systems		5102	Vanes/nozzles
CoG GT units	Gas Turbine	Exhaust Systems		5103	Silencer
CoG GT units	Gas Turbine	Exhaust Systems		5104	Cones
CoG GT units	Gas Turbine	Exhaust Systems		5105	Diverter Dampers
CoG GT units	Gas Turbine	Exhaust Systems		5106	Exhaust Stack
CoG GT units	Gas Turbine	Exhaust Systems		5108	High engine exhaust temperature
CoG GT units	Gas Turbine	Exhaust Systems		5109	Other exhaust problems (including high exhaust system temperature not attributable to a specific problem)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-35 Gas Turbine: Fuel, Ignition, and Combustion Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5040	Fuel tanks
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5041	Fuel piping and valves
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5042	Fuel nozzles/vanes

CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5043	Fuel filters
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5044	Liquid fuel oil pump
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5046	Liquid fuel oil transfer/forwarding pump
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5047	Liquid fuel purge system
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5048	Gas fuel system including controls and instrumentation
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5049	Other fuel system problems
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5050	Ignition system
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5051	Pilot fuel piping and valves
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5052	Pilot fuel nozzles/vanes
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5053	Pilot fuel filters
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5054	Water injection system
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5060	Atomizing air system
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5065	NOx water injection system including pump
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5066	NOx steam injection system
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5070	Combustor casing
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5071	Combustor liner
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5072	Combustor caps
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5073	Flame scanners
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5074	Flashback including instrumentation

CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5075	Blade path temperature spread
CoG GT units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5079	Other combustor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-36 Gas Turbine: Inlet Air System and Compressors - Compressors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5010	High pressure shaft
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5011	High pressure bearings
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5012	High pressure blades/buckets
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5013	Compressor casing and bolts
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5014	Compressor diaphragms
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5015	Compressor seals
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5016	High pressure compressor bleed valves
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5017	Low pressure compressor bleed valves
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5019	Other high pressure problems
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5020	Low pressure shaft
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5021	Low pressure bearings
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5022	Low pressure blades/buckets
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5029	Other low pressure problems
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5030	Supercharging fans
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5035	Compressor washing
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5036	Compressor shaft and bearings for two-shaft machines
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5037	Inlet bleed heat valve
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Compressors	5039	Other compressor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-37 Gas Turbine: Inlet Air System and Compressors - Ducts and Filters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5000	Inlet air ducts
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5001	Inlet air vanes/nozzles
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5002	Inlet air filters
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5003	Inlet cone

CoG GT units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5004	Inlet air chillers
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5005	Inlet air evaporative coolers
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5006	Inlet air foggers
CoG GT units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5009	Other inlet air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-38 Gas Turbine: Miscellaneous (Gas Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5200	Reduction gear
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5201	Load shaft and bearings
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5205	Main coupling between the turbine and generator
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5206	Clutch
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5210	Intercoolers
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5220	Regenerators
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5230	Heat shields
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5240	Fire detection and extinguishing system (including hazardous gas detection system)
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5241	Fire in unit
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5245	Gas Turbine Control System - data highway
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5246	Gas Turbine Control System - hardware problems (including card failure)
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5247	Gas Turbine Control System - internal and termination wiring
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5248	Gas Turbine Control System - logic problems
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5249	Gas Turbine Control System - upgrades
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5250	Other controls and instrumentation problems
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5255	Computer
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5260	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5261	Gas turbine/compressor washing
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5262	Gas turbine exchange

CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5269	Combustion Inspection (CI)
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5270	Hot end inspection
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5272	Boroscope inspection
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5274	General unit inspection
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5280	Vibration (not engine) in unit not attributable to bearings or other components
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5285	Gas turbine vibration
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5286	Gas turbine lockout
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5290	Gas turbine performance testing - individual engines (use code 9999 for total unit performance testing)
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5292	Turbine Overspeed Trip Test - Gas Turbine
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5295	Synchronous condenser equipment
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5298	Main gas filter
CoG GT units	Gas Turbine	Miscellaneous (Gas Turbine)		5299	Other miscellaneous gas turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-39 Gas Turbine: Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Gas Turbine	Turbine		5080	High pressure shaft
CoG GT units	Gas Turbine	Turbine		5081	High pressure bearings
CoG GT units	Gas Turbine	Turbine		5082	High pressure blades/buckets
CoG GT units	Gas Turbine	Turbine		5083	High pressure nozzles/vanes
CoG GT units	Gas Turbine	Turbine		5084	High pressure casing/expansion joints
CoG GT units	Gas Turbine	Turbine		5085	Interstage gas passages - HP
CoG GT units	Gas Turbine	Turbine		5086	High pressure shaft seals
CoG GT units	Gas Turbine	Turbine		5087	Thrust bearing
CoG GT units	Gas Turbine	Turbine		5088	Gas turbine cooling system
CoG GT units	Gas Turbine	Turbine		5089	Other high pressure problems
CoG GT units	Gas Turbine	Turbine		5090	Low pressure shaft
CoG GT units	Gas Turbine	Turbine		5091	Low pressure bearings
CoG GT units	Gas Turbine	Turbine		5092	Low pressure blades/buckets
CoG GT units	Gas Turbine	Turbine		5093	Low pressure nozzles/vanes
CoG GT units	Gas Turbine	Turbine		5094	Low pressure casing/expansion joints

CoG GT units	Gas Turbine	Turbine		5095	Interstage gas passages - LP
CoG GT units	Gas Turbine	Turbine		5096	Low pressure shaft seals
CoG GT units	Gas Turbine	Turbine		5097	Other low pressure problems
CoG GT units	Gas Turbine	Turbine		5098	Expansion joints
CoG GT units	Gas Turbine	Turbine		5099	HP to LP coupling
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP if only one.					

GENERATOR

This set of codes contains the generator, exciter, generator cooling systems, and generator controls. Note the main leads up to and includes the generator output breaker in this set of codes.

TABLE B03-40 Generator: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Generator	Controls		4700	Generator voltage control
CoG GT units	Generator	Controls		4710	Generator metering devices
CoG GT units	Generator	Controls		4720	Generator synchronization equipment
CoG GT units	Generator	Controls		4730	Generator current and potential transformers
CoG GT units	Generator	Controls		4740	Emergency generator trip devices
CoG GT units	Generator	Controls		4750	Other generator controls and metering problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-41 Generator: Cooling System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Generator	Cooling System		4610	Hydrogen cooling system piping and valves
CoG GT units	Generator	Cooling System		4611	Hydrogen coolers
CoG GT units	Generator	Cooling System		4612	Hydrogen storage system
CoG GT units	Generator	Cooling System		4613	Hydrogen seals
CoG GT units	Generator	Cooling System		4619	Other hydrogen system problems
CoG GT units	Generator	Cooling System		4620	Air cooling system
CoG GT units	Generator	Cooling System		4630	Liquid cooling system
CoG GT units	Generator	Cooling System		4640	Seal oil system and seals
CoG GT units	Generator	Cooling System		4650	Other cooling system problems

Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Report failures caused by water leaks into generator as codes 4500, 4510, etc.

TABLE B03-42 Generator: Exciter

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Generator	Exciter		4600	Exciter drive - motor
CoG GT units	Generator	Exciter		4601	Exciter field rheostat
CoG GT units	Generator	Exciter		4602	Exciter commutator and brushes
CoG GT units	Generator	Exciter		4603	Solid state exciter element
CoG GT units	Generator	Exciter		4604	Exciter drive - shaft
CoG GT units	Generator	Exciter		4605	Exciter transformer
CoG GT units	Generator	Exciter		4609	Other exciter problems

Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.

TABLE B03-43 Generator: Generator

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Generator	Generator		4500	Rotor windings (including damper windings and fan blades on hydro units)
CoG GT units	Generator	Generator		4510	Rotor collector rings
CoG GT units	Generator	Generator		4511	Rotor, General
CoG GT units	Generator	Generator		4512	Retaining Rings
CoG GT units	Generator	Generator		4520	Stator windings, bushings, and terminals
CoG GT units	Generator	Generator		4530	Stator core iron
CoG GT units	Generator	Generator		4535	Stator, General
CoG GT units	Generator	Generator		4536	Generator Heaters
CoG GT units	Generator	Generator		4540	Brushes and brush rigging
CoG GT units	Generator	Generator		4550	Generator bearings and lube oil system (including thrust bearings on hydro units)
CoG GT units	Generator	Generator		4551	Generator bearings
CoG GT units	Generator	Generator		4552	Generator lube oil system
CoG GT units	Generator	Generator		4555	Bearing cooling system

CoG GT units	Generator	Generator		4560	Generator vibration (excluding vibration due to failed bearing and other components)
CoG GT units	Generator	Generator		4570	Generator casing
CoG GT units	Generator	Generator		4580	Generator end bells and bolting
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-44 Generator: Miscellaneous (Generator)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Generator	Miscellaneous (Generator)		4800	Generator main leads
CoG GT units	Generator	Miscellaneous (Generator)		4805	Generator Bus Duct Cooling System
CoG GT units	Generator	Miscellaneous (Generator)		4810	Generator output breaker
CoG GT units	Generator	Miscellaneous (Generator)		4830	Major generator overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
CoG GT units	Generator	Miscellaneous (Generator)		4831	Minor generator overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
CoG GT units	Generator	Miscellaneous (Generator)		4840	Inspection
CoG GT units	Generator	Miscellaneous (Generator)		4841	Generator doble testing
CoG GT units	Generator	Miscellaneous (Generator)		4842	Reactive and capability testing
CoG GT units	Generator	Miscellaneous (Generator)		4850	Core monitor alarm
CoG GT units	Generator	Miscellaneous (Generator)		4860	Generator neutral grounding equipment
CoG GT units	Generator	Miscellaneous (Generator)		4899	Other miscellaneous generator problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

HEAT RECOVERY STEAM GENERATOR (HRSG)

(Waste Heat Boiler)

TABLE B03-45 Heat Recovery Steam Generator (HRSG): HRSG Boiler Air and Gas Systems - Air Supply

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1400	Forced draft fans

CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1401	Forced draft fan dampers
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1407	Forced draft fan lubrication system
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1410	Forced draft fan motors
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1411	Forced draft fan motors - variable speed
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1412	Forced draft fan drives (other than motor)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1415	Forced draft fan controls
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1420	Other forced draft fan problems
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1456	Induced draft fan dampers
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-46 Heat Recovery Steam Generator (HRSG): HRSG Boiler Air and Gas Systems - Miscellaneous (Boiler Air and Gas Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1590	Stacks (use code 8430 for stack problems due to pollution control equipment)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1591	Stack damper and linkage
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1592	Stack damper linkage motors
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1599	Other miscellaneous boiler air and gas system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-47 Heat Recovery Steam Generator (HRSG): HRSG Boiler Control Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1700	Feedwater controls (report local controls - feedwater pump, feedwater regulator valve, etc., - with component or system)

CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1710	Combustion/steam condition controls (report local controls - burners, pulverizers, etc., - with component or system)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1720	Desuperheater/attemperator controls
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1730	Boiler explosion or implosion
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1740	Boiler drum gage glasses / level indicator
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1750	Burner management system
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1760	Feedwater instrumentation (not local controls)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1761	Combustion/Steam condition instrumentation (not local controls)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1762	Desuperheater/attemperator instrumentation (not local controls)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1799	Other boiler instrumentation and control problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Iincluding instruments which input to the controls.					

TABLE B03-48 Heat Recovery Steam Generator (HRSG): HRSG Boiler Design Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Design Limitations		1900	Improper balance between tube sections not due to fouling or plugging
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Design Limitations		1910	Inadequate air not due to equipment problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-49 Heat Recovery Steam Generator (HRSG): HRSG Boiler Fuel Supply - Burners (Duct Burners)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	358	Oil burner piping and valves
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	359	Gas burner piping and valves
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	360	Burners
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	361	Burner orifices
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	370	Burner instruments and controls (except light off)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	380	Light off (igniter) systems (including fuel supply)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	385	Igniters
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	410	Other burner problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-50 Heat Recovery Steam Generator (HRSG): HRSG Boiler Fuel Supply - Oil and Gas Systems (except light off)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	440	Fuel oil pumps (general)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	441	Fuel oil pumps (burner supply)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	442	Fuel oil pumps (forwarding/transfer)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	443	Fuel oil (burner supply) pump drives
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	444	Fuel oil (forwarding/transfer) pump drives
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	450	Fuel oil heaters
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	460	Fuel oil atomizers
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	470	Oil and gas fires

CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	480	Other oil and gas fuel supply problems (see codes 0360-0410 for burner problems)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-51 Heat Recovery Steam Generator (HRSG): HRSG Boiler Internals and Structures

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		800	Drums and drum internals (single drum only)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		801	HP Drum (including drum level trips not attributable to other causes)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		802	IP Drum (including drum level trips not attributable to other causes)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		803	LP Drum (including drum level trips not attributable to other causes)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		810	Boiler supports and structures (use code 1320 for tube supports)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		820	Casing
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		830	Doors
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		840	Refractory and insulation
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		845	Windbox expansion joints
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		847	Other expansion joints
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		848	Inlet panel
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		850	Other internal or structural problems
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		855	Drum relief/safety valves (single drum only)

CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		856	HP Drum relief/safety valves
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		857	IP Drum relief/safety valves
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		858	LP Drum relief/safety valves
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		859	Tube external fins/membranes
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-52 Heat Recovery Steam Generator (HRSG): HRSG Boiler Overhaul and Inspections

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1800	Major boiler overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1801	Minor boiler overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1810	Other boiler inspections
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1811	Boiler Inspections - problem identification / investigation
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1812	Boiler Inspections - scheduled or routine
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1820	Chemical cleaning/steam blows
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-53 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - Boiler Recirculation

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	740	Boiler recirculation pumps
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	741	Boiler recirculation pumps - motors

CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	750	Boiler recirculation piping including downcomers
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	760	Boiler recirculation valves
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	770	Other boiler recirculation problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-54 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - Feedwater and Blowdown

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	670	Feedwater piping downstream of feedwater regulating valve
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	680	Feedwater valves (not feedwater regulating valve)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	690	Other feedwater problems downstream of feedwater regulating valve (use codes 3401 to 3499 for remainder of feedwater system)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	700	Blowdown system valves
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	710	Blowdown system piping
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	720	Blowdown system controls / instrumentation
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	730	Other blowdown system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-55 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Cold and Hot Reheat Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	540	Hot reheat steam piping up to turbine stop valves
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	541	Cold reheat steam piping up to boiler
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	550	Reheat steam relief/safety valves

CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	560	Other hot reheat steam valves (not including turbine stop or intercept valves)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	561	Other cold reheat steam valves (not including turbine stop or intercept valves)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	570	Other reheat steam problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-56 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Desuperheaters/Attemperators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6140	HP Desuperheater/attemperator piping - Greater than 600 PSIG.
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6141	HP Desuperheater/attemperator valves
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6142	HP Desuperheater/attemperator spray nozzles
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6143	HP Desuperheater/attemperator drums
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6144	Other HP desuperheater/attemperator problems
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6145	IP Desuperheater/attemperator piping - Between 200-600 PSIG
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6146	IP Desuperheater/attemperator valves
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6147	IP Desuperheater/attemperator spray nozzles
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6148	IP Desuperheater/attemperator drums
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6149	Other IP desuperheater/attemperator problems
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6150	LP Desuperheater/attemperator piping - Less than 200 PSIG
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6151	LP Desuperheater/attemperator valves

CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6152	LP Desuperheater/attemperator spray nozzles
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6153	LP Desuperheater/attemperator drums
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6154	Other LP desuperheater/attemperator problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-57 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Main Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	500	Main steam piping up to turbine stop valves
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	510	Main steam relief/safety valves off superheater
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	520	Other main steam valves (including vent and drain valves but not including the turbine stop valves)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	530	Other main steam system problems
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6110	HP steam piping up to turbine stop valves - Greater than 600 PSIG (see 0790 for piping supports)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6111	HP steam relief/safety valves
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6112	Other HP steam valves (including vent and drain valves but not including the turbine stop valves)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6113	Other HP steam system problems
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6114	HP steam isolation/boundary valves
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6120	IP steam piping up to turbine stop valves - Between 200 & 600

					PSIG (see 0790 for piping supports)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6121	IP steam relief/safety valves
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6122	Other IP steam valves (including vent and drain valves but not including the turbine stop valves)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6123	Other IP steam system problems
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6124	IP steam isolation/boundary valves
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6130	LP steam piping up to turbine stop valves - Less than 200 PSIG (see 0790 for piping supports)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6131	LP steam relief/safety valves
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6132	Other LP steam valves (including vent and drain valves but not including the turbine stop valves)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6133	Other LP steam system problems
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6134	Other main steam valves (including vent and drain valves but not including the turbine stop valves)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6135	LP steam isolation/boundary valves
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-58 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Startup Bypass

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6160	HP Startup bypass system piping (including drain lines up to heaters or condenser) - Greater than 600 PSIG

CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6161	HP Startup bypass system valves
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6162	HP Startup bypass tanks or flash tanks
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6163	Other HP startup bypass system problems
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6164	HP startup bypass instrumentation and controls
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6170	IP Startup bypass system piping (including drain lines up to heaters or condenser) - Between 200-600 PSIG
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6171	IP Startup bypass system valves
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6172	IP Startup bypass tanks or flash tanks
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6173	Other IP startup bypass system problems
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6174	IP startup bypass instrumentation and controls
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6180	LP Startup bypass system piping (including drain lines up to heaters or condenser) - Less than 200 PSIG
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6181	LP Startup bypass system valves
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6182	LP Startup bypass tanks or flash tanks
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6183	Other LP startup bypass system problems
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6184	LP startup bypass instrumentation and controls
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-59 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - Miscellaneous (Piping)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	775	Economizer piping

CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	780	Headers between tube bundles
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	782	Headers and caps
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	790	Pipe hangers, brackets, supports (general)
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	799	Other miscellaneous piping system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-60 Heat Recovery Steam Generator (HRSG): HRSG Boiler Tube Leaks

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6005	HP Evaporator tubes
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6006	IP Evaporator tubes
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6007	LP Evaporator tubes
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6010	HP superheater
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6011	HP reheater
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6012	HP economizer
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6020	IP superheater
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6021	IP reheater
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6022	IP economizer
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6030	LP reheater
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6031	LP superheater
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6032	LP economizer
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6090	Other HRSG tube problems

Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use code 0859 for tube/membrane failures.

TABLE B03-61 Heat Recovery Steam Generator (HRSG): HRSG Boiler Water Condition					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG GT units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Water Condition		1850	Boiler water condition (not feedwater water quality)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-62 Heat Recovery Steam Generator (HRSG): Miscellaneous (HRSG Boiler)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		1980	Boiler safety valve test
CoG GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		1990	Boiler performance testing (use code 9999 for total unit performance testing)
CoG GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		1999	Boiler, miscellaneous
CoG GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		6000	Heat recovery steam generator to gas turbine connecting equipment. For additional codes, use Fossil Steam Cause Codes 0010 to 1999.
CoG GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		6100	Steam turbine to gas turbine coupling. For additional codes, use Fossil Steam Cause Codes 4000 to 4499.
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use more specific codes - other slagging and fouling problems, other control problems, etc. whenever possible. Describe miscellaneous problems in the verbal description.					

TABLE B03-63 Heat Recovery Steam Generator (HRSG): Miscellaneous HRSG Boiler Tube Problems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1300	Water side fouling

CoG GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1305	Fireside cleaning (which requires a full outage) Use code 1200 for cleanings that cause deratings.
CoG GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1310	Water side cleaning (acid cleaning)
CoG GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1320	Tube supports/attachments
CoG GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1330	Slag fall damage
CoG GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1340	Tube modifications (including addition and removal of tubes)
CoG GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1350	Other miscellaneous boiler tube problems
CoG GT units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1360	Boiler drains system
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

INACTIVE STATES

TABLE B03-64 Inactive States: Inactive States

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Inactive States	Inactive States		2	Inactive Reserve Shutdown
CoG GT units	Inactive States	Inactive States		9990	Retired unit
CoG GT units	Inactive States	Inactive States		9991	Mothballed unit
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

JET ENGINE

TABLE B03-65 Jet Engine: Auxiliary Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Jet Engine	Auxiliary Systems		5510	Lube oil system
CoG GT units	Jet Engine	Auxiliary Systems		5516	Power Augmentation System Equipment
CoG GT units	Jet Engine	Auxiliary Systems		5520	Hydraulic oil system
CoG GT units	Jet Engine	Auxiliary Systems		5530	Starting system (including motor)
CoG GT units	Jet Engine	Auxiliary Systems		5540	Battery and charger system
CoG GT units	Jet Engine	Auxiliary Systems		5550	Turning gear and motor
CoG GT units	Jet Engine	Auxiliary Systems		5551	Load gear compartment

CoG GT units	Jet Engine	Auxiliary Systems		5560	Cooling and seal air system
CoG GT units	Jet Engine	Auxiliary Systems		5570	Cooling water system
CoG GT units	Jet Engine	Auxiliary Systems		5580	Anti-icing system
CoG GT units	Jet Engine	Auxiliary Systems		5590	Other auxiliary system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-66 Jet Engine: Exhaust Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Jet Engine	Exhaust Systems		5500	Chamber
CoG GT units	Jet Engine	Exhaust Systems		5501	Hoods
CoG GT units	Jet Engine	Exhaust Systems		5502	Vanes/nozzles
CoG GT units	Jet Engine	Exhaust Systems		5503	Silencer
CoG GT units	Jet Engine	Exhaust Systems		5504	Cones
CoG GT units	Jet Engine	Exhaust Systems		5505	Diverter Dampers
CoG GT units	Jet Engine	Exhaust Systems		5508	High engine exhaust temperature
CoG GT units	Jet Engine	Exhaust Systems		5509	Other exhaust problems (including high exhaust temperature not attributable to a specific problem)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-67 Jet Engine: Fuel, Ignition, and Combustion Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5440	Fuel tanks
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5441	Fuel piping and valves
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5442	Fuel nozzles/vanes
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5443	Fuel filters
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5444	Liquid fuel oil pump
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5445	Liquid fuel oil transfer/forwarding pump
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5446	Liquid fuel purge system

CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5447	Gas fuel system including controls and instrumentation
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5449	Other fuel system problems
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5450	Ignition system
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5451	Pilot fuel piping and valves
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5452	Pilot fuel nozzles/vanes
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5453	Pilot fuel filters
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5454	Water injection system
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5455	Fuel nozzle/vane cooling air system
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5460	Atomizing air system
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5470	Combustor casing
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5471	Combustor liner
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5472	Combustor caps
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5473	Flame scanners
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5474	Flashback (including instrumentation)
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5475	Blade path temperature spread
CoG GT units	Jet Engine	Fuel, Ignition, and Combustion Systems		5479	Other combustor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-68 Jet Engine: Inlet Air System and Compressors - Compressors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5410	High pressure shaft
CoG GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5411	High pressure bearings

CoG GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5412	High pressure blades/buckets
CoG GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5413	Other high pressure problems
CoG GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5414	Compressor diaphragms/vanes
CoG GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5420	Low pressure shaft
CoG GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5421	Low pressure bearings
CoG GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5422	Low pressure blades/buckets
CoG GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5429	Other low pressure problems
CoG GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5430	Supercharging fans
CoG GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5435	Compressor washing
CoG GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5436	Compressor shaft and bearings for two-shaft machines
CoG GT units	Jet Engine	Inlet Air System and Compressors	Compressors	5439	Other compressor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP compressor if only one.					

TABLE B03-69 Jet Engine: Inlet Air System and Compressors - Ducts and Filters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5400	Inlet air ducts
CoG GT units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5401	Inlet air vanes/nozzles
CoG GT units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5402	Inlet air filters
CoG GT units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5403	Inlet and exhaust cones
CoG GT units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5404	Inlet air chillers
CoG GT units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5405	Inlet air evaporative coolers
CoG GT units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5406	Inlet air foggers
CoG GT units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5409	Other inlet air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP compressor if only one.					

TABLE B03-70 Jet Engine: Miscellaneous (Jet Engine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5600	Reduction gear
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5601	Load shaft and bearings
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5605	Main coupling between the turbine and generator
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5606	Clutch
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5610	Intercoolers
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5620	Regenerators
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5630	Heat shields

CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5640	Fire detection and extinguishing system
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5641	Fire in unit
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5645	Jet Engine Control System - data highway
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5646	Jet Engine Control System - hardware problems (including card failure)
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5647	Jet Engine Control System - internal and termination wiring
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5648	Jet Engine Control System - logic problems
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5649	Jet Engine Control System - upgrades
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5650	Other controls and instrumentation problems
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5660	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5661	Engine/compressor washing
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5662	Engine exchange
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5665	Engine shafts and bearings
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5670	Hot end inspection
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5672	Boroscope inspection
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5674	General unit inspection
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5680	Vibration (not engine) in unit not attributable to bearings or other components
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5685	Engine vibration
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5686	Jet engine lockout
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5690	Engine performance testing - individual engines (use code 9999 for total unit performance testing)
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5692	Turbine Overspeed Trip Test - Jet Engine
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5695	Synchronous condenser equipment
CoG GT units	Jet Engine	Miscellaneous (Jet Engine)		5699	Other miscellaneous jet engine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-71 Jet Engine: Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Jet Engine	Turbine		5480	High pressure shaft
CoG GT units	Jet Engine	Turbine		5481	High pressure bearings
CoG GT units	Jet Engine	Turbine		5482	High pressure blades/buckets
CoG GT units	Jet Engine	Turbine		5483	High pressure nozzles/vanes
CoG GT units	Jet Engine	Turbine		5484	High pressure casing/expansion joint
CoG GT units	Jet Engine	Turbine		5485	Interstage gas passages
CoG GT units	Jet Engine	Turbine		5486	High pressure shaft seals
CoG GT units	Jet Engine	Turbine		5487	Thrust bearing
CoG GT units	Jet Engine	Turbine		5489	Other high pressure problems
CoG GT units	Jet Engine	Turbine		5490	Low pressure shaft
CoG GT units	Jet Engine	Turbine		5491	Low pressure bearings
CoG GT units	Jet Engine	Turbine		5492	Low pressure blades/buckets
CoG GT units	Jet Engine	Turbine		5493	Low pressure nozzles/vanes
CoG GT units	Jet Engine	Turbine		5494	Low pressure casing/expansion joints
CoG GT units	Jet Engine	Turbine		5497	Other low pressure problems
CoG GT units	Jet Engine	Turbine		5498	Expansion joints
CoG GT units	Jet Engine	Turbine		5499	Shaft seals
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP if only one.					

MISCELLANEOUS

TABLE B03-72 Miscellaneous: Instruments and Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Miscellaneous	Instruments and Controls		6200	Combined cycle instruments and controls. (Report instruments and controls specific to the gas turbine, steam turbine, boiler, generator, or balance of plant using the codes for the appropriate piece of equipment.)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

PERFORMANCE

TABLE B03-73 Performance: Performance

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Performance	Performance		9997	NERC Reliability Standard Requirement

CoG GT units	Performance	Performance		9998	Black start testing
CoG GT units	Performance	Performance		9999	Total unit performance testing (use appropriate codes for individual component testing)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

PERSONNEL OR PROCEDURAL ERRORS

TABLE B03-74 Personnel or Procedural Errors: Personnel or Procedural Errors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Personnel or Procedural Errors	Personnel or Procedural Errors		9900	Operator error
CoG GT units	Personnel or Procedural Errors	Personnel or Procedural Errors		9910	Maintenance personnel error
CoG GT units	Personnel or Procedural Errors	Personnel or Procedural Errors		9920	Contractor error
CoG GT units	Personnel or Procedural Errors	Personnel or Procedural Errors		9930	Operating procedure error
CoG GT units	Personnel or Procedural Errors	Personnel or Procedural Errors		9940	Maintenance procedure error
CoG GT units	Personnel or Procedural Errors	Personnel or Procedural Errors		9950	Contractor procedure error
CoG GT units	Personnel or Procedural Errors	Personnel or Procedural Errors		9960	Staff shortage
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

POLLUTION CONTROL EQUIPMENT

TABLE B03-75 Pollution Control Equipment: CO Reduction

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Pollution Control Equipment	CO Reduction		8840	CO Active catalyst
CoG GT units	Pollution Control Equipment	CO Reduction		8841	CO Support materials
CoG GT units	Pollution Control Equipment	CO Reduction		8842	CO Plugging
CoG GT units	Pollution Control Equipment	CO Reduction		8845	Other CO reduction problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-76 Pollution Control Equipment: Continuous Emissions Monitoring Systems (CEMS)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

CoG GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8700	CEMS Certification and Recertification
CoG GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8710	SO2 analyzer problems
CoG GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8720	NOx analyzer problems
CoG GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8730	CO analyzer problems
CoG GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8740	CO2 analyzer problems
CoG GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8750	O2 analyzer problems
CoG GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8760	Opacity monitor problems
CoG GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8770	Flow monitor problems
CoG GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8780	Data acquisition system problems
CoG GT units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8790	Miscellaneous CEMS problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-77 Pollution Control Equipment: NOx Reduction Systems - Catalytic Air Heaters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8830	CAH NOx Active catalyst
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8831	CAH NOx Support materials
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8832	CAH NOx Plugging
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8835	Other CAH problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-78 Pollution Control Equipment: NOx Reduction Systems - Selective Catalytic Reduction Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8810	SCR NOx Reactor
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8811	SCR NOx Reagent
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8812	SCR NOx Catalyst
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8813	SCR NOx Injection grid piping/valves
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8814	SCR NOx Catalyst support material
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8815	SCR NOx Soot blowers
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8816	SCR NOx Plugging

CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8817	SCR NOx Control system
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8820	SCR NOx Ammonia injection grid piping/valves
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8821	SCR NOx Ammonia tanks, piping and valves (not injection)
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8822	SCR NOx Ammonia air blowers
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8823	SCR NOx Other ammonia system problems
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8825	Other SCR NOx problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-79 Pollution Control Equipment: NOx Reduction Systems - Selective Non-Catalytic Reduction Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8800	SNCR NOx Reagent
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8801	SNCR NOx Carrier gas
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8802	SNCR NOx Control system
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8803	SNCR Performance Testing
CoG GT units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8809	Other SNCR NOx problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use code 0360 for Low NOx Burners.					

REGULATORY, SAFETY, ENVIRONMENTAL

Use these codes only for events not directly attributable to equipment failures. Inspections or testing of certain equipment due to regulation are reported using the appropriate equipment cause codes, and the fact that it was a regulatory requirement noted in the verbal description section.

TABLE B03-80 Regulatory, Safety, Environmental: Other Operating Environmental Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9660	Thermal discharge limits - fossil and nuclear
CoG GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9663	Thermal discharge limits - gas turbines
CoG GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9664	Thermal discharge limits - jet engines
CoG GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9670	Noise limits (not for personnel safety) - fossil and nuclear

CoG GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9673	Noise limits (not for personnel safety) - gas turbines
CoG GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9674	Noise limits (not for personnel safety) - jet engines
CoG GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9677	Noise limits testing - fossil
CoG GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9678	Noise limits testing - gas turbines
CoG GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9679	Noise limits testing - jet engines
CoG GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9680	Fish kill - fossil and nuclear
CoG GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9683	Fish kill - gas turbines
CoG GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9684	Fish kill - jet engines
CoG GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9690	Other miscellaneous operational environmental limits - fossil and nuclear
CoG GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9693	Other miscellaneous operational environmental limits - gas turbines
CoG GT units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9694	Other miscellaneous operational environmental limits - jet engines
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-81 Regulatory, Safety, Environmental: Regulatory

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Regulatory, Safety, Environmental	Regulatory		9504	Regulatory (environmental) proceedings and hearings - regulatory agency initiated
CoG GT units	Regulatory, Safety, Environmental	Regulatory		9506	Regulatory (environmental) proceedings and hearings - intervenor initiated
CoG GT units	Regulatory, Safety, Environmental	Regulatory		9510	Plant modifications strictly for compliance with new or changed regulatory requirements (scrubbers, cooling towers, etc.)

CoG GT units	Regulatory, Safety, Environmental	Regulatory		9520	Oil spill in Gulf of Mexico (OMC)
CoG GT units	Regulatory, Safety, Environmental	Regulatory		9590	Miscellaneous regulatory (this code is primarily intended for use with event contribution code 2 to indicate that a regulatory-related factor contributed to the primary cause of the event)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-82 Regulatory, Safety, Environmental: Safety

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Regulatory, Safety, Environmental	Safety		9700	OSHA-related retrofit or inspection
CoG GT units	Regulatory, Safety, Environmental	Safety		9720	Other safety problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-83 Regulatory, Safety, Environmental: Stack Emission

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Regulatory, Safety, Environmental	Stack Emission		9600	SO2 stack emissions - fossil
CoG GT units	Regulatory, Safety, Environmental	Stack Emission		9603	SO2 stack emissions - gas turbines
CoG GT units	Regulatory, Safety, Environmental	Stack Emission		9604	SO2 stack emissions - jet engines
CoG GT units	Regulatory, Safety, Environmental	Stack Emission		9610	NOx stack emissions - fossil
CoG GT units	Regulatory, Safety, Environmental	Stack Emission		9613	NOx stack emissions - gas turbines
CoG GT units	Regulatory, Safety, Environmental	Stack Emission		9614	NOx stack emissions - jet engines
CoG GT units	Regulatory, Safety, Environmental	Stack Emission		9616	CO stack emissions - fossil
CoG GT units	Regulatory, Safety, Environmental	Stack Emission		9620	Particulate stack emissions - fossil

CoG GT units	Regulatory, Safety, Environmental	Stack Emission		9623	Particulate stack emissions - gas turbines
CoG GT units	Regulatory, Safety, Environmental	Stack Emission		9624	Particulate stack emissions - jet engines
CoG GT units	Regulatory, Safety, Environmental	Stack Emission		9630	Opacity - fossil
CoG GT units	Regulatory, Safety, Environmental	Stack Emission		9633	Opacity - gas turbines
CoG GT units	Regulatory, Safety, Environmental	Stack Emission		9634	Opacity - jet engines
CoG GT units	Regulatory, Safety, Environmental	Stack Emission		9650	Other stack/exhaust emissions - fossil (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
CoG GT units	Regulatory, Safety, Environmental	Stack Emission		9653	Other stack or exhaust emissions - gas turbines (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
CoG GT units	Regulatory, Safety, Environmental	Stack Emission		9654	Other stack or exhaust emissions - jet engines (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
CoG GT units	Regulatory, Safety, Environmental	Stack Emission		9656	Other stack or exhaust emissions testing - fossil
CoG GT units	Regulatory, Safety, Environmental	Stack Emission		9657	Other stack or exhaust emissions testing - gas turbines
CoG GT units	Regulatory, Safety, Environmental	Stack Emission		9658	Other stack or exhaust emissions testing - jet engines
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Include exhaust emissions.					

STEAM TURBINE

Besides the turbine, this set includes the steam stop/control valves, turbine control system, and the turbine auxiliaries. The extraction steam codes are contained in the Balance of Plant set.

TABLE B03-84 Steam Turbine: Controls					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG GT units	Steam Turbine	Controls		4290	Hydraulic system pumps
CoG GT units	Steam Turbine	Controls		4291	Hydraulic system coolers
CoG GT units	Steam Turbine	Controls		4292	Hydraulic system filters
CoG GT units	Steam Turbine	Controls		4293	Hydraulic system pipes and valves
CoG GT units	Steam Turbine	Controls		4299	Other hydraulic system problems
CoG GT units	Steam Turbine	Controls		4300	Turbine supervisory system (use codes 4290 to 4299 for hydraulic oil)
CoG GT units	Steam Turbine	Controls		4301	Turbine governing system
CoG GT units	Steam Turbine	Controls		4302	Turbine trip devices (including instruments)
CoG GT units	Steam Turbine	Controls		4303	Exhaust hood and spray controls
CoG GT units	Steam Turbine	Controls		4304	Automatic turbine control systems - mechanical
CoG GT units	Steam Turbine	Controls		4305	Automatic turbine control systems - mechanical - hydraulic
CoG GT units	Steam Turbine	Controls		4306	Automatic turbine control systems - electro-hydraulic - analog
CoG GT units	Steam Turbine	Controls		4307	Automatic turbine control systems - electro-hydraulic - digital
CoG GT units	Steam Turbine	Controls		4308	Automatic turbine control systems - digital control and monitoring
CoG GT units	Steam Turbine	Controls		4309	Other turbine instrument and control problems
CoG GT units	Steam Turbine	Controls		4310	Steam Turbine Control System - data highway
CoG GT units	Steam Turbine	Controls		4311	Steam Turbine Control System - hardware problems (including card failure)
CoG GT units	Steam Turbine	Controls		4312	Steam Turbine Control System - internal and termination wiring
CoG GT units	Steam Turbine	Controls		4313	Steam Turbine Control System - logic problems
CoG GT units	Steam Turbine	Controls		4314	Steam Turbine Control System - upgrades
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-85 Steam Turbine: High Pressure Turbine					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG GT units	Steam Turbine	High Pressure Turbine		4000	Outer casing
CoG GT units	Steam Turbine	High Pressure Turbine		4001	Inner casing
CoG GT units	Steam Turbine	High Pressure Turbine		4009	Nozzle bolting
CoG GT units	Steam Turbine	High Pressure Turbine		4010	Nozzles and nozzle blocks
CoG GT units	Steam Turbine	High Pressure Turbine		4011	Diaphragms
CoG GT units	Steam Turbine	High Pressure Turbine		4012	Buckets or blades
CoG GT units	Steam Turbine	High Pressure Turbine		4013	Diaphragms unit and shroud type
CoG GT units	Steam Turbine	High Pressure Turbine		4014	Bucket or blade fouling
CoG GT units	Steam Turbine	High Pressure Turbine		4015	Wheels or spindles
CoG GT units	Steam Turbine	High Pressure Turbine		4020	Shaft seals
CoG GT units	Steam Turbine	High Pressure Turbine		4021	Dummy rings
CoG GT units	Steam Turbine	High Pressure Turbine		4022	Gland rings
CoG GT units	Steam Turbine	High Pressure Turbine		4030	Rotor shaft
CoG GT units	Steam Turbine	High Pressure Turbine		4040	Bearings
CoG GT units	Steam Turbine	High Pressure Turbine		4041	Thrust bearings
CoG GT units	Steam Turbine	High Pressure Turbine		4099	Other high pressure turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-86 Steam Turbine: Intermediate Pressure Turbine					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG GT units	Steam Turbine	Intermediate Pressure Turbine		4100	Outer casing
CoG GT units	Steam Turbine	Intermediate Pressure Turbine		4101	Inner casing
CoG GT units	Steam Turbine	Intermediate Pressure Turbine		4109	Nozzle bolting
CoG GT units	Steam Turbine	Intermediate Pressure Turbine		4110	Nozzles and nozzle blocks
CoG GT units	Steam Turbine	Intermediate Pressure Turbine		4111	Diaphragms
CoG GT units	Steam Turbine	Intermediate Pressure Turbine		4112	Buckets or blades
CoG GT units	Steam Turbine	Intermediate Pressure Turbine		4113	Bucket or blade fouling
CoG GT units	Steam Turbine	Intermediate Pressure Turbine		4115	Wheels or spindles
CoG GT units	Steam Turbine	Intermediate Pressure Turbine		4120	Shaft seals
CoG GT units	Steam Turbine	Intermediate Pressure Turbine		4121	Dummy rings
CoG GT units	Steam Turbine	Intermediate Pressure Turbine		4122	Gland rings
CoG GT units	Steam Turbine	Intermediate Pressure Turbine		4130	Rotor shaft
CoG GT units	Steam Turbine	Intermediate Pressure Turbine		4140	Bearings
CoG GT units	Steam Turbine	Intermediate Pressure Turbine		4141	Thrust bearings

CoG GT units	Steam Turbine	Intermediate Pressure Turbine		4199	Other intermediate pressure turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-87 Steam Turbine: Low Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Steam Turbine	Low Pressure Turbine		4200	Outer casing
CoG GT units	Steam Turbine	Low Pressure Turbine		4201	Inner casing
CoG GT units	Steam Turbine	Low Pressure Turbine		4209	Nozzle bolting
CoG GT units	Steam Turbine	Low Pressure Turbine		4210	Nozzles and nozzle blocks
CoG GT units	Steam Turbine	Low Pressure Turbine		4211	Diaphragms
CoG GT units	Steam Turbine	Low Pressure Turbine		4212	Buckets or blades
CoG GT units	Steam Turbine	Low Pressure Turbine		4213	Bucket or blade fouling
CoG GT units	Steam Turbine	Low Pressure Turbine		4215	Wheels or spindles
CoG GT units	Steam Turbine	Low Pressure Turbine		4220	Shaft seals
CoG GT units	Steam Turbine	Low Pressure Turbine		4221	Dummy rings
CoG GT units	Steam Turbine	Low Pressure Turbine		4222	Gland rings
CoG GT units	Steam Turbine	Low Pressure Turbine		4230	Rotor shaft
CoG GT units	Steam Turbine	Low Pressure Turbine		4240	Bearings
CoG GT units	Steam Turbine	Low Pressure Turbine		4241	Thrust bearings
CoG GT units	Steam Turbine	Low Pressure Turbine		4250	Other low pressure turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-88 Steam Turbine: Lube Oil

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Steam Turbine	Lube Oil		4280	Lube oil pumps
CoG GT units	Steam Turbine	Lube Oil		4281	Lube oil coolers
CoG GT units	Steam Turbine	Lube Oil		4282	Lube oil conditioners
CoG GT units	Steam Turbine	Lube Oil		4283	Lube oil system valves and piping
CoG GT units	Steam Turbine	Lube Oil		4284	Lube oil pump drive
CoG GT units	Steam Turbine	Lube Oil		4289	Other lube oil system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Do not include bearing failures due to lube oil.					

TABLE B03-89 Steam Turbine: Miscellaneous (Steam Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4400	Major turbine overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
CoG GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4401	Inspection
CoG GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4402	Minor turbine overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
CoG GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4410	Turning gear and motor
CoG GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4411	Steam turbine gear box (single shaft configuration)
CoG GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4412	Steam turbine clutch (single shaft configuration)
CoG GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4415	Shaft coupling mechanism
CoG GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4420	Vibration of the turbine generator unit that cannot be attributed to a specific cause such as bearings or blades (use this code for balance moves)
CoG GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4430	Gland seal system
CoG GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4450	Water induction
CoG GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4460	Turbine overspeed trip test
CoG GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4470	Differential expansion
CoG GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4490	Turbine performance testing (use code 9999 for total unit performance testing)
CoG GT units	Steam Turbine	Miscellaneous (Steam Turbine)		4499	Other miscellaneous steam turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-90 Steam Turbine: Piping

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Steam Turbine	Piping		4270	Crossover or under piping
CoG GT units	Steam Turbine	Piping		4279	Miscellaneous turbine piping
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B03-91 Steam Turbine: Valves

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG GT units	Steam Turbine	Valves		4260	Main stop valves
CoG GT units	Steam Turbine	Valves		4261	Control valves
CoG GT units	Steam Turbine	Valves		4262	Intercept valves
CoG GT units	Steam Turbine	Valves		4263	Reheat stop valves
CoG GT units	Steam Turbine	Valves		4264	Combined intercept valves
CoG GT units	Steam Turbine	Valves		4265	Miscellaneous drain and vent valves
CoG GT units	Steam Turbine	Valves		4266	Main stop valve testing
CoG GT units	Steam Turbine	Valves		4267	Control valve testing
CoG GT units	Steam Turbine	Valves		4268	Reheat/intercept valve testing
CoG GT units	Steam Turbine	Valves		4269	Other turbine valves (including LP steam admission valves)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

Appendix B04: Index to Co-Generator Steam Turbine Unit Cause Codes

CO-GENERATOR STEAM TURBINE UNITS

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B04-1	Balance of Plant	Auxiliary Systems	Auxiliary Steam
B04-2	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems
B04-3	Balance of Plant	Auxiliary Systems	Fire Protection System
B04-4	Balance of Plant	Auxiliary Systems	Instrument Air
B04-5	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System
B04-6	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)
B04-7	Balance of Plant	Auxiliary Systems	Open Cooling Water System
B04-8	Balance of Plant	Auxiliary Systems	Seal Air Fans
B04-9	Balance of Plant	Auxiliary Systems	Service Air
B04-10	Balance of Plant	Auxiliary Systems	Service Water (Open System)
B04-11	Balance of Plant	Circulating Water Systems	
B04-12	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators
B04-13	Balance of Plant	Condensate System	Miscellaneous (Condensate System)
B04-14	Balance of Plant	Condensate System	Polishers/Chemical Addition
B04-15	Balance of Plant	Condensate System	Pumps, Piping, and Valves
B04-16	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals
B04-17	Balance of Plant	Condensing System	Condenser Controls
B04-18	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment
B04-19	Balance of Plant	Condensing System	Miscellaneous (Condensing System)
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B04-21	Balance of Plant	Electrical	
B04-22	Balance of Plant	Extraction Steam	
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B04-25	Balance of Plant	Miscellaneous (Balance of Plant)	
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B04-27	Balance of Plant	Waste Water (zero discharge) Systems	
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B04-36	Gas Turbine	Inlet Air System and Compressors	Compressors
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B04-64	Inactive States	Inactive States	
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B04-69	Jet Engine	Inlet Air System and Compressors	Ducts and Filters
B04-70	Jet Engine	Miscellaneous (Jet Engine)	
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B04-72	Miscellaneous	Instruments and Controls	
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B04-77	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters
B04-78	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems
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B04-90	Steam Turbine	Piping	
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BALANCE OF PLANT

TABLE B04-1 Balance of Plant: Auxiliary Systems - Auxiliary Steam					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG steam units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3830	Auxiliary boiler
CoG steam units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3831	Auxiliary steam piping
CoG steam units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3832	Auxiliary steam valves
CoG steam units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3833	Auxiliary steam controls and instruments
CoG steam units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3834	Auxiliary boiler tube leaks
CoG steam units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3835	Auxiliary boiler burner management system

CoG steam units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3836	Steam transfer to other unit
CoG steam units	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3839	Other auxiliary steam problems (also see extraction steam codes 3520 to 3529; startup bypass codes 0630 to 0660; and soot blower steam code 0870)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-2 Balance of Plant: Auxiliary Systems - Closed Cooling Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3820	Closed cooling water pumps and motors
CoG steam units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3821	Closed cooling water piping
CoG steam units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3822	Closed cooling water valves
CoG steam units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3823	Closed cooling water heat exchangers
CoG steam units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3824	Closed cooling water system fouling
CoG steam units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3825	Closed cooling water instrumentation
CoG steam units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3826	Closed cooling water strainer
CoG steam units	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3829	Other closed cooling water system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-3 Balance of Plant: Auxiliary Systems - Fire Protection System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Balance of Plant	Auxiliary Systems	Fire Protection System	3860	Fire protection system pumps
CoG steam units	Balance of Plant	Auxiliary Systems	Fire Protection System	3861	Fire protection system piping
CoG steam units	Balance of Plant	Auxiliary Systems	Fire Protection System	3862	Fire protection system valves
CoG steam units	Balance of Plant	Auxiliary Systems	Fire Protection System	3863	Fire protection system fouling
CoG steam units	Balance of Plant	Auxiliary Systems	Fire Protection System	3864	Fire protection system instrumentation and controls
CoG steam units	Balance of Plant	Auxiliary Systems	Fire Protection System	3869	Other fire protection system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-4 Balance of Plant: Auxiliary Systems - Instrument Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Balance of Plant	Auxiliary Systems	Instrument Air	3850	Instrument air compressors

CoG steam units	Balance of Plant	Auxiliary Systems	Instrument Air	3851	Instrument air piping
CoG steam units	Balance of Plant	Auxiliary Systems	Instrument Air	3852	Instrument air valves
CoG steam units	Balance of Plant	Auxiliary Systems	Instrument Air	3853	Instrument air dryers
CoG steam units	Balance of Plant	Auxiliary Systems	Instrument Air	3854	N2 backup to instrument air
CoG steam units	Balance of Plant	Auxiliary Systems	Instrument Air	3859	Other instrument air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-5 Balance of Plant: Auxiliary Systems - Low-pressure Gas Compression System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3870	Fuel Gas Compressor and Motors
CoG steam units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3871	Fuel Gas Compressor Piping
CoG steam units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3872	Fuel Gas Compressor Valves
CoG steam units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3873	Fuel Gas Compressor Heat Exchangers
CoG steam units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3874	Fuel Gas Compressor Controls and Instrumentation
CoG steam units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3875	Fuel Gas Compressor Filters
CoG steam units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3876	Fuel Gas Compressor Fire System
CoG steam units	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3879	Fuel Gas Compressor - other
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-6 Balance of Plant: Auxiliary Systems - Miscellaneous (Auxiliary Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3898	Miscellaneous plant auxiliary process and services instrumentation and controls
CoG steam units	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3899	Other miscellaneous auxiliary system problems
CoG steam units	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	6299	Other combined cycle block problems (Use other gas turbine problem codes, other steam turbine codes, etc., whenever appropriate.)

CoG steam units	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	6399	Other coal gasification equipment problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-7 Balance of Plant: Auxiliary Systems - Open Cooling Water System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3800	Open cooling water pumps and motors
CoG steam units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3801	Open cooling water piping
CoG steam units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3802	Open cooling water valves
CoG steam units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3803	Open cooling water heat exchangers
CoG steam units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3804	Open cooling water system fouling
CoG steam units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3805	Open cooling water system instrumentation
CoG steam units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3806	Open cooling water strainer
CoG steam units	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3809	Other open cooling water problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-8 Balance of Plant: Auxiliary Systems - Seal Air Fans

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3880	Seal air fan
CoG steam units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3881	Seal air fan drive - motor
CoG steam units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3882	Seal air control dampers and drives
CoG steam units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3883	Seal air filters
CoG steam units	Balance of Plant	Auxiliary Systems	Seal Air Fans	3889	Other seal air fan problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-9 Balance of Plant: Auxiliary Systems - Service Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Balance of Plant	Auxiliary Systems	Service Air	3840	Service air compressors
CoG steam units	Balance of Plant	Auxiliary Systems	Service Air	3841	Service air piping
CoG steam units	Balance of Plant	Auxiliary Systems	Service Air	3842	Service air valves
CoG steam units	Balance of Plant	Auxiliary Systems	Service Air	3843	Service air dryers
CoG steam units	Balance of Plant	Auxiliary Systems	Service Air	3849	Other service air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-10 Balance of Plant: Auxiliary Systems - Service Water (Open System)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG steam units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3810	Service water pumps and motors
CoG steam units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3811	Service water piping
CoG steam units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3812	Service water valves
CoG steam units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3813	Service water heat exchangers
CoG steam units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3814	Service water system fouling
CoG steam units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3815	Service water strainer
CoG steam units	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3819	Other service water problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-11 Balance of Plant: Circulating Water Systems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG steam units	Balance of Plant	Circulating Water Systems		3210	Circulating water pumps
CoG steam units	Balance of Plant	Circulating Water Systems		3211	Circulating water pump motors
CoG steam units	Balance of Plant	Circulating Water Systems		3220	Circulating water piping
CoG steam units	Balance of Plant	Circulating Water Systems		3221	Circulating water piping fouling
CoG steam units	Balance of Plant	Circulating Water Systems		3230	Circulating water valves
CoG steam units	Balance of Plant	Circulating Water Systems		3231	Waterbox
CoG steam units	Balance of Plant	Circulating Water Systems		3232	Condenser tube cleaning system including debris filter
CoG steam units	Balance of Plant	Circulating Water Systems		3233	Circulating water priming system
CoG steam units	Balance of Plant	Circulating Water Systems		3235	Cooling tower booster pump
CoG steam units	Balance of Plant	Circulating Water Systems		3236	Cooling tower booster motor
CoG steam units	Balance of Plant	Circulating Water Systems		3238	Cooling tower fan motors
CoG steam units	Balance of Plant	Circulating Water Systems		3239	Cooling tower fan motors - variable speed
CoG steam units	Balance of Plant	Circulating Water Systems		3240	Cooling tower fans
CoG steam units	Balance of Plant	Circulating Water Systems		3241	Cooling tower efficiency below design
CoG steam units	Balance of Plant	Circulating Water Systems		3242	Cooling tower fill damage
CoG steam units	Balance of Plant	Circulating Water Systems		3243	Cooling tower icing
CoG steam units	Balance of Plant	Circulating Water Systems		3244	Cooling tower fires
CoG steam units	Balance of Plant	Circulating Water Systems		3245	Other cooling tower problems
CoG steam units	Balance of Plant	Circulating Water Systems		3246	Cooling tower fouling
CoG steam units	Balance of Plant	Circulating Water Systems		3247	Cooling tower instrumentation
CoG steam units	Balance of Plant	Circulating Water Systems		3248	Cooling Tower Overhaul

CoG steam units	Balance of Plant	Circulating Water Systems		3250	Circulating water system instruments and controls
CoG steam units	Balance of Plant	Circulating Water Systems		3260	Traveling screens
CoG steam units	Balance of Plant	Circulating Water Systems		3261	Traveling screen fouling
CoG steam units	Balance of Plant	Circulating Water Systems		3269	Circulating water biological conditions (ie, zebra mussels)
CoG steam units	Balance of Plant	Circulating Water Systems		3270	Intake system problems other than traveling screens
CoG steam units	Balance of Plant	Circulating Water Systems		3271	Intake grating fouling
CoG steam units	Balance of Plant	Circulating Water Systems		3272	Circulating water screenwash system
CoG steam units	Balance of Plant	Circulating Water Systems		3273	Debris in circulating water from outside sources (leaves, mud, etc.)
CoG steam units	Balance of Plant	Circulating Water Systems		3280	High circulating water temperature (not due to season, tower efficiency below design, or other listed equipment problem)
CoG steam units	Balance of Plant	Circulating Water Systems		3281	Circulating water tempering system
CoG steam units	Balance of Plant	Circulating Water Systems		3282	Circulating water cooling ponds
CoG steam units	Balance of Plant	Circulating Water Systems		3285	Circulating water chemistry
CoG steam units	Balance of Plant	Circulating Water Systems		3299	Other circulating water system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-12 Balance of Plant: Condensate System - Low/Intermediate Pressure Heater and Deaerators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3339	LP heater head leaks
CoG steam units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3340	LP heater tube leaks
CoG steam units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3341	Other LP heater - general
CoG steam units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3342	IP heater tube leaks
CoG steam units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3343	Other IP heater - general
CoG steam units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3344	Deaerator (including level control)
CoG steam units	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3345	IP heater head leaks
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-13 Balance of Plant: Condensate System - Miscellaneous (Condensate System)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG steam units	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3360	Condensate makeup and return (including storage tanks)
CoG steam units	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3370	Condensate system controls and instrumentation (not hotwell level, heater level, or deaerator level controls; see codes 3150-3159, 3344, 3502).
CoG steam units	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3380	Condensate coolers
CoG steam units	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3399	Other miscellaneous condensate system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-14 Balance of Plant: Condensate System - Polishers/Chemical Addition					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG steam units	Balance of Plant	Condensate System	Polishers/Chemical Addition	3350	Condensate polishing and filtering systems
CoG steam units	Balance of Plant	Condensate System	Polishers/Chemical Addition	3351	Chemical addition systems
CoG steam units	Balance of Plant	Condensate System	Polishers/Chemical Addition	3352	Feedwater chemistry (not specific to condenser, polishers, or chemical addition)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-15 Balance of Plant: Condensate System - Pumps, Piping, and Valves					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG steam units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3300	Condensate water pre-treatment
CoG steam units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3310	Condensate/hotwell pumps
CoG steam units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3311	Condensate/hotwell pump motor
CoG steam units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3312	Condensate booster pump
CoG steam units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3313	Condensate booster pump motor
CoG steam units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3314	Condensate booster pump motor - variable speed
CoG steam units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3315	Condensate booster pump drive (other than 3313 and 3314)
CoG steam units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3320	Condensate piping
CoG steam units	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3330	Condensate valves
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-16 Balance of Plant: Condensing System - Condenser Casing or Shell and Internals					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG steam units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3120	Tube sheets
CoG steam units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3121	Expansion joint
CoG steam units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3122	Gaskets and seals
CoG steam units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3123	Hot well
CoG steam units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3124	Tube sheet fouling
CoG steam units	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3129	Other condenser casing or shell and internal problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-17 Balance of Plant: Condensing System - Condenser Controls					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG steam units	Balance of Plant	Condensing System	Condenser Controls	3150	Hot well level controls
CoG steam units	Balance of Plant	Condensing System	Condenser Controls	3151	Vacuum pump and air ejector controls
CoG steam units	Balance of Plant	Condensing System	Condenser Controls	3152	Air-cooled condenser controls
CoG steam units	Balance of Plant	Condensing System	Condenser Controls	3159	Other condensing system controls and instruments
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-18 Balance of Plant: Condensing System - Condenser Tubes and Support Equipment					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3110	Condenser tube leaks
CoG steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3111	Condenser tube fouling shell side
CoG steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3112	Condenser tube fouling tube side
CoG steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3113	Condenser tube and water box cleaning (including circulating water flow reversal)

CoG steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3114	Air-cooled condenser tubes
CoG steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3115	Air-cooled condenser pumps
CoG steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3116	Air-cooled condenser fans
CoG steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3117	Air-cooled condenser fan motors
CoG steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3118	Other Air-cooled condenser problems
CoG steam units	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3119	Other condenser tube casing or shell and internal problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-19 Balance of Plant: Condensing System - Miscellaneous (Condensing System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3170	Condenser inspection (use code 3110 to report looking for tube leaks)
CoG steam units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3171	Air-cooled condenser inspections
CoG steam units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3180	Major condenser overhaul
CoG steam units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3185	Water side cathodic protection
CoG steam units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3186	Auxiliary condenser and associated equipment
CoG steam units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3190	Air leakage (for losses not attributable to previously noted equipment related codes)
CoG steam units	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3199	Other miscellaneous condensing system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-20 Balance of Plant: Condensing System - Vacuum Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Balance of Plant	Condensing System	Vacuum Equipment	3130	Air ejectors
CoG steam units	Balance of Plant	Condensing System	Vacuum Equipment	3131	Air ejector piping and valves
CoG steam units	Balance of Plant	Condensing System	Vacuum Equipment	3132	Inter and after condensers
CoG steam units	Balance of Plant	Condensing System	Vacuum Equipment	3133	Vacuum pumps
CoG steam units	Balance of Plant	Condensing System	Vacuum Equipment	3134	Vacuum pump piping and valves

CoG steam units	Balance of Plant	Condensing System	Vacuum Equipment	3135	Vacuum pump motor and auxiliaries
CoG steam units	Balance of Plant	Condensing System	Vacuum Equipment	3139	Other air extraction system problems - general
CoG steam units	Balance of Plant	Condensing System	Vacuum Equipment	3149	Loss of vacuum not attributable to a particular component such as air ejectors or valves, or high back pressure not attributable to high circulating water temperature, or vacuum losses from a known cause.
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-21 Balance of Plant: Electrical

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Balance of Plant	Electrical		3600	Switchyard transformers and associated cooling systems - external (OMC)
CoG steam units	Balance of Plant	Electrical		3601	Switchyard transformers and associated cooling systems - external (not OMC)
CoG steam units	Balance of Plant	Electrical		3610	Switchyard circuit breakers - external (not OMC)
CoG steam units	Balance of Plant	Electrical		3611	Switchyard circuit breakers - external (OMC)
CoG steam units	Balance of Plant	Electrical		3612	Switchyard system protection devices - external (OMC)
CoG steam units	Balance of Plant	Electrical		3613	Switchyard system protection devices - external (not OMC)
CoG steam units	Balance of Plant	Electrical		3618	Other switchyard equipment - external (not OMC)
CoG steam units	Balance of Plant	Electrical		3619	Other switchyard equipment - external (OMC)
CoG steam units	Balance of Plant	Electrical		3620	Main transformer
CoG steam units	Balance of Plant	Electrical		3621	Unit auxiliaries transformer
CoG steam units	Balance of Plant	Electrical		3622	Station service startup transformer
CoG steam units	Balance of Plant	Electrical		3623	Auxiliary generators
CoG steam units	Balance of Plant	Electrical		3624	Auxiliary generator voltage supply system

CoG steam units	Balance of Plant	Electrical		3629	Other switchyard or high voltage system problems - external
CoG steam units	Balance of Plant	Electrical		3630	400-700 volt transformers
CoG steam units	Balance of Plant	Electrical		3631	400-700 volt circuit breakers
CoG steam units	Balance of Plant	Electrical		3632	400-700 volt conductors and buses
CoG steam units	Balance of Plant	Electrical		3633	400-700 volt insulators
CoG steam units	Balance of Plant	Electrical		3634	400-700 volt protection devices
CoG steam units	Balance of Plant	Electrical		3639	Other 400-700 volt problems
CoG steam units	Balance of Plant	Electrical		3640	AC instrument power transformers
CoG steam units	Balance of Plant	Electrical		3641	AC Circuit breakers
CoG steam units	Balance of Plant	Electrical		3642	AC Conductors and buses
CoG steam units	Balance of Plant	Electrical		3643	AC Inverters
CoG steam units	Balance of Plant	Electrical		3644	AC Protection devices
CoG steam units	Balance of Plant	Electrical		3649	Other AC instrument power problems
CoG steam units	Balance of Plant	Electrical		3650	DC instrument power battery chargers
CoG steam units	Balance of Plant	Electrical		3651	DC circuit breakers
CoG steam units	Balance of Plant	Electrical		3652	DC conductors and buses
CoG steam units	Balance of Plant	Electrical		3653	DC protection devices
CoG steam units	Balance of Plant	Electrical		3659	Other DC power problems
CoG steam units	Balance of Plant	Electrical		3660	4000-7000 volt transformers
CoG steam units	Balance of Plant	Electrical		3661	4000-7000 volt circuit breakers
CoG steam units	Balance of Plant	Electrical		3662	4000-7000 volt conductors and buses
CoG steam units	Balance of Plant	Electrical		3663	4000-7000 volt insulators
CoG steam units	Balance of Plant	Electrical		3664	4000-7000 volt protection devices
CoG steam units	Balance of Plant	Electrical		3669	Other 4000-7000 volt problems
CoG steam units	Balance of Plant	Electrical		3670	12-15kV transformers
CoG steam units	Balance of Plant	Electrical		3671	12-15kV circuit breakers
CoG steam units	Balance of Plant	Electrical		3672	12-15kV conductors and buses
CoG steam units	Balance of Plant	Electrical		3673	12-15kV insulators
CoG steam units	Balance of Plant	Electrical		3674	12-15kV protection devices
CoG steam units	Balance of Plant	Electrical		3679	Other 12-15kV problems
CoG steam units	Balance of Plant	Electrical		3680	Other voltage transformers
CoG steam units	Balance of Plant	Electrical		3681	Other voltage circuit breakers
CoG steam units	Balance of Plant	Electrical		3682	Other voltage conductors and buses
CoG steam units	Balance of Plant	Electrical		3683	Other voltage insulators
CoG steam units	Balance of Plant	Electrical		3684	Other voltage protection devices
CoG steam units	Balance of Plant	Electrical		3689	Other voltage problems

CoG steam units	Balance of Plant	Electrical		3690	Station Service Power Distribution System, General
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-22 Balance of Plant: Extraction Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Balance of Plant	Extraction Steam		3520	HP Extraction steam piping
CoG steam units	Balance of Plant	Extraction Steam		3521	HP Extraction steam valves
CoG steam units	Balance of Plant	Extraction Steam		3522	HP Extraction steam instruments and controls
CoG steam units	Balance of Plant	Extraction Steam		3529	Other HP extraction steam system problems
CoG steam units	Balance of Plant	Extraction Steam		3530	IP Extraction steam piping
CoG steam units	Balance of Plant	Extraction Steam		3531	IP Extraction steam valves
CoG steam units	Balance of Plant	Extraction Steam		3532	IP Extraction steam instruments and controls
CoG steam units	Balance of Plant	Extraction Steam		3539	Other IP extraction steam system problems
CoG steam units	Balance of Plant	Extraction Steam		3540	LP Extraction steam piping
CoG steam units	Balance of Plant	Extraction Steam		3541	LP Extraction steam valves
CoG steam units	Balance of Plant	Extraction Steam		3542	LP Extraction steam instruments and controls
CoG steam units	Balance of Plant	Extraction Steam		3549	Other LP extraction steam system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-23 Balance of Plant: Feedwater System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Balance of Plant	Feedwater System		3401	Startup feedwater pump
CoG steam units	Balance of Plant	Feedwater System		3402	Startup feedwater pump drives - all types
CoG steam units	Balance of Plant	Feedwater System		3407	Feedwater pump suction screens
CoG steam units	Balance of Plant	Feedwater System		3408	Feedwater pump drive - local controls
CoG steam units	Balance of Plant	Feedwater System		3409	Feedwater pump drive motor - variable speed
CoG steam units	Balance of Plant	Feedwater System		3410	Feedwater pump

CoG steam units	Balance of Plant	Feedwater System		3411	Feedwater pump drive - motor
CoG steam units	Balance of Plant	Feedwater System		3412	Feedwater pump drive - steam turbine
CoG steam units	Balance of Plant	Feedwater System		3413	Feedwater pump coupling and drive shaft
CoG steam units	Balance of Plant	Feedwater System		3414	Feedwater pump local controls
CoG steam units	Balance of Plant	Feedwater System		3415	Feedwater pump/drive lube oil system
CoG steam units	Balance of Plant	Feedwater System		3416	Other feedwater pump problems
CoG steam units	Balance of Plant	Feedwater System		3417	Feedwater pump drive - main shaft
CoG steam units	Balance of Plant	Feedwater System		3418	Feedwater pump drive - other
CoG steam units	Balance of Plant	Feedwater System		3419	Feedwater pump drive - gear
CoG steam units	Balance of Plant	Feedwater System		3420	Feedwater piping and supports
CoG steam units	Balance of Plant	Feedwater System		3430	Feedwater regulating (boiler level control) valve
CoG steam units	Balance of Plant	Feedwater System		3431	Other feedwater valves
CoG steam units	Balance of Plant	Feedwater System		3439	HP heater head leaks
CoG steam units	Balance of Plant	Feedwater System		3440	High pressure heater tube leaks
CoG steam units	Balance of Plant	Feedwater System		3441	Other high pressure heater problems (see condensate system for LP and IP heater codes)
CoG steam units	Balance of Plant	Feedwater System		3451	Feedwater booster pump suction screens
CoG steam units	Balance of Plant	Feedwater System		3452	Feedwater booster pump drive - local controls
CoG steam units	Balance of Plant	Feedwater System		3453	Feedwater booster pump drive motor - variable speed
CoG steam units	Balance of Plant	Feedwater System		3454	Feedwater booster pump
CoG steam units	Balance of Plant	Feedwater System		3455	Feedwater booster pump drive - motor
CoG steam units	Balance of Plant	Feedwater System		3456	Feedwater booster pump drive - steam turbine
CoG steam units	Balance of Plant	Feedwater System		3457	Feedwater booster pump coupling and drive shaft
CoG steam units	Balance of Plant	Feedwater System		3458	Feedwater booster pump local controls
CoG steam units	Balance of Plant	Feedwater System		3459	Feedwater booster pump/drive lube oil system
CoG steam units	Balance of Plant	Feedwater System		3460	Other feedwater booster pump problems

CoG steam units	Balance of Plant	Feedwater System		3461	Feedwater booster pump drive - main shaft
CoG steam units	Balance of Plant	Feedwater System		3462	Feedwater booster pump drive - other
CoG steam units	Balance of Plant	Feedwater System		3463	Feedwater booster pump drive - gear
CoG steam units	Balance of Plant	Feedwater System		3499	Other feedwater system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Excluding extraction or drain systems.					

TABLE B04-24 Balance of Plant: Heater Drain Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Balance of Plant	Heater Drain Systems		3501	Heater drain pumps
CoG steam units	Balance of Plant	Heater Drain Systems		3502	Heater level control
CoG steam units	Balance of Plant	Heater Drain Systems		3503	Heater drain piping
CoG steam units	Balance of Plant	Heater Drain Systems		3504	Heater drain valves
CoG steam units	Balance of Plant	Heater Drain Systems		3505	Heater drain pump drive
CoG steam units	Balance of Plant	Heater Drain Systems		3509	Other heater drain system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-25 Balance of Plant: Miscellaneous (Balance of Plant)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3950	Process computer
CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3960	Thermal derating (thermal efficiency losses in balance of plant when specific cause(s) unknown)
CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3970	Distributive Control System (DCS) - process computer
CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3971	DCS - data highway
CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3972	DCS - hardware problems (including card failure)
CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3973	DCS - internal and termination wiring
CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3974	DCS - logic problems
CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3975	DCS - upgrades
CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3979	Other DCS problems
CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3980	Programmable Logic Controller (PLC)
CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3981	PLC - data highway

CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3982	PLC - hardware problems (including card failure)
CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3983	PLC - internal and termination wiring
CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3984	PLC - logic problems
CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3985	PLC - upgrades
CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3989	Other PLC problems
CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3995	Powerhouse heating and ventilating systems
CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3996	Air conditioning systems - rooms and areas
CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3998	Balance of plant overhaul/outage
CoG steam units	Balance of Plant	Miscellaneous (Balance of Plant)		3999	Other miscellaneous balance of plant problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-26 Balance of Plant: Power Station Switchyard

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Balance of Plant	Power Station Switchyard		3700	Power Station switchyard (non generating unit equipment)
CoG steam units	Balance of Plant	Power Station Switchyard		3710	Transmission line (connected to powerhouse switchyard to 1st Substation)
CoG steam units	Balance of Plant	Power Station Switchyard		3720	Transmission equipment at the 1st substation (see code 9300 if applicable)
CoG steam units	Balance of Plant	Power Station Switchyard		3730	Transmission equipment beyond the 1st substation (see code 9300 if applicable)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-27 Balance of Plant: Waste Water (zero discharge) Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Balance of Plant	Waste Water (zero discharge) Systems		3290	Waste water (zero discharge) tanks, pumps, and motors
CoG steam units	Balance of Plant	Waste Water (zero discharge) Systems		3291	Waste water (zero discharge) system fouling

CoG steam units	Balance of Plant	Waste Water (zero discharge) Systems		3292	Waste water (zero discharge) piping
CoG steam units	Balance of Plant	Waste Water (zero discharge) Systems		3293	Waste water (zero discharge) valves
CoG steam units	Balance of Plant	Waste Water (zero discharge) Systems		3294	Waste water (zero discharge) controls and instrumentation
CoG steam units	Balance of Plant	Waste Water (zero discharge) Systems		3295	Other waste water (zero discharge) problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

EXPANDER TURBINE

TABLE B04-28 Expander Turbine: Expander Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Expander Turbine	Expander Turbine		7800	Couplings
CoG steam units	Expander Turbine	Expander Turbine		7810	Shaft
CoG steam units	Expander Turbine	Expander Turbine		7820	Bearings
CoG steam units	Expander Turbine	Expander Turbine		7830	Blades
CoG steam units	Expander Turbine	Expander Turbine		7840	Discs
CoG steam units	Expander Turbine	Expander Turbine		7850	Spacers
CoG steam units	Expander Turbine	Expander Turbine		7860	Nozzles/vanes
CoG steam units	Expander Turbine	Expander Turbine		7870	Heat shields
CoG steam units	Expander Turbine	Expander Turbine		7880	Exhaust diffusers
CoG steam units	Expander Turbine	Expander Turbine		7890	Seal oil system and seals
CoG steam units	Expander Turbine	Expander Turbine		7900	Inner casing
CoG steam units	Expander Turbine	Expander Turbine		7910	Outer exhaust casing
CoG steam units	Expander Turbine	Expander Turbine		7920	Lube oil system
CoG steam units	Expander Turbine	Expander Turbine		7930	Controls and instrumentation
CoG steam units	Expander Turbine	Expander Turbine		7940	Evactor
CoG steam units	Expander Turbine	Expander Turbine		7950	Major overhaul
CoG steam units	Expander Turbine	Expander Turbine		7960	Other expander turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

EXTERNAL

Use this set of codes to report events caused by external factors (flood, lightning, etc.); economic factors (lack of fuel, labor strikes, etc.); operator training; and transmission system problems external to the plant.

TABLE B04-29 External: Catastrophe

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	External	Catastrophe		9000	Flood
CoG steam units	External	Catastrophe		9001	Drought
CoG steam units	External	Catastrophe		9010	Fire including wildfires, not related to a specific component
CoG steam units	External	Catastrophe		9020	Lightning
CoG steam units	External	Catastrophe		9025	Geomagnetic disturbance
CoG steam units	External	Catastrophe		9030	Earthquake
CoG steam units	External	Catastrophe		9031	Tornado
CoG steam units	External	Catastrophe		9035	Hurricane
CoG steam units	External	Catastrophe		9036	Storms (ice, snow, etc)
CoG steam units	External	Catastrophe		9040	Other catastrophe
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-30 External: Economic

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	External	Economic		0	Reserve shutdown
CoG steam units	External	Economic		9130	Failure of fuel supplier to fulfill contractual obligations or a pre-arranged deal due to physical fuel disruptions or operational impairments (e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)
CoG steam units	External	Economic		9131	Lack of fuel – due to contractual or tariff provisions that allow for service interruption or price fluctuations during peak demand periods.
CoG steam units	External	Economic		9134	Fuel conservation
CoG steam units	External	Economic		9136	Problems with Primary Fuel for Units with Secondary Fuel Operation
CoG steam units	External	Economic		9137	Ground water or other water supply problems
CoG steam units	External	Economic		9140	Plant modifications to burn different fuel that are not regulatory mandated

CoG steam units	External	Economic		9150	Labor strikes company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.
CoG steam units	External	Economic		9151	Labor strikes direct plant management grievances that result in a walkout or strike are under plant management control.
CoG steam units	External	Economic		9160	Other economic problems
CoG steam units	External	Economic		9180	Economic (for internal use at plants only)
CoG steam units	External	Economic		9181	Economic (for internal use at plants only)
CoG steam units	External	Economic		9182	Economic (for internal use at plants only)
CoG steam units	External	Economic		9183	Economic (for internal use at plants only)
CoG steam units	External	Economic		9184	Economic (for internal use at plants only)
CoG steam units	External	Economic		9185	Economic (for internal use at plants only)
CoG steam units	External	Economic		9186	Economic (for internal use at plants only)
CoG steam units	External	Economic		9187	Economic (for internal use at plants only)
CoG steam units	External	Economic		9188	Economic (for internal use at plants only)
CoG steam units	External	Economic		9189	Economic (for internal use at plants only)
CoG steam units	External	Economic		9190	Economic (for internal use at plants only)
CoG steam units	External	Economic		9191	Economic (for internal use at plants only)
CoG steam units	External	Economic		9192	Economic (for internal use at plants only)
CoG steam units	External	Economic		9193	Economic (for internal use at plants only)

CoG steam units	External	Economic		9194	Economic (for internal use at plants only)
CoG steam units	External	Economic		9195	Economic (for internal use at plants only)
CoG steam units	External	Economic		9196	Economic (for internal use at plants only)
CoG steam units	External	Economic		9197	Economic (for internal use at plants only)
CoG steam units	External	Economic		9198	Economic (for internal use at plants only)
CoG steam units	External	Economic		9199	Economic (for internal use at plants only)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-31 External: Fuel Quality

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	External	Fuel Quality		9200	High ash content (OMC)
CoG steam units	External	Fuel Quality		9201	High ash content (not OMC)
CoG steam units	External	Fuel Quality		9205	Poor quality natural gas fuel, low heat content
CoG steam units	External	Fuel Quality		9220	High sulfur content (OMC)
CoG steam units	External	Fuel Quality		9221	High sulfur content (not OMC)
CoG steam units	External	Fuel Quality		9230	High vanadium content (OMC)
CoG steam units	External	Fuel Quality		9231	High vanadium content (not OMC)
CoG steam units	External	Fuel Quality		9240	High sodium content (OMC)
CoG steam units	External	Fuel Quality		9241	High sodium content (not OMC)
CoG steam units	External	Fuel Quality		9260	Low BTU oil (OMC)
CoG steam units	External	Fuel Quality		9261	Low BTU oil (not OMC)
CoG steam units	External	Fuel Quality		9290	Other fuel quality problems (OMC)
CoG steam units	External	Fuel Quality		9291	Other fuel quality problems (not OMC)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use code 9600 to 9650 if the fuel quality results in excess stack emissions through no fault in the pollution control equipment. Use the appropriate equipment code to report fouling and slagging.					

TABLE B04-32 External: Miscellaneous (External)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

CoG steam units	External	Miscellaneous (External)		9300	Transmission system problems other than catastrophes (do not include switchyard problems in this category; see codes 3600 to 3629, 3720 to 3730)
CoG steam units	External	Miscellaneous (External)		9310	Operator training
CoG steam units	External	Miscellaneous (External)		9320	Other miscellaneous external problems
CoG steam units	External	Miscellaneous (External)		9340	Synchronous Condenser Operation
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

GAS TURBINE

TABLE B04-33 Gas Turbine: Auxiliary Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Gas Turbine	Auxiliary Systems		5110	Lube oil system - general
CoG steam units	Gas Turbine	Auxiliary Systems		5111	Lube oil pumps
CoG steam units	Gas Turbine	Auxiliary Systems		5112	Lube oil coolers
CoG steam units	Gas Turbine	Auxiliary Systems		5113	Lube oil valves/piping
CoG steam units	Gas Turbine	Auxiliary Systems		5114	Lube oil filters
CoG steam units	Gas Turbine	Auxiliary Systems		5115	Oil vapor extractor
CoG steam units	Gas Turbine	Auxiliary Systems		5116	Power Augmentation System Equipment
CoG steam units	Gas Turbine	Auxiliary Systems		5117	Power augmentation piping
CoG steam units	Gas Turbine	Auxiliary Systems		5118	Power augmentation valves
CoG steam units	Gas Turbine	Auxiliary Systems		5119	Power augmentation controls
CoG steam units	Gas Turbine	Auxiliary Systems		5120	Hydraulic oil system
CoG steam units	Gas Turbine	Auxiliary Systems		5121	Hydraulic oil system pumps
CoG steam units	Gas Turbine	Auxiliary Systems		5122	Hydraulic oil system piping/valves
CoG steam units	Gas Turbine	Auxiliary Systems		5130	Starting system (including motor)
CoG steam units	Gas Turbine	Auxiliary Systems		5140	Battery and charger system
CoG steam units	Gas Turbine	Auxiliary Systems		5150	Turning gear and motor
CoG steam units	Gas Turbine	Auxiliary Systems		5151	Load gear compartment
CoG steam units	Gas Turbine	Auxiliary Systems		5160	Cooling and seal air system
CoG steam units	Gas Turbine	Auxiliary Systems		5170	Cooling water system
CoG steam units	Gas Turbine	Auxiliary Systems		5180	Anti-icing system
CoG steam units	Gas Turbine	Auxiliary Systems		5190	Other auxiliary system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-34 Gas Turbine: Exhaust Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Gas Turbine	Exhaust Systems		5100	Chamber
CoG steam units	Gas Turbine	Exhaust Systems		5101	Hoods
CoG steam units	Gas Turbine	Exhaust Systems		5102	Vanes/nozzles
CoG steam units	Gas Turbine	Exhaust Systems		5103	Silencer
CoG steam units	Gas Turbine	Exhaust Systems		5104	Cones
CoG steam units	Gas Turbine	Exhaust Systems		5105	Diverter Dampers
CoG steam units	Gas Turbine	Exhaust Systems		5106	Exhaust Stack
CoG steam units	Gas Turbine	Exhaust Systems		5108	High engine exhaust temperature
CoG steam units	Gas Turbine	Exhaust Systems		5109	Other exhaust problems (including high exhaust system temperature not attributable to a specific problem)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-35 Gas Turbine: Fuel, Ignition, and Combustion Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5040	Fuel tanks
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5041	Fuel piping and valves
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5042	Fuel nozzles/vanes
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5043	Fuel filters
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5044	Liquid fuel oil pump
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5046	Liquid fuel oil transfer/forwarding pump
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5047	Liquid fuel purge system
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5048	Gas fuel system including controls and instrumentation
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5049	Other fuel system problems
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5050	Ignition system

CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5051	Pilot fuel piping and valves
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5052	Pilot fuel nozzles/vanes
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5053	Pilot fuel filters
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5054	Water injection system
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5060	Atomizing air system
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5065	NOx water injection system including pump
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5066	NOx steam injection system
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5070	Combustor casing
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5071	Combustor liner
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5072	Combustor caps
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5073	Flame scanners
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5074	Flashback including instrumentation
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5075	Blade path temperature spread
CoG steam units	Gas Turbine	Fuel, Ignition, and Combustion Systems		5079	Other combustor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-36 Gas Turbine: Inlet Air System and Compressors - Compressors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5010	High pressure shaft
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5011	High pressure bearings
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5012	High pressure blades/buckets
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5013	Compressor casing and bolts
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5014	Compressor diaphragms
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5015	Compressor seals

CoG steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5016	High pressure compressor bleed valves
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5017	Low pressure compressor bleed valves
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5019	Other high pressure problems
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5020	Low pressure shaft
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5021	Low pressure bearings
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5022	Low pressure blades/buckets
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5029	Other low pressure problems
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5030	Supercharging fans
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5035	Compressor washing
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5036	Compressor shaft and bearings for two-shaft machines
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5037	Inlet bleed heat valve
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Compressors	5039	Other compressor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-37 Gas Turbine: Inlet Air System and Compressors - Ducts and Filters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5000	Inlet air ducts
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5001	Inlet air vanes/nozzles
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5002	Inlet air filters
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5003	Inlet cone
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5004	Inlet air chillers
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5005	Inlet air evaporative coolers
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5006	Inlet air foggers
CoG steam units	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5009	Other inlet air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-38 Gas Turbine: Miscellaneous (Gas Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5200	Reduction gear
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5201	Load shaft and bearings
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5205	Main coupling between the turbine and generator
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5206	Clutch
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5210	Intercoolers

CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5220	Regenerators
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5230	Heat shields
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5240	Fire detection and extinguishing system (including hazardous gas detection system)
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5241	Fire in unit
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5245	Gas Turbine Control System - data highway
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5246	Gas Turbine Control System - hardware problems (including card failure)
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5247	Gas Turbine Control System - internal and termination wiring
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5248	Gas Turbine Control System - logic problems
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5249	Gas Turbine Control System - upgrades
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5250	Other controls and instrumentation problems
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5255	Computer
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5260	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5261	Gas turbine/compressor washing
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5262	Gas turbine exchange
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5269	Combustion Inspection (CI)
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5270	Hot end inspection
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5272	Borescope inspection
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5274	General unit inspection
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5280	Vibration (not engine) in unit not attributable to bearings or other components
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5285	Gas turbine vibration
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5286	Gas turbine lockout
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5290	Gas turbine performance testing - individual engines (use code 9999 for total unit performance testing)
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5292	Turbine Overspeed Trip Test - Gas Turbine
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5295	Synchronous condenser equipment
CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5298	Main gas filter

CoG steam units	Gas Turbine	Miscellaneous (Gas Turbine)		5299	Other miscellaneous gas turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-39 Gas Turbine: Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Gas Turbine	Turbine		5080	High pressure shaft
CoG steam units	Gas Turbine	Turbine		5081	High pressure bearings
CoG steam units	Gas Turbine	Turbine		5082	High pressure blades/buckets
CoG steam units	Gas Turbine	Turbine		5083	High pressure nozzles/vanes
CoG steam units	Gas Turbine	Turbine		5084	High pressure casing/expansion joints
CoG steam units	Gas Turbine	Turbine		5085	Interstage gas passages - HP
CoG steam units	Gas Turbine	Turbine		5086	High pressure shaft seals
CoG steam units	Gas Turbine	Turbine		5087	Thrust bearing
CoG steam units	Gas Turbine	Turbine		5088	Gas turbine cooling system
CoG steam units	Gas Turbine	Turbine		5089	Other high pressure problems
CoG steam units	Gas Turbine	Turbine		5090	Low pressure shaft
CoG steam units	Gas Turbine	Turbine		5091	Low pressure bearings
CoG steam units	Gas Turbine	Turbine		5092	Low pressure blades/buckets
CoG steam units	Gas Turbine	Turbine		5093	Low pressure nozzles/vanes
CoG steam units	Gas Turbine	Turbine		5094	Low pressure casing/expansion joints
CoG steam units	Gas Turbine	Turbine		5095	Interstage gas passages - LP
CoG steam units	Gas Turbine	Turbine		5096	Low pressure shaft seals
CoG steam units	Gas Turbine	Turbine		5097	Other low pressure problems
CoG steam units	Gas Turbine	Turbine		5098	Expansion joints
CoG steam units	Gas Turbine	Turbine		5099	HP to LP coupling
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP if only one.					

GENERATOR

This set of codes contains the generator, exciter, generator cooling systems, and generator controls. Note the main leads up to and includes the generator output breaker in this set of codes.

TABLE B04-40 Generator: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Generator	Controls		4700	Generator voltage control
CoG steam units	Generator	Controls		4710	Generator metering devices

CoG steam units	Generator	Controls		4720	Generator synchronization equipment
CoG steam units	Generator	Controls		4730	Generator current and potential transformers
CoG steam units	Generator	Controls		4740	Emergency generator trip devices
CoG steam units	Generator	Controls		4750	Other generator controls and metering problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-41 Generator: Cooling System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Generator	Cooling System		4610	Hydrogen cooling system piping and valves
CoG steam units	Generator	Cooling System		4611	Hydrogen coolers
CoG steam units	Generator	Cooling System		4612	Hydrogen storage system
CoG steam units	Generator	Cooling System		4613	Hydrogen seals
CoG steam units	Generator	Cooling System		4619	Other hydrogen system problems
CoG steam units	Generator	Cooling System		4620	Air cooling system
CoG steam units	Generator	Cooling System		4630	Liquid cooling system
CoG steam units	Generator	Cooling System		4640	Seal oil system and seals
CoG steam units	Generator	Cooling System		4650	Other cooling system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Report failures caused by water leaks into generator as codes 4500, 4510, etc.					

TABLE B04-42 Generator: Exciter

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Generator	Exciter		4600	Exciter drive - motor
CoG steam units	Generator	Exciter		4601	Exciter field rheostat
CoG steam units	Generator	Exciter		4602	Exciter commutator and brushes
CoG steam units	Generator	Exciter		4603	Solid state exciter element
CoG steam units	Generator	Exciter		4604	Exciter drive - shaft
CoG steam units	Generator	Exciter		4605	Exciter transformer
CoG steam units	Generator	Exciter		4609	Other exciter problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-43 Generator: Generator

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Generator	Generator		4500	Rotor windings (including damper windings and fan blades on hydro units)
CoG steam units	Generator	Generator		4510	Rotor collector rings
CoG steam units	Generator	Generator		4511	Rotor, General
CoG steam units	Generator	Generator		4512	Retaining Rings
CoG steam units	Generator	Generator		4520	Stator windings, bushings, and terminals
CoG steam units	Generator	Generator		4530	Stator core iron
CoG steam units	Generator	Generator		4535	Stator, General
CoG steam units	Generator	Generator		4536	Generator Heaters
CoG steam units	Generator	Generator		4540	Brushes and brush rigging
CoG steam units	Generator	Generator		4550	Generator bearings and lube oil system (including thrust bearings on hydro units)
CoG steam units	Generator	Generator		4551	Generator bearings
CoG steam units	Generator	Generator		4552	Generator lube oil system
CoG steam units	Generator	Generator		4555	Bearing cooling system
CoG steam units	Generator	Generator		4560	Generator vibration (excluding vibration due to failed bearing and other components)
CoG steam units	Generator	Generator		4570	Generator casing
CoG steam units	Generator	Generator		4580	Generator end bells and bolting
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-44 Generator: Miscellaneous (Generator)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Generator	Miscellaneous (Generator)		4800	Generator main leads
CoG steam units	Generator	Miscellaneous (Generator)		4805	Generator Bus Duct Cooling System
CoG steam units	Generator	Miscellaneous (Generator)		4810	Generator output breaker
CoG steam units	Generator	Miscellaneous (Generator)		4830	Major generator overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
CoG steam units	Generator	Miscellaneous (Generator)		4831	Minor generator overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)

CoG steam units	Generator	Miscellaneous (Generator)		4840	Inspection
CoG steam units	Generator	Miscellaneous (Generator)		4841	Generator doble testing
CoG steam units	Generator	Miscellaneous (Generator)		4842	Reactive and capability testing
CoG steam units	Generator	Miscellaneous (Generator)		4850	Core monitor alarm
CoG steam units	Generator	Miscellaneous (Generator)		4860	Generator neutral grounding equipment
CoG steam units	Generator	Miscellaneous (Generator)		4899	Other miscellaneous generator problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

HEAT RECOVERY STEAM GENERATOR (HRSG)

(Waste Heat Boiler)

TABLE B04-45 Heat Recovery Steam Generator (HRSG): HRSG Boiler Air and Gas Systems - Air Supply

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1400	Forced draft fans
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1401	Forced draft fan dampers
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1407	Forced draft fan lubrication system
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1410	Forced draft fan motors
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1411	Forced draft fan motors - variable speed
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1412	Forced draft fan drives (other than motor)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1415	Forced draft fan controls
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1420	Other forced draft fan problems
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1456	Induced draft fan dampers
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-46 Heat Recovery Steam Generator (HRSG): HRSG Boiler Air and Gas Systems - Miscellaneous (Boiler Air and Gas Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1590	Stacks (use code 8430 for stack problems due to pollution control equipment)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1591	Stack damper and linkage
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1592	Stack damper linkage motors
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1599	Other miscellaneous boiler air and gas system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-47 Heat Recovery Steam Generator (HRSG): HRSG Boiler Control Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1700	Feedwater controls (report local controls - feedwater pump, feedwater regulator valve, etc., - with component or system)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1710	Combustion/steam condition controls (report local controls - burners, pulverizers, etc., - with component or system)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1720	Desuperheater/attemperator controls
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1730	Boiler explosion or implosion
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1740	Boiler drum gage glasses / level indicator
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1750	Burner management system
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1760	Feedwater instrumentation (not local controls)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1761	Combustion/Steam condition instrumentation (not local controls)

CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1762	Desuperheater/attemperator instrumentation (not local controls)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1799	Other boiler instrumentation and control problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Iincluding instruments which input to the controls.					

TABLE B04-48 Heat Recovery Steam Generator (HRSG): HRSG Boiler Design Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Design Limitations		1900	Improper balance between tube sections not due to fouling or plugging
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Design Limitations		1910	Inadequate air not due to equipment problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-49 Heat Recovery Steam Generator (HRSG): HRSG Boiler Fuel Supply - Burners (Duct Burners)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	358	Oil burner piping and valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	359	Gas burner piping and valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	360	Burners
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	361	Burner orifices
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	370	Burner instruments and controls (except light off)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	380	Light off (igniter) systems (including fuel supply)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	385	Igniters
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	410	Other burner problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-50 Heat Recovery Steam Generator (HRSG): HRSG Boiler Fuel Supply - Oil and Gas Systems (except light off)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	440	Fuel oil pumps (general)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	441	Fuel oil pumps (burner supply)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	442	Fuel oil pumps (forwarding/transfer)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	443	Fuel oil (burner supply) pump drives
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	444	Fuel oil (forwarding/transfer) pump drives
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	450	Fuel oil heaters
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	460	Fuel oil atomizers
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	470	Oil and gas fires
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	480	Other oil and gas fuel supply problems (see codes 0360-0410 for burner problems)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-51 Heat Recovery Steam Generator (HRSG): HRSG Boiler Internals and Structures					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		800	Drums and drum internals (single drum only)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		801	HP Drum (including drum level trips not attributable to other causes)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		802	IP Drum (including drum level trips not attributable to other causes)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		803	LP Drum (including drum level trips not attributable to other causes)

CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		810	Boiler supports and structures (use code 1320 for tube supports)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		820	Casing
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		830	Doors
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		840	Refractory and insulation
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		845	Windbox expansion joints
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		847	Other expansion joints
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		848	Inlet panel
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		850	Other internal or structural problems
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		855	Drum relief/safety valves (single drum only)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		856	HP Drum relief/safety valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		857	IP Drum relief/safety valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		858	LP Drum relief/safety valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		859	Tube external fins/membranes
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-52 Heat Recovery Steam Generator (HRSG): HRSG Boiler Overhaul and Inspections

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1800	Major boiler overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1801	Minor boiler overhaul (less than 720 hours) (use for non-specific

					overhaul only; see page B-CCGT-2)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1810	Other boiler inspections
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1811	Boiler Inspections - problem identification / investigation
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1812	Boiler Inspections - scheduled or routine
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1820	Chemical cleaning/steam blows
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-53 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - Boiler Recirculation

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	740	Boiler recirculation pumps
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	741	Boiler recirculation pumps - motors
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	750	Boiler recirculation piping including downcomers
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	760	Boiler recirculation valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	770	Other boiler recirculation problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-54 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - Feedwater and Blowdown

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	670	Feedwater piping downstream of feedwater regulating valve
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	680	Feedwater valves (not feedwater regulating valve)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	690	Other feedwater problems downstream of feedwater regulating valve (use codes 3401 to 3499 for remainder of feedwater system)

CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	700	Blowdown system valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	710	Blowdown system piping
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	720	Blowdown system controls / instrumentation
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	730	Other blowdown system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-55 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Cold and Hot Reheat Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	540	Hot reheat steam piping up to turbine stop valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	541	Cold reheat steam piping up to boiler
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	550	Reheat steam relief/safety valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	560	Other hot reheat steam valves (not including turbine stop or intercept valves)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	561	Other cold reheat steam valves (not including turbine stop or intercept valves)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	570	Other reheat steam problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-56 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Desuperheaters/Attemperators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6140	HP Desuperheater/attemperator piping - Greater than 600 PSIG.
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6141	HP Desuperheater/attemperator valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6142	HP Desuperheater/attemperator spray nozzles

CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6143	HP Desuperheater/attemperator drums
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6144	Other HP desuperheater/attemperator problems
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6145	IP Desuperheater/attemperator piping - Between 200-600 PSIG
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6146	IP Desuperheater/attemperator valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6147	IP Desuperheater/attemperator spray nozzles
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6148	IP Desuperheater/attemperator drums
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6149	Other IP desuperheater/attemperator problems
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6150	LP Desuperheater/attemperator piping - Less than 200 PSIG
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6151	LP Desuperheater/attemperator valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6152	LP Desuperheater/attemperator spray nozzles
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6153	LP Desuperheater/attemperator drums
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6154	Other LP desuperheater/attemperator problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-57 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Main Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	500	Main steam piping up to turbine stop valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	510	Main steam relief/safety valves off superheater
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	520	Other main steam valves (including vent and drain valves

					but not including the turbine stop valves)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	530	Other main steam system problems
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6110	HP steam piping up to turbine stop valves - Greater than 600 PSIG (see 0790 for piping supports)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6111	HP steam relief/safety valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6112	Other HP steam valves (including vent and drain valves but not including the turbine stop valves)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6113	Other HP steam system problems
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6114	HP steam isolation/boundary valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6120	IP steam piping up to turbine stop valves - Between 200 & 600 PSIG (see 0790 for piping supports)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6121	IP steam relief/safety valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6122	Other IP steam valves (including vent and drain valves but not including the turbine stop valves)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6123	Other IP steam system problems
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6124	IP steam isolation/boundary valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6130	LP steam piping up to turbine stop valves - Less than 200 PSIG (see 0790 for piping supports)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6131	LP steam relief/safety valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6132	Other LP steam valves (including vent and drain valves but not

					including the turbine stop valves)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6133	Other LP steam system problems
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6134	Other main steam valves (including vent and drain valves but not including the turbine stop valves)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6135	LP steam isolation/boundary valves
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-58 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Startup Bypass

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6160	HP Startup bypass system piping (including drain lines up to heaters or condenser) - Greater than 600 PSIG
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6161	HP Startup bypass system valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6162	HP Startup bypass tanks or flash tanks
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6163	Other HP startup bypass system problems
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6164	HP startup bypass instrumentation and controls
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6170	IP Startup bypass system piping (including drain lines up to heaters or condenser) - Between 200-600 PSIG
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6171	IP Startup bypass system valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6172	IP Startup bypass tanks or flash tanks
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6173	Other IP startup bypass system problems

CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6174	IP startup bypass instrumentation and controls
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6180	LP Startup bypass system piping (including drain lines up to heaters or condenser) - Less than 200 PSIG
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6181	LP Startup bypass system valves
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6182	LP Startup bypass tanks or flash tanks
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6183	Other LP startup bypass system problems
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6184	LP startup bypass instrumentation and controls
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-59 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - Miscellaneous (Piping)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	775	Economizer piping
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	780	Headers between tube bundles
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	782	Headers and caps
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	790	Pipe hangers, brackets, supports (general)
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	799	Other miscellaneous piping system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-60 Heat Recovery Steam Generator (HRSG): HRSG Boiler Tube Leaks

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6005	HP Evaporator tubes
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6006	IP Evaporator tubes

CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6007	LP Evaporator tubes
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6010	HP superheater
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6011	HP reheater
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6012	HP economizer
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6020	IP superheater
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6021	IP reheater
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6022	IP economizer
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6030	LP reheater
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6031	LP superheater
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6032	LP economizer
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6090	Other HRSG tube problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use code 0859 for tube/membrane failures.					

TABLE B04-61 Heat Recovery Steam Generator (HRSG): HRSG Boiler Water Condition					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG steam units	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Water Condition		1850	Boiler water condition (not feedwater water quality)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-62 Heat Recovery Steam Generator (HRSG): Miscellaneous (HRSG Boiler)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		1980	Boiler safety valve test

CoG steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		1990	Boiler performance testing (use code 9999 for total unit performance testing)
CoG steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		1999	Boiler, miscellaneous
CoG steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		6000	Heat recovery steam generator to gas turbine connecting equipment. For additional codes, use Fossil Steam Cause Codes 0010 to 1999.
CoG steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		6100	Steam turbine to gas turbine coupling. For additional codes, use Fossil Steam Cause Codes 4000 to 4499.
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use more specific codes - other slagging and fouling problems, other control problems, etc. whenever possible. Describe miscellaneous problems in the verbal description.					

TABLE B04-63 Heat Recovery Steam Generator (HRSG): Miscellaneous HRSG Boiler Tube Problems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1300	Water side fouling
CoG steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1305	Fireside cleaning (which requires a full outage) Use code 1200 for cleanings that cause deratings.
CoG steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1310	Water side cleaning (acid cleaning)
CoG steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1320	Tube supports/attachments
CoG steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1330	Slag fall damage
CoG steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1340	Tube modifications (including addition and removal of tubes)
CoG steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1350	Other miscellaneous boiler tube problems
CoG steam units	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1360	Boiler drains system
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

INACTIVE STATES

TABLE B04-64 Inactive States: Inactive States					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG steam units	Inactive States	Inactive States		2	Inactive Reserve Shutdown
CoG steam units	Inactive States	Inactive States		9990	Retired unit
CoG steam units	Inactive States	Inactive States		9991	Mothballed unit
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

JET ENGINE

TABLE B04-65 Jet Engine: Auxiliary Systems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG steam units	Jet Engine	Auxiliary Systems		5510	Lube oil system
CoG steam units	Jet Engine	Auxiliary Systems		5516	Power Augmentation System Equipment
CoG steam units	Jet Engine	Auxiliary Systems		5520	Hydraulic oil system
CoG steam units	Jet Engine	Auxiliary Systems		5530	Starting system (including motor)
CoG steam units	Jet Engine	Auxiliary Systems		5540	Battery and charger system
CoG steam units	Jet Engine	Auxiliary Systems		5550	Turning gear and motor
CoG steam units	Jet Engine	Auxiliary Systems		5551	Load gear compartment
CoG steam units	Jet Engine	Auxiliary Systems		5560	Cooling and seal air system
CoG steam units	Jet Engine	Auxiliary Systems		5570	Cooling water system
CoG steam units	Jet Engine	Auxiliary Systems		5580	Anti-icing system
CoG steam units	Jet Engine	Auxiliary Systems		5590	Other auxiliary system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-66 Jet Engine: Exhaust Systems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG steam units	Jet Engine	Exhaust Systems		5500	Chamber
CoG steam units	Jet Engine	Exhaust Systems		5501	Hoods
CoG steam units	Jet Engine	Exhaust Systems		5502	Vanes/nozzles
CoG steam units	Jet Engine	Exhaust Systems		5503	Silencer
CoG steam units	Jet Engine	Exhaust Systems		5504	Cones
CoG steam units	Jet Engine	Exhaust Systems		5505	Diverter Dampers
CoG steam units	Jet Engine	Exhaust Systems		5508	High engine exhaust temperature

CoG steam units	Jet Engine	Exhaust Systems		5509	Other exhaust problems (including high exhaust temperature not attributable to a specific problem)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-67 Jet Engine: Fuel, Ignition, and Combustion Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5440	Fuel tanks
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5441	Fuel piping and valves
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5442	Fuel nozzles/vanes
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5443	Fuel filters
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5444	Liquid fuel oil pump
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5445	Liquid fuel oil transfer/forwarding pump
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5446	Liquid fuel purge system
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5447	Gas fuel system including controls and instrumentation
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5449	Other fuel system problems
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5450	Ignition system
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5451	Pilot fuel piping and valves
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5452	Pilot fuel nozzles/vanes
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5453	Pilot fuel filters
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5454	Water injection system
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5455	Fuel nozzle/vane cooling air system

CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5460	Atomizing air system
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5470	Combustor casing
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5471	Combustor liner
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5472	Combustor caps
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5473	Flame scanners
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5474	Flashback (including instrumentation)
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5475	Blade path temperature spread
CoG steam units	Jet Engine	Fuel, Ignition, and Combustion Systems		5479	Other combustor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-68 Jet Engine: Inlet Air System and Compressors - Compressors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5410	High pressure shaft
CoG steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5411	High pressure bearings
CoG steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5412	High pressure blades/buckets
CoG steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5413	Other high pressure problems
CoG steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5414	Compressor diaphragms/vanes
CoG steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5420	Low pressure shaft
CoG steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5421	Low pressure bearings
CoG steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5422	Low pressure blades/buckets
CoG steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5429	Other low pressure problems
CoG steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5430	Supercharging fans
CoG steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5435	Compressor washing
CoG steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5436	Compressor shaft and bearings for two-shaft machines
CoG steam units	Jet Engine	Inlet Air System and Compressors	Compressors	5439	Other compressor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP compressor if only one.					

TABLE B04-69 Jet Engine: Inlet Air System and Compressors - Ducts and Filters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5400	Inlet air ducts
CoG steam units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5401	Inlet air vanes/nozzles
CoG steam units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5402	Inlet air filters
CoG steam units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5403	Inlet and exhaust cones
CoG steam units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5404	Inlet air chillers
CoG steam units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5405	Inlet air evaporative coolers
CoG steam units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5406	Inlet air foggers
CoG steam units	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5409	Other inlet air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP compressor if only one.					

TABLE B04-70 Jet Engine: Miscellaneous (Jet Engine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5600	Reduction gear
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5601	Load shaft and bearings
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5605	Main coupling between the turbine and generator
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5606	Clutch
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5610	Intercoolers
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5620	Regenerators
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5630	Heat shields
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5640	Fire detection and extinguishing system
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5641	Fire in unit
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5645	Jet Engine Control System - data highway
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5646	Jet Engine Control System - hardware problems (including card failure)
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5647	Jet Engine Control System - internal and termination wiring
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5648	Jet Engine Control System - logic problems
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5649	Jet Engine Control System - upgrades
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5650	Other controls and instrumentation problems

CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5660	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5661	Engine/compressor washing
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5662	Engine exchange
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5665	Engine shafts and bearings
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5670	Hot end inspection
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5672	Boroscope inspection
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5674	General unit inspection
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5680	Vibration (not engine) in unit not attributable to bearings or other components
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5685	Engine vibration
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5686	Jet engine lockout
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5690	Engine performance testing - individual engines (use code 9999 for total unit performance testing)
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5692	Turbine Overspeed Trip Test - Jet Engine
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5695	Synchronous condenser equipment
CoG steam units	Jet Engine	Miscellaneous (Jet Engine)		5699	Other miscellaneous jet engine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-71 Jet Engine: Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Jet Engine	Turbine		5480	High pressure shaft
CoG steam units	Jet Engine	Turbine		5481	High pressure bearings
CoG steam units	Jet Engine	Turbine		5482	High pressure blades/buckets
CoG steam units	Jet Engine	Turbine		5483	High pressure nozzles/vanes
CoG steam units	Jet Engine	Turbine		5484	High pressure casing/expansion joint
CoG steam units	Jet Engine	Turbine		5485	Interstage gas passages
CoG steam units	Jet Engine	Turbine		5486	High pressure shaft seals
CoG steam units	Jet Engine	Turbine		5487	Thrust bearing
CoG steam units	Jet Engine	Turbine		5489	Other high pressure problems
CoG steam units	Jet Engine	Turbine		5490	Low pressure shaft
CoG steam units	Jet Engine	Turbine		5491	Low pressure bearings
CoG steam units	Jet Engine	Turbine		5492	Low pressure blades/buckets

CoG steam units	Jet Engine	Turbine		5493	Low pressure nozzles/vanes
CoG steam units	Jet Engine	Turbine		5494	Low pressure casing/expansion joints
CoG steam units	Jet Engine	Turbine		5497	Other low pressure problems
CoG steam units	Jet Engine	Turbine		5498	Expansion joints
CoG steam units	Jet Engine	Turbine		5499	Shaft seals
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP if only one.					

MISCELLANEOUS

TABLE B04-72 Miscellaneous: Instruments and Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Miscellaneous	Instruments and Controls		6200	Combined cycle instruments and controls. (Report instruments and controls specific to the gas turbine, steam turbine, boiler, generator, or balance of plant using the codes for the appropriate piece of equipment.)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

PERFORMANCE

TABLE B04-73 Performance: Performance

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Performance	Performance		9997	NERC Reliability Standard Requirement
CoG steam units	Performance	Performance		9998	Black start testing
CoG steam units	Performance	Performance		9999	Total unit performance testing (use appropriate codes for individual component testing)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

PERSONNEL OR PROCEDURAL ERRORS

TABLE B04-74 Personnel or Procedural Errors: Personnel or Procedural Errors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

CoG steam units	Personnel or Procedural Errors	Personnel or Procedural Errors		9900	Operator error
CoG steam units	Personnel or Procedural Errors	Personnel or Procedural Errors		9910	Maintenance personnel error
CoG steam units	Personnel or Procedural Errors	Personnel or Procedural Errors		9920	Contractor error
CoG steam units	Personnel or Procedural Errors	Personnel or Procedural Errors		9930	Operating procedure error
CoG steam units	Personnel or Procedural Errors	Personnel or Procedural Errors		9940	Maintenance procedure error
CoG steam units	Personnel or Procedural Errors	Personnel or Procedural Errors		9950	Contractor procedure error
CoG steam units	Personnel or Procedural Errors	Personnel or Procedural Errors		9960	Staff shortage
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

POLLUTION CONTROL EQUIPMENT

TABLE B04-75 Pollution Control Equipment: CO Reduction

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Pollution Control Equipment	CO Reduction		8840	CO Active catalyst
CoG steam units	Pollution Control Equipment	CO Reduction		8841	CO Support materials
CoG steam units	Pollution Control Equipment	CO Reduction		8842	CO Plugging
CoG steam units	Pollution Control Equipment	CO Reduction		8845	Other CO reduction problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-76 Pollution Control Equipment: Continuous Emissions Monitoring Systems (CEMS)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8700	CEMS Certification and Recertification
CoG steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8710	SO2 analyzer problems
CoG steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8720	NOx analyzer problems
CoG steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8730	CO analyzer problems

CoG steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8740	CO2 analyzer problems
CoG steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8750	O2 analyzer problems
CoG steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8760	Opacity monitor problems
CoG steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8770	Flow monitor problems
CoG steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8780	Data acquisition system problems
CoG steam units	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8790	Miscellaneous CEMS problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-77 Pollution Control Equipment: NOx Reduction Systems - Catalytic Air Heaters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8830	CAH NOx Active catalyst
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8831	CAH NOx Support materials
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8832	CAH NOx Plugging
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8835	Other CAH problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-78 Pollution Control Equipment: NOx Reduction Systems - Selective Catalytic Reduction Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8810	SCR NOx Reactor
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8811	SCR NOx Reagent
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8812	SCR NOx Catalyst
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8813	SCR NOx Injection grid piping/valves
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8814	SCR NOx Catalyst support material
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8815	SCR NOx Soot blowers

CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8816	SCR NOx Plugging
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8817	SCR NOx Control system
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8820	SCR NOx Ammonia injection grid piping/valves
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8821	SCR NOx Ammonia tanks, piping and valves (not injection)
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8822	SCR NOx Ammonia air blowers
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8823	SCR NOx Other ammonia system problems
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8825	Other SCR NOx problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-79 Pollution Control Equipment: NOx Reduction Systems - Selective Non-Catalytic Reduction Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8800	SNCR NOx Reagent
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8801	SNCR NOx Carrier gas
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8802	SNCR NOx Control system
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8803	SNCR Performance Testing
CoG steam units	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8809	Other SNCR NOx problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use code 0360 for Low NOx Burners.					

REGULATORY, SAFETY, ENVIRONMENTAL

Use these codes only for events not directly attributable to equipment failures. Inspections or testing of certain equipment due to regulation are reported using the appropriate equipment cause codes, and the fact that it was a regulatory requirement noted in the verbal description section.

TABLE B04-80 Regulatory, Safety, Environmental: Other Operating Environmental Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9660	Thermal discharge limits - fossil and nuclear
CoG steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9663	Thermal discharge limits - gas turbines
CoG steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9664	Thermal discharge limits - jet engines
CoG steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9670	Noise limits (not for personnel safety) - fossil and nuclear
CoG steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9673	Noise limits (not for personnel safety) - gas turbines
CoG steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9674	Noise limits (not for personnel safety) - jet engines
CoG steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9677	Noise limits testing - fossil
CoG steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9678	Noise limits testing - gas turbines
CoG steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9679	Noise limits testing - jet engines
CoG steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9680	Fish kill - fossil and nuclear
CoG steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9683	Fish kill - gas turbines
CoG steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9684	Fish kill - jet engines
CoG steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9690	Other miscellaneous operational environmental limits - fossil and nuclear
CoG steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9693	Other miscellaneous operational environmental limits - gas turbines
CoG steam units	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9694	Other miscellaneous operational environmental limits - jet engines
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-81 Regulatory, Safety, Environmental: Regulatory					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**

CoG steam units	Regulatory, Safety, Environmental	Regulatory		9504	Regulatory (environmental) proceedings and hearings - regulatory agency initiated
CoG steam units	Regulatory, Safety, Environmental	Regulatory		9506	Regulatory (environmental) proceedings and hearings - intervenor initiated
CoG steam units	Regulatory, Safety, Environmental	Regulatory		9510	Plant modifications strictly for compliance with new or changed regulatory requirements (scrubbers, cooling towers, etc.)
CoG steam units	Regulatory, Safety, Environmental	Regulatory		9520	Oil spill in Gulf of Mexico (OMC)
CoG steam units	Regulatory, Safety, Environmental	Regulatory		9590	Miscellaneous regulatory (this code is primarily intended for use with event contribution code 2 to indicate that a regulatory-related factor contributed to the primary cause of the event)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-82 Regulatory, Safety, Environmental: Safety

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Regulatory, Safety, Environmental	Safety		9700	OSHA-related retrofit or inspection
CoG steam units	Regulatory, Safety, Environmental	Safety		9720	Other safety problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-83 Regulatory, Safety, Environmental: Stack Emission

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Regulatory, Safety, Environmental	Stack Emission		9600	SO2 stack emissions - fossil
CoG steam units	Regulatory, Safety, Environmental	Stack Emission		9603	SO2 stack emissions - gas turbines
CoG steam units	Regulatory, Safety, Environmental	Stack Emission		9604	SO2 stack emissions - jet engines

CoG steam units	Regulatory, Safety, Environmental	Stack Emission		9610	NOx stack emissions - fossil
CoG steam units	Regulatory, Safety, Environmental	Stack Emission		9613	NOx stack emissions - gas turbines
CoG steam units	Regulatory, Safety, Environmental	Stack Emission		9614	NOx stack emissions - jet engines
CoG steam units	Regulatory, Safety, Environmental	Stack Emission		9616	CO stack emissions - fossil
CoG steam units	Regulatory, Safety, Environmental	Stack Emission		9620	Particulate stack emissions - fossil
CoG steam units	Regulatory, Safety, Environmental	Stack Emission		9623	Particulate stack emissions - gas turbines
CoG steam units	Regulatory, Safety, Environmental	Stack Emission		9624	Particulate stack emissions - jet engines
CoG steam units	Regulatory, Safety, Environmental	Stack Emission		9630	Opacity - fossil
CoG steam units	Regulatory, Safety, Environmental	Stack Emission		9633	Opacity - gas turbines
CoG steam units	Regulatory, Safety, Environmental	Stack Emission		9634	Opacity - jet engines
CoG steam units	Regulatory, Safety, Environmental	Stack Emission		9650	Other stack/exhaust emissions - fossil (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
CoG steam units	Regulatory, Safety, Environmental	Stack Emission		9653	Other stack or exhaust emissions - gas turbines (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
CoG steam units	Regulatory, Safety, Environmental	Stack Emission		9654	Other stack or exhaust emissions - jet engines (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
CoG steam units	Regulatory, Safety, Environmental	Stack Emission		9656	Other stack or exhaust emissions testing - fossil

CoG steam units	Regulatory, Safety, Environmental	Stack Emission		9657	Other stack or exhaust emissions testing - gas turbines
CoG steam units	Regulatory, Safety, Environmental	Stack Emission		9658	Other stack or exhaust emissions testing - jet engines
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Include exhaust emissions.					

STEAM TURBINE

Besides the turbine, this set includes the steam stop/control valves, turbine control system, and the turbine auxiliaries. The extraction steam codes are contained in the Balance of Plant set.

TABLE B04-84 Steam Turbine: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Steam Turbine	Controls		4290	Hydraulic system pumps
CoG steam units	Steam Turbine	Controls		4291	Hydraulic system coolers
CoG steam units	Steam Turbine	Controls		4292	Hydraulic system filters
CoG steam units	Steam Turbine	Controls		4293	Hydraulic system pipes and valves
CoG steam units	Steam Turbine	Controls		4299	Other hydraulic system problems
CoG steam units	Steam Turbine	Controls		4300	Turbine supervisory system (use codes 4290 to 4299 for hydraulic oil)
CoG steam units	Steam Turbine	Controls		4301	Turbine governing system
CoG steam units	Steam Turbine	Controls		4302	Turbine trip devices (including instruments)
CoG steam units	Steam Turbine	Controls		4303	Exhaust hood and spray controls
CoG steam units	Steam Turbine	Controls		4304	Automatic turbine control systems - mechanical
CoG steam units	Steam Turbine	Controls		4305	Automatic turbine control systems - mechanical - hydraulic
CoG steam units	Steam Turbine	Controls		4306	Automatic turbine control systems - electro-hydraulic - analog
CoG steam units	Steam Turbine	Controls		4307	Automatic turbine control systems - electro-hydraulic - digital
CoG steam units	Steam Turbine	Controls		4308	Automatic turbine control systems - digital control and monitoring
CoG steam units	Steam Turbine	Controls		4309	Other turbine instrument and control problems
CoG steam units	Steam Turbine	Controls		4310	Steam Turbine Control System - data highway

CoG steam units	Steam Turbine	Controls		4311	Steam Turbine Control System - hardware problems (including card failure)
CoG steam units	Steam Turbine	Controls		4312	Steam Turbine Control System - internal and termination wiring
CoG steam units	Steam Turbine	Controls		4313	Steam Turbine Control System - logic problems
CoG steam units	Steam Turbine	Controls		4314	Steam Turbine Control System - upgrades
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-85 Steam Turbine: High Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Steam Turbine	High Pressure Turbine		4000	Outer casing
CoG steam units	Steam Turbine	High Pressure Turbine		4001	Inner casing
CoG steam units	Steam Turbine	High Pressure Turbine		4009	Nozzle bolting
CoG steam units	Steam Turbine	High Pressure Turbine		4010	Nozzles and nozzle blocks
CoG steam units	Steam Turbine	High Pressure Turbine		4011	Diaphragms
CoG steam units	Steam Turbine	High Pressure Turbine		4012	Buckets or blades
CoG steam units	Steam Turbine	High Pressure Turbine		4013	Diaphragms unit and shroud type
CoG steam units	Steam Turbine	High Pressure Turbine		4014	Bucket or blade fouling
CoG steam units	Steam Turbine	High Pressure Turbine		4015	Wheels or spindles
CoG steam units	Steam Turbine	High Pressure Turbine		4020	Shaft seals
CoG steam units	Steam Turbine	High Pressure Turbine		4021	Dummy rings
CoG steam units	Steam Turbine	High Pressure Turbine		4022	Gland rings
CoG steam units	Steam Turbine	High Pressure Turbine		4030	Rotor shaft
CoG steam units	Steam Turbine	High Pressure Turbine		4040	Bearings
CoG steam units	Steam Turbine	High Pressure Turbine		4041	Thrust bearings
CoG steam units	Steam Turbine	High Pressure Turbine		4099	Other high pressure turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-86 Steam Turbine: Intermediate Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Steam Turbine	Intermediate Pressure Turbine		4100	Outer casing
CoG steam units	Steam Turbine	Intermediate Pressure Turbine		4101	Inner casing
CoG steam units	Steam Turbine	Intermediate Pressure Turbine		4109	Nozzle bolting

CoG steam units	Steam Turbine	Intermediate Pressure Turbine		4110	Nozzles and nozzle blocks
CoG steam units	Steam Turbine	Intermediate Pressure Turbine		4111	Diaphragms
CoG steam units	Steam Turbine	Intermediate Pressure Turbine		4112	Buckets or blades
CoG steam units	Steam Turbine	Intermediate Pressure Turbine		4113	Bucket or blade fouling
CoG steam units	Steam Turbine	Intermediate Pressure Turbine		4115	Wheels or spindles
CoG steam units	Steam Turbine	Intermediate Pressure Turbine		4120	Shaft seals
CoG steam units	Steam Turbine	Intermediate Pressure Turbine		4121	Dummy rings
CoG steam units	Steam Turbine	Intermediate Pressure Turbine		4122	Gland rings
CoG steam units	Steam Turbine	Intermediate Pressure Turbine		4130	Rotor shaft
CoG steam units	Steam Turbine	Intermediate Pressure Turbine		4140	Bearings
CoG steam units	Steam Turbine	Intermediate Pressure Turbine		4141	Thrust bearings
CoG steam units	Steam Turbine	Intermediate Pressure Turbine		4199	Other intermediate pressure turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-87 Steam Turbine: Low Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Steam Turbine	Low Pressure Turbine		4200	Outer casing
CoG steam units	Steam Turbine	Low Pressure Turbine		4201	Inner casing
CoG steam units	Steam Turbine	Low Pressure Turbine		4209	Nozzle bolting
CoG steam units	Steam Turbine	Low Pressure Turbine		4210	Nozzles and nozzle blocks
CoG steam units	Steam Turbine	Low Pressure Turbine		4211	Diaphragms
CoG steam units	Steam Turbine	Low Pressure Turbine		4212	Buckets or blades
CoG steam units	Steam Turbine	Low Pressure Turbine		4213	Bucket or blade fouling
CoG steam units	Steam Turbine	Low Pressure Turbine		4215	Wheels or spindles
CoG steam units	Steam Turbine	Low Pressure Turbine		4220	Shaft seals
CoG steam units	Steam Turbine	Low Pressure Turbine		4221	Dummy rings
CoG steam units	Steam Turbine	Low Pressure Turbine		4222	Gland rings
CoG steam units	Steam Turbine	Low Pressure Turbine		4230	Rotor shaft
CoG steam units	Steam Turbine	Low Pressure Turbine		4240	Bearings
CoG steam units	Steam Turbine	Low Pressure Turbine		4241	Thrust bearings
CoG steam units	Steam Turbine	Low Pressure Turbine		4250	Other low pressure turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-88 Steam Turbine: Lube Oil

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

CoG steam units	Steam Turbine	Lube Oil		4280	Lube oil pumps
CoG steam units	Steam Turbine	Lube Oil		4281	Lube oil coolers
CoG steam units	Steam Turbine	Lube Oil		4282	Lube oil conditioners
CoG steam units	Steam Turbine	Lube Oil		4283	Lube oil system valves and piping
CoG steam units	Steam Turbine	Lube Oil		4284	Lube oil pump drive
CoG steam units	Steam Turbine	Lube Oil		4289	Other lube oil system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Do not include bearing failures due to lube oil.					

TABLE B04-89 Steam Turbine: Miscellaneous (Steam Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
CoG steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4400	Major turbine overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
CoG steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4401	Inspection
CoG steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4402	Minor turbine overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
CoG steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4410	Turning gear and motor
CoG steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4411	Steam turbine gear box (single shaft configuration)
CoG steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4412	Steam turbine clutch (single shaft configuration)
CoG steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4415	Shaft coupling mechanism
CoG steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4420	Vibration of the turbine generator unit that cannot be attributed to a specific cause such as bearings or blades (use this code for balance moves)
CoG steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4430	Gland seal system
CoG steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4450	Water induction
CoG steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4460	Turbine overspeed trip test
CoG steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4470	Differential expansion
CoG steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4490	Turbine performance testing (use code 9999 for total unit performance testing)
CoG steam units	Steam Turbine	Miscellaneous (Steam Turbine)		4499	Other miscellaneous steam turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-90 Steam Turbine: Piping					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG steam units	Steam Turbine	Piping		4270	Crossover or under piping
CoG steam units	Steam Turbine	Piping		4279	Miscellaneous turbine piping
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B04-91 Steam Turbine: Valves					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
CoG steam units	Steam Turbine	Valves		4260	Main stop valves
CoG steam units	Steam Turbine	Valves		4261	Control valves
CoG steam units	Steam Turbine	Valves		4262	Intercept valves
CoG steam units	Steam Turbine	Valves		4263	Reheat stop valves
CoG steam units	Steam Turbine	Valves		4264	Combined intercept valves
CoG steam units	Steam Turbine	Valves		4265	Miscellaneous drain and vent valves
CoG steam units	Steam Turbine	Valves		4266	Main stop valve testing
CoG steam units	Steam Turbine	Valves		4267	Control valve testing
CoG steam units	Steam Turbine	Valves		4268	Reheat/intercept valve testing
CoG steam units	Steam Turbine	Valves		4269	Other turbine valves (including LP steam admission valves)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

Appendix B05: Index To Co-Generator Block Unit Cause Codes

COGENERATOR BLOCK UNITS

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
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B05-2	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems
B05-3	Balance of Plant	Auxiliary Systems	Fire Protection System
B05-4	Balance of Plant	Auxiliary Systems	Instrument Air
B05-5	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System
B05-6	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)
B05-7	Balance of Plant	Auxiliary Systems	Open Cooling Water System
B05-8	Balance of Plant	Auxiliary Systems	Seal Air Fans
B05-9	Balance of Plant	Auxiliary Systems	Service Air
B05-10	Balance of Plant	Auxiliary Systems	Service Water (Open System)
B05-11	Balance of Plant	Circulating Water Systems	
B05-12	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators
B05-13	Balance of Plant	Condensate System	Miscellaneous (Condensate System)
B05-14	Balance of Plant	Condensate System	Polishers/Chemical Addition
B05-15	Balance of Plant	Condensate System	Pumps, Piping, and Valves
B05-16	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals
B05-17	Balance of Plant	Condensing System	Condenser Controls
B05-18	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment
B05-19	Balance of Plant	Condensing System	Miscellaneous (Condensing System)
B05-20	Balance of Plant	Condensing System	Vacuum Equipment
B05-21	Balance of Plant	Electrical	
B05-22	Balance of Plant	Extraction Steam	
B05-23	Balance of Plant	Feedwater System	
B05-24	Balance of Plant	Heater Drain Systems	
B05-25	Balance of Plant	Miscellaneous (Balance of Plant)	
B05-26	Balance of Plant	Power Station Switchyard	
B05-27	Balance of Plant	Waste Water (zero discharge) Systems	
B05-28	Expander Turbine	Expander Turbine	
B05-29	External	Catastrophe	
B05-30	External	Economic	
B05-31	External	Fuel Quality	
B05-32	External	Miscellaneous (External)	
B05-33	Gas Turbine	Auxiliary Systems	

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B05-34	Gas Turbine	Exhaust Systems	
B05-35	Gas Turbine	Fuel, Ignition, and Combustion Systems	
B05-36	Gas Turbine	Inlet Air System and Compressors	Compressors
B05-37	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters
B05-38	Gas Turbine	Miscellaneous (Gas Turbine)	
B05-39	Gas Turbine	Turbine	
B05-40	Generator	Controls	
B05-41	Generator	Cooling System	
B05-42	Generator	Exciter	
B05-43	Generator	Generator	
B05-44	Generator	Miscellaneous (Generator)	
B05-45	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply
B05-46	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)
B05-47	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems	
B05-48	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Design Limitations	
B05-49	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)
B05-50	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)
B05-51	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures	
B05-52	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections	
B05-53	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation
B05-54	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown
B05-55	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam
B05-56	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators
B05-57	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam
B05-58	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass
B05-59	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)
B05-60	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks	
B05-61	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Water Condition	
B05-62	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)	
B05-63	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems	
B05-64	Inactive States	Inactive States	
B05-65	Jet Engine	Auxiliary Systems	
B05-66	Jet Engine	Exhaust Systems	
B05-67	Jet Engine	Fuel, Ignition, and Combustion Systems	
B05-68	Jet Engine	Inlet Air System and Compressors	Compressors
B05-69	Jet Engine	Inlet Air System and Compressors	Ducts and Filters
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INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
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B05-72	Miscellaneous	Instruments and Controls	
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B05-74	Personnel or Procedural Errors	Personnel or Procedural Errors	
B05-75	Pollution Control Equipment	CO Reduction	
B05-76	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)	
B05-77	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters
B05-78	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems
B05-79	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems
B05-80	Regulatory, Safety, Environmental	Other Operating Environmental Limitations	
B05-81	Regulatory, Safety, Environmental	Regulatory	
B05-82	Regulatory, Safety, Environmental	Safety	
B05-83	Regulatory, Safety, Environmental	Stack Emission	
B05-84	Steam Turbine	Controls	
B05-85	Steam Turbine	High Pressure Turbine	
B05-86	Steam Turbine	Intermediate Pressure Turbine	
B05-87	Steam Turbine	Low Pressure Turbine	
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B05-89	Steam Turbine	Miscellaneous (Steam Turbine)	
B05-90	Steam Turbine	Piping	
B05-91	Steam Turbine	Valves	

BALANCE OF PLANT

TABLE B05-1 Balance of Plant: Auxiliary Systems - Auxiliary Steam					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Co-generator Block	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3830	Auxiliary boiler
Co-generator Block	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3831	Auxiliary steam piping
Co-generator Block	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3832	Auxiliary steam valves
Co-generator Block	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3833	Auxiliary steam controls and instruments
Co-generator Block	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3834	Auxiliary boiler tube leaks
Co-generator Block	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3835	Auxiliary boiler burner management system
Co-generator Block	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3836	Steam transfer to other unit

Co-generator Block	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3839	Other auxiliary steam problems (also see extraction steam codes 3520 to 3529; startup bypass codes 0630 to 0660; and soot blower steam code 0870)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-2 Balance of Plant: Auxiliary Systems - Closed Cooling Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3820	Closed cooling water pumps and motors
Co-generator Block	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3821	Closed cooling water piping
Co-generator Block	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3822	Closed cooling water valves
Co-generator Block	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3823	Closed cooling water heat exchangers
Co-generator Block	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3824	Closed cooling water system fouling
Co-generator Block	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3825	Closed cooling water instrumentation
Co-generator Block	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3826	Closed cooling water strainer
Co-generator Block	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3829	Other closed cooling water system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-3 Balance of Plant: Auxiliary Systems - Fire Protection System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Auxiliary Systems	Fire Protection System	3860	Fire protection system pumps
Co-generator Block	Balance of Plant	Auxiliary Systems	Fire Protection System	3861	Fire protection system piping
Co-generator Block	Balance of Plant	Auxiliary Systems	Fire Protection System	3862	Fire protection system valves
Co-generator Block	Balance of Plant	Auxiliary Systems	Fire Protection System	3863	Fire protection system fouling
Co-generator Block	Balance of Plant	Auxiliary Systems	Fire Protection System	3864	Fire protection system instrumentation and controls
Co-generator Block	Balance of Plant	Auxiliary Systems	Fire Protection System	3869	Other fire protection system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-4 Balance of Plant: Auxiliary Systems - Instrument Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Auxiliary Systems	Instrument Air	3850	Instrument air compressors

Co-generator Block	Balance of Plant	Auxiliary Systems	Instrument Air	3851	Instrument air piping
Co-generator Block	Balance of Plant	Auxiliary Systems	Instrument Air	3852	Instrument air valves
Co-generator Block	Balance of Plant	Auxiliary Systems	Instrument Air	3853	Instrument air dryers
Co-generator Block	Balance of Plant	Auxiliary Systems	Instrument Air	3854	N2 backup to instrument air
Co-generator Block	Balance of Plant	Auxiliary Systems	Instrument Air	3859	Other instrument air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-5 Balance of Plant: Auxiliary Systems - Low-pressure Gas Compression System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3870	Fuel Gas Compressor and Motors
Co-generator Block	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3871	Fuel Gas Compressor Piping
Co-generator Block	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3872	Fuel Gas Compressor Valves
Co-generator Block	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3873	Fuel Gas Compressor Heat Exchangers
Co-generator Block	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3874	Fuel Gas Compressor Controls and Instrumentation
Co-generator Block	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3875	Fuel Gas Compressor Filters
Co-generator Block	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3876	Fuel Gas Compressor Fire System
Co-generator Block	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3879	Fuel Gas Compressor - other
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-6 Balance of Plant: Auxiliary Systems - Miscellaneous (Auxiliary Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3898	Miscellaneous plant auxiliary process and services instrumentation and controls
Co-generator Block	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3899	Other miscellaneous auxiliary system problems
Co-generator Block	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	6299	Other combined cycle block problems (Use other gas turbine problem codes,

					other steam turbine codes, etc., whenever appropriate.)
Co-generator Block	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	6399	Other coal gasification equipment problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-7 Balance of Plant: Auxiliary Systems - Open Cooling Water System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3800	Open cooling water pumps and motors
Co-generator Block	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3801	Open cooling water piping
Co-generator Block	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3802	Open cooling water valves
Co-generator Block	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3803	Open cooling water heat exchangers
Co-generator Block	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3804	Open cooling water system fouling
Co-generator Block	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3805	Open cooling water system instrumentation
Co-generator Block	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3806	Open cooling water strainer
Co-generator Block	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3809	Other open cooling water problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-8 Balance of Plant: Auxiliary Systems - Seal Air Fans

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Auxiliary Systems	Seal Air Fans	3880	Seal air fan
Co-generator Block	Balance of Plant	Auxiliary Systems	Seal Air Fans	3881	Seal air fan drive - motor
Co-generator Block	Balance of Plant	Auxiliary Systems	Seal Air Fans	3882	Seal air control dampers and drives
Co-generator Block	Balance of Plant	Auxiliary Systems	Seal Air Fans	3883	Seal air filters
Co-generator Block	Balance of Plant	Auxiliary Systems	Seal Air Fans	3889	Other seal air fan problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-9 Balance of Plant: Auxiliary Systems - Service Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Auxiliary Systems	Service Air	3840	Service air compressors
Co-generator Block	Balance of Plant	Auxiliary Systems	Service Air	3841	Service air piping
Co-generator Block	Balance of Plant	Auxiliary Systems	Service Air	3842	Service air valves
Co-generator Block	Balance of Plant	Auxiliary Systems	Service Air	3843	Service air dryers

Co-generator Block	Balance of Plant	Auxiliary Systems	Service Air	3849	Other service air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-10 Balance of Plant: Auxiliary Systems - Service Water (Open System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3810	Service water pumps and motors
Co-generator Block	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3811	Service water piping
Co-generator Block	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3812	Service water valves
Co-generator Block	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3813	Service water heat exchangers
Co-generator Block	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3814	Service water system fouling
Co-generator Block	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3815	Service water strainer
Co-generator Block	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3819	Other service water problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-11 Balance of Plant: Circulating Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Circulating Water Systems		3210	Circulating water pumps
Co-generator Block	Balance of Plant	Circulating Water Systems		3211	Circulating water pump motors
Co-generator Block	Balance of Plant	Circulating Water Systems		3220	Circulating water piping
Co-generator Block	Balance of Plant	Circulating Water Systems		3221	Circulating water piping fouling
Co-generator Block	Balance of Plant	Circulating Water Systems		3230	Circulating water valves
Co-generator Block	Balance of Plant	Circulating Water Systems		3231	Waterbox
Co-generator Block	Balance of Plant	Circulating Water Systems		3232	Condenser tube cleaning system including debris filter
Co-generator Block	Balance of Plant	Circulating Water Systems		3233	Circulating water priming system
Co-generator Block	Balance of Plant	Circulating Water Systems		3235	Cooling tower booster pump
Co-generator Block	Balance of Plant	Circulating Water Systems		3236	Cooling tower booster motor
Co-generator Block	Balance of Plant	Circulating Water Systems		3238	Cooling tower fan motors
Co-generator Block	Balance of Plant	Circulating Water Systems		3239	Cooling tower fan motors - variable speed
Co-generator Block	Balance of Plant	Circulating Water Systems		3240	Cooling tower fans
Co-generator Block	Balance of Plant	Circulating Water Systems		3241	Cooling tower efficiency below design
Co-generator Block	Balance of Plant	Circulating Water Systems		3242	Cooling tower fill damage
Co-generator Block	Balance of Plant	Circulating Water Systems		3243	Cooling tower icing
Co-generator Block	Balance of Plant	Circulating Water Systems		3244	Cooling tower fires

Co-generator Block	Balance of Plant	Circulating Water Systems		3245	Other cooling tower problems
Co-generator Block	Balance of Plant	Circulating Water Systems		3246	Cooling tower fouling
Co-generator Block	Balance of Plant	Circulating Water Systems		3247	Cooling tower instrumentation
Co-generator Block	Balance of Plant	Circulating Water Systems		3248	Cooling Tower Overhaul
Co-generator Block	Balance of Plant	Circulating Water Systems		3250	Circulating water system instruments and controls
Co-generator Block	Balance of Plant	Circulating Water Systems		3260	Traveling screens
Co-generator Block	Balance of Plant	Circulating Water Systems		3261	Traveling screen fouling
Co-generator Block	Balance of Plant	Circulating Water Systems		3269	Circulating water biological conditions (ie, zebra mussels)
Co-generator Block	Balance of Plant	Circulating Water Systems		3270	Intake system problems other than traveling screens
Co-generator Block	Balance of Plant	Circulating Water Systems		3271	Intake grating fouling
Co-generator Block	Balance of Plant	Circulating Water Systems		3272	Circulating water screenwash system
Co-generator Block	Balance of Plant	Circulating Water Systems		3273	Debris in circulating water from outside sources (leaves, mud, etc.)
Co-generator Block	Balance of Plant	Circulating Water Systems		3280	High circulating water temperature (not due to season, tower efficiency below design, or other listed equipment problem)
Co-generator Block	Balance of Plant	Circulating Water Systems		3281	Circulating water tempering system
Co-generator Block	Balance of Plant	Circulating Water Systems		3282	Circulating water cooling ponds
Co-generator Block	Balance of Plant	Circulating Water Systems		3285	Circulating water chemistry
Co-generator Block	Balance of Plant	Circulating Water Systems		3299	Other circulating water system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-12 Balance of Plant: Condensate System - Low/Intermediate Pressure Heater and Deaerators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3339	LP heater head leaks
Co-generator Block	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3340	LP heater tube leaks
Co-generator Block	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3341	Other LP heater - general
Co-generator Block	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3342	IP heater tube leaks

Co-generator Block	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3343	Other IP heater - general
Co-generator Block	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3344	Deaerator (including level control)
Co-generator Block	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3345	IP heater head leaks
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-13 Balance of Plant: Condensate System - Miscellaneous (Condensate System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3360	Condensate makeup and return (including storage tanks)
Co-generator Block	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3370	Condensate system controls and instrumentation (not hotwell level, heater level, or deaerator level controls; see codes 3150-3159, 3344, 3502).
Co-generator Block	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3380	Condensate coolers
Co-generator Block	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3399	Other miscellaneous condensate system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-14 Balance of Plant: Condensate System - Polishers/Chemical Addition

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Condensate System	Polishers/Chemical Addition	3350	Condensate polishing and filtering systems
Co-generator Block	Balance of Plant	Condensate System	Polishers/Chemical Addition	3351	Chemical addition systems
Co-generator Block	Balance of Plant	Condensate System	Polishers/Chemical Addition	3352	Feedwater chemistry (not specific to condenser, polishers, or chemical addition)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-15 Balance of Plant: Condensate System - Pumps, Piping, and Valves

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3300	Condensate water pre-treatment

Co-generator Block	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3310	Condensate/hotwell pumps
Co-generator Block	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3311	Condensate/hotwell pump motor
Co-generator Block	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3312	Condensate booster pump
Co-generator Block	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3313	Condensate booster pump motor
Co-generator Block	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3314	Condensate booster pump motor - variable speed
Co-generator Block	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3315	Condensate booster pump drive (other than 3313 and 3314)
Co-generator Block	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3320	Condensate piping
Co-generator Block	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3330	Condensate valves
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-16 Balance of Plant: Condensing System - Condenser Casing or Shell and Internals

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3120	Tube sheets
Co-generator Block	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3121	Expansion joint
Co-generator Block	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3122	Gaskets and seals
Co-generator Block	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3123	Hot well
Co-generator Block	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3124	Tube sheet fouling
Co-generator Block	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3129	Other condenser casing or shell and internal problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-17 Balance of Plant: Condensing System - Condenser Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Condensing System	Condenser Controls	3150	Hot well level controls
Co-generator Block	Balance of Plant	Condensing System	Condenser Controls	3151	Vacuum pump and air ejector controls
Co-generator Block	Balance of Plant	Condensing System	Condenser Controls	3152	Air-cooled condenser controls
Co-generator Block	Balance of Plant	Condensing System	Condenser Controls	3159	Other condensing system controls and instruments
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-18 Balance of Plant: Condensing System - Condenser Tubes and Support Equipment					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Co-generator Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3110	Condenser tube leaks
Co-generator Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3111	Condenser tube fouling shell side
Co-generator Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3112	Condenser tube fouling tube side
Co-generator Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3113	Condenser tube and water box cleaning (including circulating water flow reversal)
Co-generator Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3114	Air-cooled condenser tubes
Co-generator Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3115	Air-cooled condenser pumps
Co-generator Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3116	Air-cooled condenser fans
Co-generator Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3117	Air-cooled condenser fan motors
Co-generator Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3118	Other Air-cooled condenser problems
Co-generator Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3119	Other condenser tube casing or shell and internal problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-19 Balance of Plant: Condensing System - Miscellaneous (Condensing System)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Co-generator Block	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3170	Condenser inspection (use code 3110 to report looking for tube leaks)
Co-generator Block	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3171	Air-cooled condenser inspections
Co-generator Block	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3180	Major condenser overhaul
Co-generator Block	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3185	Water side cathodic protection
Co-generator Block	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3186	Auxiliary condenser and associated equipment

Co-generator Block	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3190	Air leakage (for losses not attributable to previously noted equipment related codes)
Co-generator Block	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3199	Other miscellaneous condensing system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-20 Balance of Plant: Condensing System - Vacuum Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Condensing System	Vacuum Equipment	3130	Air ejectors
Co-generator Block	Balance of Plant	Condensing System	Vacuum Equipment	3131	Air ejector piping and valves
Co-generator Block	Balance of Plant	Condensing System	Vacuum Equipment	3132	Inter and after condensers
Co-generator Block	Balance of Plant	Condensing System	Vacuum Equipment	3133	Vacuum pumps
Co-generator Block	Balance of Plant	Condensing System	Vacuum Equipment	3134	Vacuum pump piping and valves
Co-generator Block	Balance of Plant	Condensing System	Vacuum Equipment	3135	Vacuum pump motor and auxiliaries
Co-generator Block	Balance of Plant	Condensing System	Vacuum Equipment	3139	Other air extraction system problems - general
Co-generator Block	Balance of Plant	Condensing System	Vacuum Equipment	3149	Loss of vacuum not attributable to a particular component such as air ejectors or valves, or high back pressure not attributable to high circulating water temperature, or vacuum losses from a known cause.
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-21 Balance of Plant: Electrical

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Electrical		3600	Switchyard transformers and associated cooling systems - external (OMC)
Co-generator Block	Balance of Plant	Electrical		3601	Switchyard transformers and associated cooling systems - external (not OMC)
Co-generator Block	Balance of Plant	Electrical		3610	Switchyard circuit breakers - external (not OMC)
Co-generator Block	Balance of Plant	Electrical		3611	Switchyard circuit breakers - external (OMC)

Co-generator Block	Balance of Plant	Electrical		3612	Switchyard system protection devices - external (OMC)
Co-generator Block	Balance of Plant	Electrical		3613	Switchyard system protection devices - external (not OMC)
Co-generator Block	Balance of Plant	Electrical		3618	Other switchyard equipment - external (not OMC)
Co-generator Block	Balance of Plant	Electrical		3619	Other switchyard equipment - external (OMC)
Co-generator Block	Balance of Plant	Electrical		3620	Main transformer
Co-generator Block	Balance of Plant	Electrical		3621	Unit auxiliaries transformer
Co-generator Block	Balance of Plant	Electrical		3622	Station service startup transformer
Co-generator Block	Balance of Plant	Electrical		3623	Auxiliary generators
Co-generator Block	Balance of Plant	Electrical		3624	Auxiliary generator voltage supply system
Co-generator Block	Balance of Plant	Electrical		3629	Other switchyard or high voltage system problems - external
Co-generator Block	Balance of Plant	Electrical		3630	400-700 volt transformers
Co-generator Block	Balance of Plant	Electrical		3631	400-700 volt circuit breakers
Co-generator Block	Balance of Plant	Electrical		3632	400-700 volt conductors and buses
Co-generator Block	Balance of Plant	Electrical		3633	400-700 volt insulators
Co-generator Block	Balance of Plant	Electrical		3634	400-700 volt protection devices
Co-generator Block	Balance of Plant	Electrical		3639	Other 400-700 volt problems
Co-generator Block	Balance of Plant	Electrical		3640	AC instrument power transformers
Co-generator Block	Balance of Plant	Electrical		3641	AC Circuit breakers
Co-generator Block	Balance of Plant	Electrical		3642	AC Conductors and buses
Co-generator Block	Balance of Plant	Electrical		3643	AC Inverters
Co-generator Block	Balance of Plant	Electrical		3644	AC Protection devices
Co-generator Block	Balance of Plant	Electrical		3649	Other AC instrument power problems
Co-generator Block	Balance of Plant	Electrical		3650	DC instrument power battery chargers
Co-generator Block	Balance of Plant	Electrical		3651	DC circuit breakers
Co-generator Block	Balance of Plant	Electrical		3652	DC conductors and buses
Co-generator Block	Balance of Plant	Electrical		3653	DC protection devices
Co-generator Block	Balance of Plant	Electrical		3659	Other DC power problems
Co-generator Block	Balance of Plant	Electrical		3660	4000-7000 volt transformers
Co-generator Block	Balance of Plant	Electrical		3661	4000-7000 volt circuit breakers
Co-generator Block	Balance of Plant	Electrical		3662	4000-7000 volt conductors and buses
Co-generator Block	Balance of Plant	Electrical		3663	4000-7000 volt insulators

Co-generator Block	Balance of Plant	Electrical		3664	4000-7000 volt protection devices
Co-generator Block	Balance of Plant	Electrical		3669	Other 4000-7000 volt problems
Co-generator Block	Balance of Plant	Electrical		3670	12-15kV transformers
Co-generator Block	Balance of Plant	Electrical		3671	12-15kV circuit breakers
Co-generator Block	Balance of Plant	Electrical		3672	12-15kV conductors and buses
Co-generator Block	Balance of Plant	Electrical		3673	12-15kV insulators
Co-generator Block	Balance of Plant	Electrical		3674	12-15kV protection devices
Co-generator Block	Balance of Plant	Electrical		3679	Other 12-15kV problems
Co-generator Block	Balance of Plant	Electrical		3680	Other voltage transformers
Co-generator Block	Balance of Plant	Electrical		3681	Other voltage circuit breakers
Co-generator Block	Balance of Plant	Electrical		3682	Other voltage conductors and buses
Co-generator Block	Balance of Plant	Electrical		3683	Other voltage insulators
Co-generator Block	Balance of Plant	Electrical		3684	Other voltage protection devices
Co-generator Block	Balance of Plant	Electrical		3689	Other voltage problems
Co-generator Block	Balance of Plant	Electrical		3690	Station Service Power Distribution System, General
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-22 Balance of Plant: Extraction Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Extraction Steam		3520	HP Extraction steam piping
Co-generator Block	Balance of Plant	Extraction Steam		3521	HP Extraction steam valves
Co-generator Block	Balance of Plant	Extraction Steam		3522	HP Extraction steam instruments and controls
Co-generator Block	Balance of Plant	Extraction Steam		3529	Other HP extraction steam system problems
Co-generator Block	Balance of Plant	Extraction Steam		3530	IP Extraction steam piping
Co-generator Block	Balance of Plant	Extraction Steam		3531	IP Extraction steam valves
Co-generator Block	Balance of Plant	Extraction Steam		3532	IP Extraction steam instruments and controls
Co-generator Block	Balance of Plant	Extraction Steam		3539	Other IP extraction steam system problems
Co-generator Block	Balance of Plant	Extraction Steam		3540	LP Extraction steam piping
Co-generator Block	Balance of Plant	Extraction Steam		3541	LP Extraction steam valves
Co-generator Block	Balance of Plant	Extraction Steam		3542	LP Extraction steam instruments and controls

Co-generator Block	Balance of Plant	Extraction Steam		3549	Other LP extraction steam system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-23 Balance of Plant: Feedwater System					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Co-generator Block	Balance of Plant	Feedwater System		3401	Startup feedwater pump
Co-generator Block	Balance of Plant	Feedwater System		3402	Startup feedwater pump drives - all types
Co-generator Block	Balance of Plant	Feedwater System		3407	Feedwater pump suction screens
Co-generator Block	Balance of Plant	Feedwater System		3408	Feedwater pump drive - local controls
Co-generator Block	Balance of Plant	Feedwater System		3409	Feedwater pump drive motor - variable speed
Co-generator Block	Balance of Plant	Feedwater System		3410	Feedwater pump
Co-generator Block	Balance of Plant	Feedwater System		3411	Feedwater pump drive - motor
Co-generator Block	Balance of Plant	Feedwater System		3412	Feedwater pump drive - steam turbine
Co-generator Block	Balance of Plant	Feedwater System		3413	Feedwater pump coupling and drive shaft
Co-generator Block	Balance of Plant	Feedwater System		3414	Feedwater pump local controls
Co-generator Block	Balance of Plant	Feedwater System		3415	Feedwater pump/drive lube oil system
Co-generator Block	Balance of Plant	Feedwater System		3416	Other feedwater pump problems
Co-generator Block	Balance of Plant	Feedwater System		3417	Feedwater pump drive - main shaft
Co-generator Block	Balance of Plant	Feedwater System		3418	Feedwater pump drive - other
Co-generator Block	Balance of Plant	Feedwater System		3419	Feedwater pump drive - gear
Co-generator Block	Balance of Plant	Feedwater System		3420	Feedwater piping and supports
Co-generator Block	Balance of Plant	Feedwater System		3430	Feedwater regulating (boiler level control) valve
Co-generator Block	Balance of Plant	Feedwater System		3431	Other feedwater valves
Co-generator Block	Balance of Plant	Feedwater System		3439	HP heater head leaks
Co-generator Block	Balance of Plant	Feedwater System		3440	High pressure heater tube leaks
Co-generator Block	Balance of Plant	Feedwater System		3441	Other high pressure heater problems (see condensate system for LP and IP heater codes)
Co-generator Block	Balance of Plant	Feedwater System		3451	Feedwater booster pump suction screens
Co-generator Block	Balance of Plant	Feedwater System		3452	Feedwater booster pump drive - local controls

Co-generator Block	Balance of Plant	Feedwater System		3453	Feedwater booster pump drive motor - variable speed
Co-generator Block	Balance of Plant	Feedwater System		3454	Feedwater booster pump
Co-generator Block	Balance of Plant	Feedwater System		3455	Feedwater booster pump drive - motor
Co-generator Block	Balance of Plant	Feedwater System		3456	Feedwater booster pump drive - steam turbine
Co-generator Block	Balance of Plant	Feedwater System		3457	Feedwater booster pump coupling and drive shaft
Co-generator Block	Balance of Plant	Feedwater System		3458	Feedwater booster pump local controls
Co-generator Block	Balance of Plant	Feedwater System		3459	Feedwater booster pump/drive lube oil system
Co-generator Block	Balance of Plant	Feedwater System		3460	Other feedwater booster pump problems
Co-generator Block	Balance of Plant	Feedwater System		3461	Feedwater booster pump drive - main shaft
Co-generator Block	Balance of Plant	Feedwater System		3462	Feedwater booster pump drive - other
Co-generator Block	Balance of Plant	Feedwater System		3463	Feedwater booster pump drive - gear
Co-generator Block	Balance of Plant	Feedwater System		3499	Other feedwater system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Excluding extraction or drain systems.					

TABLE B05-24 Balance of Plant: Heater Drain Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Heater Drain Systems		3501	Heater drain pumps
Co-generator Block	Balance of Plant	Heater Drain Systems		3502	Heater level control
Co-generator Block	Balance of Plant	Heater Drain Systems		3503	Heater drain piping
Co-generator Block	Balance of Plant	Heater Drain Systems		3504	Heater drain valves
Co-generator Block	Balance of Plant	Heater Drain Systems		3505	Heater drain pump drive
Co-generator Block	Balance of Plant	Heater Drain Systems		3509	Other heater drain system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-25 Balance of Plant: Miscellaneous (Balance of Plant)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3950	Process computer

Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3960	Thermal derating (thermal efficiency losses in balance of plant when specific cause(s) unknown)
Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3970	Distributive Control System (DCS) - process computer
Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3971	DCS - data highway
Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3972	DCS - hardware problems (including card failure)
Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3973	DCS - internal and termination wiring
Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3974	DCS - logic problems
Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3975	DCS - upgrades
Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3979	Other DCS problems
Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3980	Programmable Logic Controller (PLC)
Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3981	PLC - data highway
Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3982	PLC - hardware problems (including card failure)
Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3983	PLC - internal and termination wiring
Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3984	PLC - logic problems
Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3985	PLC - upgrades
Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3989	Other PLC problems
Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3995	Powerhouse heating and ventilating systems
Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3996	Air conditioning systems - rooms and areas
Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3998	Balance of plant overhaul/outage
Co-generator Block	Balance of Plant	Miscellaneous (Balance of Plant)		3999	Other miscellaneous balance of plant problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-26 Balance of Plant: Power Station Switchyard

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Power Station Switchyard		3700	Power Station switchyard (non generating unit equipment)
Co-generator Block	Balance of Plant	Power Station Switchyard		3710	Transmission line (connected to powerhouse switchyard to 1st Substation)

Co-generator Block	Balance of Plant	Power Station Switchyard		3720	Transmission equipment at the 1st substation (see code 9300 if applicable)
Co-generator Block	Balance of Plant	Power Station Switchyard		3730	Transmission equipment beyond the 1st substation (see code 9300 if applicable)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-27 Balance of Plant: Waste Water (zero discharge) Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Balance of Plant	Waste Water (zero discharge) Systems		3290	Waste water (zero discharge) tanks, pumps, and motors
Co-generator Block	Balance of Plant	Waste Water (zero discharge) Systems		3291	Waste water (zero discharge) system fouling
Co-generator Block	Balance of Plant	Waste Water (zero discharge) Systems		3292	Waste water (zero discharge) piping
Co-generator Block	Balance of Plant	Waste Water (zero discharge) Systems		3293	Waste water (zero discharge) valves
Co-generator Block	Balance of Plant	Waste Water (zero discharge) Systems		3294	Waste water (zero discharge) controls and instrumentation
Co-generator Block	Balance of Plant	Waste Water (zero discharge) Systems		3295	Other waste water (zero discharge) problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

EXPANDER TURBINE

TABLE B05-28 Expander Turbine: Expander Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Expander Turbine	Expander Turbine		7800	Couplings
Co-generator Block	Expander Turbine	Expander Turbine		7810	Shaft
Co-generator Block	Expander Turbine	Expander Turbine		7820	Bearings
Co-generator Block	Expander Turbine	Expander Turbine		7830	Blades
Co-generator Block	Expander Turbine	Expander Turbine		7840	Discs
Co-generator Block	Expander Turbine	Expander Turbine		7850	Spacers
Co-generator Block	Expander Turbine	Expander Turbine		7860	Nozzles/vanes

Co-generator Block	Expander Turbine	Expander Turbine		7870	Heat shields
Co-generator Block	Expander Turbine	Expander Turbine		7880	Exhaust diffusers
Co-generator Block	Expander Turbine	Expander Turbine		7890	Seal oil system and seals
Co-generator Block	Expander Turbine	Expander Turbine		7900	Inner casing
Co-generator Block	Expander Turbine	Expander Turbine		7910	Outer exhaust casing
Co-generator Block	Expander Turbine	Expander Turbine		7920	Lube oil system
Co-generator Block	Expander Turbine	Expander Turbine		7930	Controls and instrumentation
Co-generator Block	Expander Turbine	Expander Turbine		7940	Evactor
Co-generator Block	Expander Turbine	Expander Turbine		7950	Major overhaul
Co-generator Block	Expander Turbine	Expander Turbine		7960	Other expander turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

EXTERNAL

Use this set of codes to report events caused by external factors (flood, lightning, etc.); economic factors (lack of fuel, labor strikes, etc.); operator training; and transmission system problems external to the plant.

TABLE B05-29 External: Catastrophe

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	External	Catastrophe		9000	Flood
Co-generator Block	External	Catastrophe		9001	Drought
Co-generator Block	External	Catastrophe		9010	Fire including wildfires, not related to a specific component
Co-generator Block	External	Catastrophe		9020	Lightning
Co-generator Block	External	Catastrophe		9025	Geomagnetic disturbance
Co-generator Block	External	Catastrophe		9030	Earthquake
Co-generator Block	External	Catastrophe		9031	Tornado
Co-generator Block	External	Catastrophe		9035	Hurricane
Co-generator Block	External	Catastrophe		9036	Storms (ice, snow, etc)
Co-generator Block	External	Catastrophe		9040	Other catastrophe
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-30 External: Economic

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	External	Economic		0	Reserve shutdown

Co-generator Block	External	Economic		9130	Failure of fuel supplier to fulfill contractual obligations or a pre-arranged deal due to physical fuel disruptions or operational impairments (e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)
Co-generator Block	External	Economic		9131	Lack of fuel – due to contractual or tariff provisions that allow for service interruption or price fluctuations during peak demand periods.
Co-generator Block	External	Economic		9134	Fuel conservation
Co-generator Block	External	Economic		9136	Problems with Primary Fuel for Units with Secondary Fuel Operation
Co-generator Block	External	Economic		9137	Ground water or other water supply problems
Co-generator Block	External	Economic		9140	Plant modifications to burn different fuel that are not regulatory mandated
Co-generator Block	External	Economic		9150	Labor strikes company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.
Co-generator Block	External	Economic		9151	Labor strikes direct plant management grievances that result in a walkout or strike are under plant management control.
Co-generator Block	External	Economic		9160	Other economic problems
Co-generator Block	External	Economic		9180	Economic (for internal use at plants only)
Co-generator Block	External	Economic		9181	Economic (for internal use at plants only)
Co-generator Block	External	Economic		9182	Economic (for internal use at plants only)
Co-generator Block	External	Economic		9183	Economic (for internal use at plants only)
Co-generator Block	External	Economic		9184	Economic (for internal use at plants only)

Co-generator Block	External	Economic		9185	Economic (for internal use at plants only)
Co-generator Block	External	Economic		9186	Economic (for internal use at plants only)
Co-generator Block	External	Economic		9187	Economic (for internal use at plants only)
Co-generator Block	External	Economic		9188	Economic (for internal use at plants only)
Co-generator Block	External	Economic		9189	Economic (for internal use at plants only)
Co-generator Block	External	Economic		9190	Economic (for internal use at plants only)
Co-generator Block	External	Economic		9191	Economic (for internal use at plants only)
Co-generator Block	External	Economic		9192	Economic (for internal use at plants only)
Co-generator Block	External	Economic		9193	Economic (for internal use at plants only)
Co-generator Block	External	Economic		9194	Economic (for internal use at plants only)
Co-generator Block	External	Economic		9195	Economic (for internal use at plants only)
Co-generator Block	External	Economic		9196	Economic (for internal use at plants only)
Co-generator Block	External	Economic		9197	Economic (for internal use at plants only)
Co-generator Block	External	Economic		9198	Economic (for internal use at plants only)
Co-generator Block	External	Economic		9199	Economic (for internal use at plants only)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-31 External: Fuel Quality

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	External	Fuel Quality		9200	High ash content (OMC)
Co-generator Block	External	Fuel Quality		9201	High ash content (not OMC)
Co-generator Block	External	Fuel Quality		9205	Poor quality natural gas fuel, low heat content

Co-generator Block	External	Fuel Quality		9220	High sulfur content (OMC)
Co-generator Block	External	Fuel Quality		9221	High sulfur content (not OMC)
Co-generator Block	External	Fuel Quality		9230	High vanadium content (OMC)
Co-generator Block	External	Fuel Quality		9231	High vanadium content (not OMC)
Co-generator Block	External	Fuel Quality		9240	High sodium content (OMC)
Co-generator Block	External	Fuel Quality		9241	High sodium content (not OMC)
Co-generator Block	External	Fuel Quality		9260	Low BTU oil (OMC)
Co-generator Block	External	Fuel Quality		9261	Low BTU oil (not OMC)
Co-generator Block	External	Fuel Quality		9290	Other fuel quality problems (OMC)
Co-generator Block	External	Fuel Quality		9291	Other fuel quality problems (not OMC)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use code 9600 to 9650 if the fuel quality results in excess stack emissions through no fault in the pollution control equipment. Use the appropriate equipment code to report fouling and slagging.					

TABLE B05-32 External: Miscellaneous (External)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	External	Miscellaneous (External)		9300	Transmission system problems other than catastrophes (do not include switchyard problems in this category; see codes 3600 to 3629, 3720 to 3730)
Co-generator Block	External	Miscellaneous (External)		9310	Operator training
Co-generator Block	External	Miscellaneous (External)		9320	Other miscellaneous external problems
Co-generator Block	External	Miscellaneous (External)		9340	Synchronous Condenser Operation
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

GAS TURBINE

TABLE B05-33 Gas Turbine: Auxiliary Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Gas Turbine	Auxiliary Systems		5110	Lube oil system - general
Co-generator Block	Gas Turbine	Auxiliary Systems		5111	Lube oil pumps
Co-generator Block	Gas Turbine	Auxiliary Systems		5112	Lube oil coolers
Co-generator Block	Gas Turbine	Auxiliary Systems		5113	Lube oil valves/piping
Co-generator Block	Gas Turbine	Auxiliary Systems		5114	Lube oil filters
Co-generator Block	Gas Turbine	Auxiliary Systems		5115	Oil vapor extractor

Co-generator Block	Gas Turbine	Auxiliary Systems		5116	Power Augmentation System Equipment
Co-generator Block	Gas Turbine	Auxiliary Systems		5117	Power augmentation piping
Co-generator Block	Gas Turbine	Auxiliary Systems		5118	Power augmentation valves
Co-generator Block	Gas Turbine	Auxiliary Systems		5119	Power augmentation controls
Co-generator Block	Gas Turbine	Auxiliary Systems		5120	Hydraulic oil system
Co-generator Block	Gas Turbine	Auxiliary Systems		5121	Hydraulic oil system pumps
Co-generator Block	Gas Turbine	Auxiliary Systems		5122	Hydraulic oil system piping/valves
Co-generator Block	Gas Turbine	Auxiliary Systems		5130	Starting system (including motor)
Co-generator Block	Gas Turbine	Auxiliary Systems		5140	Battery and charger system
Co-generator Block	Gas Turbine	Auxiliary Systems		5150	Turning gear and motor
Co-generator Block	Gas Turbine	Auxiliary Systems		5151	Load gear compartment
Co-generator Block	Gas Turbine	Auxiliary Systems		5160	Cooling and seal air system
Co-generator Block	Gas Turbine	Auxiliary Systems		5170	Cooling water system
Co-generator Block	Gas Turbine	Auxiliary Systems		5180	Anti-icing system
Co-generator Block	Gas Turbine	Auxiliary Systems		5190	Other auxiliary system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-34 Gas Turbine: Exhaust Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Gas Turbine	Exhaust Systems		5100	Chamber
Co-generator Block	Gas Turbine	Exhaust Systems		5101	Hoods
Co-generator Block	Gas Turbine	Exhaust Systems		5102	Vanes/nozzles
Co-generator Block	Gas Turbine	Exhaust Systems		5103	Silencer
Co-generator Block	Gas Turbine	Exhaust Systems		5104	Cones
Co-generator Block	Gas Turbine	Exhaust Systems		5105	Diverter Dampers
Co-generator Block	Gas Turbine	Exhaust Systems		5106	Exhaust Stack
Co-generator Block	Gas Turbine	Exhaust Systems		5108	High engine exhaust temperature
Co-generator Block	Gas Turbine	Exhaust Systems		5109	Other exhaust problems (including high exhaust system temperature not attributable to a specific problem)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-35 Gas Turbine: Fuel, Ignition, and Combustion Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5040	Fuel tanks
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5041	Fuel piping and valves
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5042	Fuel nozzles/vanes
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5043	Fuel filters
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5044	Liquid fuel oil pump
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5046	Liquid fuel oil transfer/forwarding pump
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5047	Liquid fuel purge system
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5048	Gas fuel system including controls and instrumentation
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5049	Other fuel system problems
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5050	Ignition system
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5051	Pilot fuel piping and valves
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5052	Pilot fuel nozzles/vanes
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5053	Pilot fuel filters
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5054	Water injection system
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5060	Atomizing air system
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5065	NOx water injection system including pump
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5066	NOx steam injection system
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5070	Combustor casing
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5071	Combustor liner

Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5072	Combustor caps
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5073	Flame scanners
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5074	Flashback including instrumentation
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5075	Blade path temperature spread
Co-generator Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5079	Other combustor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-36 Gas Turbine: Inlet Air System and Compressors - Compressors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5010	High pressure shaft
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5011	High pressure bearings
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5012	High pressure blades/buckets
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5013	Compressor casing and bolts
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5014	Compressor diaphragms
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5015	Compressor seals
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5016	High pressure compressor bleed valves
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5017	Low pressure compressor bleed valves
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5019	Other high pressure problems
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5020	Low pressure shaft
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5021	Low pressure bearings
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5022	Low pressure blades/buckets
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5029	Other low pressure problems
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5030	Supercharging fans
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5035	Compressor washing
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5036	Compressor shaft and bearings for two-shaft machines
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5037	Inlet bleed heat valve
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5039	Other compressor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-37 Gas Turbine: Inlet Air System and Compressors - Ducts and Filters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5000	Inlet air ducts
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5001	Inlet air vanes/nozzles
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5002	Inlet air filters
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5003	Inlet cone
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5004	Inlet air chillers
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5005	Inlet air evaporative coolers
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5006	Inlet air foggers
Co-generator Block	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5009	Other inlet air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-38 Gas Turbine: Miscellaneous (Gas Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5200	Reduction gear
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5201	Load shaft and bearings
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5205	Main coupling between the turbine and generator
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5206	Clutch
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5210	Intercoolers
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5220	Regenerators
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5230	Heat shields
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5240	Fire detection and extinguishing system (including hazardous gas detection system)
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5241	Fire in unit
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5245	Gas Turbine Control System - data highway
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5246	Gas Turbine Control System - hardware problems (including card failure)
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5247	Gas Turbine Control System - internal and termination wiring
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5248	Gas Turbine Control System - logic problems
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5249	Gas Turbine Control System - upgrades

Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5250	Other controls and instrumentation problems
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5255	Computer
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5260	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5261	Gas turbine/compressor washing
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5262	Gas turbine exchange
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5269	Combustion Inspection (CI)
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5270	Hot end inspection
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5272	Boroscope inspection
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5274	General unit inspection
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5280	Vibration (not engine) in unit not attributable to bearings or other components
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5285	Gas turbine vibration
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5286	Gas turbine lockout
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5290	Gas turbine performance testing - individual engines (use code 9999 for total unit performance testing)
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5292	Turbine Overspeed Trip Test - Gas Turbine
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5295	Synchronous condenser equipment
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5298	Main gas filter
Co-generator Block	Gas Turbine	Miscellaneous (Gas Turbine)		5299	Other miscellaneous gas turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-39 Gas Turbine: Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Gas Turbine	Turbine		5080	High pressure shaft
Co-generator Block	Gas Turbine	Turbine		5081	High pressure bearings
Co-generator Block	Gas Turbine	Turbine		5082	High pressure blades/buckets
Co-generator Block	Gas Turbine	Turbine		5083	High pressure nozzles/vanes
Co-generator Block	Gas Turbine	Turbine		5084	High pressure casing/expansion joints
Co-generator Block	Gas Turbine	Turbine		5085	Interstage gas passages - HP
Co-generator Block	Gas Turbine	Turbine		5086	High pressure shaft seals
Co-generator Block	Gas Turbine	Turbine		5087	Thrust bearing

Co-generator Block	Gas Turbine	Turbine		5088	Gas turbine cooling system
Co-generator Block	Gas Turbine	Turbine		5089	Other high pressure problems
Co-generator Block	Gas Turbine	Turbine		5090	Low pressure shaft
Co-generator Block	Gas Turbine	Turbine		5091	Low pressure bearings
Co-generator Block	Gas Turbine	Turbine		5092	Low pressure blades/buckets
Co-generator Block	Gas Turbine	Turbine		5093	Low pressure nozzles/vanes
Co-generator Block	Gas Turbine	Turbine		5094	Low pressure casing/expansion joints
Co-generator Block	Gas Turbine	Turbine		5095	Interstage gas passages - LP
Co-generator Block	Gas Turbine	Turbine		5096	Low pressure shaft seals
Co-generator Block	Gas Turbine	Turbine		5097	Other low pressure problems
Co-generator Block	Gas Turbine	Turbine		5098	Expansion joints
Co-generator Block	Gas Turbine	Turbine		5099	HP to LP coupling
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP if only one.					

GENERATOR

This set of codes contains the generator, exciter, generator cooling systems, and generator controls. Note the main leads up to and includes the generator output breaker in this set of codes.

TABLE B05-40 Generator: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Generator	Controls		4700	Generator voltage control
Co-generator Block	Generator	Controls		4710	Generator metering devices
Co-generator Block	Generator	Controls		4720	Generator synchronization equipment
Co-generator Block	Generator	Controls		4730	Generator current and potential transformers
Co-generator Block	Generator	Controls		4740	Emergency generator trip devices
Co-generator Block	Generator	Controls		4750	Other generator controls and metering problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-41 Generator: Cooling System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Generator	Cooling System		4610	Hydrogen cooling system piping and valves
Co-generator Block	Generator	Cooling System		4611	Hydrogen coolers
Co-generator Block	Generator	Cooling System		4612	Hydrogen storage system

Co-generator Block	Generator	Cooling System		4613	Hydrogen seals
Co-generator Block	Generator	Cooling System		4619	Other hydrogen system problems
Co-generator Block	Generator	Cooling System		4620	Air cooling system
Co-generator Block	Generator	Cooling System		4630	Liquid cooling system
Co-generator Block	Generator	Cooling System		4640	Seal oil system and seals
Co-generator Block	Generator	Cooling System		4650	Other cooling system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Report failures caused by water leaks into generator as codes 4500, 4510, etc.					

TABLE B05-42 Generator: Exciter

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Generator	Exciter		4600	Exciter drive - motor
Co-generator Block	Generator	Exciter		4601	Exciter field rheostat
Co-generator Block	Generator	Exciter		4602	Exciter commutator and brushes
Co-generator Block	Generator	Exciter		4603	Solid state exciter element
Co-generator Block	Generator	Exciter		4604	Exciter drive - shaft
Co-generator Block	Generator	Exciter		4605	Exciter transformer
Co-generator Block	Generator	Exciter		4609	Other exciter problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-43 Generator: Generator

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Generator	Generator		4500	Rotor windings (including damper windings and fan blades on hydro units)
Co-generator Block	Generator	Generator		4510	Rotor collector rings
Co-generator Block	Generator	Generator		4511	Rotor, General
Co-generator Block	Generator	Generator		4512	Retaining Rings
Co-generator Block	Generator	Generator		4520	Stator windings, bushings, and terminals
Co-generator Block	Generator	Generator		4530	Stator core iron
Co-generator Block	Generator	Generator		4535	Stator, General
Co-generator Block	Generator	Generator		4536	Generator Heaters
Co-generator Block	Generator	Generator		4540	Brushes and brush rigging

Co-generator Block	Generator	Generator		4550	Generator bearings and lube oil system (including thrust bearings on hydro units)
Co-generator Block	Generator	Generator		4551	Generator bearings
Co-generator Block	Generator	Generator		4552	Generator lube oil system
Co-generator Block	Generator	Generator		4555	Bearing cooling system
Co-generator Block	Generator	Generator		4560	Generator vibration (excluding vibration due to failed bearing and other components)
Co-generator Block	Generator	Generator		4570	Generator casing
Co-generator Block	Generator	Generator		4580	Generator end bells and bolting
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-44 Generator: Miscellaneous (Generator)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Generator	Miscellaneous (Generator)		4800	Generator main leads
Co-generator Block	Generator	Miscellaneous (Generator)		4805	Generator Bus Duct Cooling System
Co-generator Block	Generator	Miscellaneous (Generator)		4810	Generator output breaker
Co-generator Block	Generator	Miscellaneous (Generator)		4830	Major generator overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Co-generator Block	Generator	Miscellaneous (Generator)		4831	Minor generator overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Co-generator Block	Generator	Miscellaneous (Generator)		4840	Inspection
Co-generator Block	Generator	Miscellaneous (Generator)		4841	Generator doble testing
Co-generator Block	Generator	Miscellaneous (Generator)		4842	Reactive and capability testing
Co-generator Block	Generator	Miscellaneous (Generator)		4850	Core monitor alarm
Co-generator Block	Generator	Miscellaneous (Generator)		4860	Generator neutral grounding equipment
Co-generator Block	Generator	Miscellaneous (Generator)		4899	Other miscellaneous generator problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

HEAT RECOVERY STEAM GENERATOR (HRSG)

(Waste Heat Boiler)

TABLE B05-45 Heat Recovery Steam Generator (HRSG): HRSG Boiler Air and Gas Systems - Air Supply					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1400	Forced draft fans
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1401	Forced draft fan dampers
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1407	Forced draft fan lubrication system
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1410	Forced draft fan motors
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1411	Forced draft fan motors - variable speed
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1412	Forced draft fan drives (other than motor)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1415	Forced draft fan controls
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1420	Other forced draft fan problems
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1430	Air supply ducts from FD fan
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1431	Air supply dampers from FD fan
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1432	Air supply duct expansion joints
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1440	Air supply dampers
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1450	Other air supply problems
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1456	Induced draft fan dampers
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1536	Flue gas recirculating fan dampers
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-46 Heat Recovery Steam Generator (HRSG): HRSG Boiler Air and Gas Systems - Miscellaneous (Boiler Air and Gas Systems)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**

Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1590	Stacks (use code 8430 for stack problems due to pollution control equipment)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1591	Stack damper and linkage
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1592	Stack damper linkage motors
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1599	Other miscellaneous boiler air and gas system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-47 Heat Recovery Steam Generator (HRSG): HRSG Boiler Control Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1700	Feedwater controls (report local controls - feedwater pump, feedwater regulator valve, etc., - with component or system)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1710	Combustion/steam condition controls (report local controls - burners, pulverizers, etc., - with component or system)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1720	Desuperheater/attemperator controls
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1730	Boiler explosion or implosion
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1740	Boiler drum gage glasses / level indicator
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1750	Burner management system
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1760	Feedwater instrumentation (not local controls)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1761	Combustion/Steam condition instrumentation (not local controls)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1762	Desuperheater/attemperator instrumentation (not local controls)

Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1799	Other boiler instrumentation and control problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Iincluding instruments which input to the controls.					

TABLE B05-48 Heat Recovery Steam Generator (HRSG): HRSG Boiler Design Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Design Limitations		1900	Improper balance between tube sections not due to fouling or plugging
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Design Limitations		1910	Inadequate air not due to equipment problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-49 Heat Recovery Steam Generator (HRSG): HRSG Boiler Fuel Supply - Burners (Duct Burners)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	358	Oil burner piping and valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	359	Gas burner piping and valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	360	Burners
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	361	Burner orifices
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	370	Burner instruments and controls (except light off)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	380	Light off (igniter) systems (including fuel supply)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	385	Igniters
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	410	Other burner problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-50 Heat Recovery Steam Generator (HRSG): HRSG Boiler Fuel Supply - Oil and Gas Systems (except light off)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	440	Fuel oil pumps (general)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	441	Fuel oil pumps (burner supply)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	442	Fuel oil pumps (forwarding/transfer)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	443	Fuel oil (burner supply) pump drives
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	444	Fuel oil (forwarding/transfer) pump drives
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	450	Fuel oil heaters
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	460	Fuel oil atomizers
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	470	Oil and gas fires
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	480	Other oil and gas fuel supply problems (see codes 0360-0410 for burner problems)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-51 Heat Recovery Steam Generator (HRSG): HRSG Boiler Internals and Structures

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		800	Drums and drum internals (single drum only)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		801	HP Drum (including drum level trips not attributable to other causes)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		802	IP Drum (including drum level trips not attributable to other causes)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		803	LP Drum (including drum level trips not attributable to other causes)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		810	Boiler supports and structures (use code 1320 for tube supports)

Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		820	Casing
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		830	Doors
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		840	Refractory and insulation
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		845	Windbox expansion joints
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		847	Other expansion joints
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		848	Inlet panel
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		850	Other internal or structural problems
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		855	Drum relief/safety valves (single drum only)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		856	HP Drum relief/safety valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		857	IP Drum relief/safety valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		858	LP Drum relief/safety valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		859	Tube external fins/membranes
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-52 Heat Recovery Steam Generator (HRSG): HRSG Boiler Overhaul and Inspections

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1800	Major boiler overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1801	Minor boiler overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1810	Other boiler inspections

Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1811	Boiler Inspections - problem identification / investigation
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1812	Boiler Inspections - scheduled or routine
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1820	Chemical cleaning/steam blows
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-53 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - Boiler Recirculation

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	740	Boiler recirculation pumps
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	741	Boiler recirculation pumps - motors
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	750	Boiler recirculation piping including downcomers
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	760	Boiler recirculation valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	770	Other boiler recirculation problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-54 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - Feedwater and Blowdown

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	670	Feedwater piping downstream of feedwater regulating valve
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	680	Feedwater valves (not feedwater regulating valve)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	690	Other feedwater problems downstream of feedwater regulating valve (use codes 3401 to 3499 for remainder of feedwater system)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	700	Blowdown system valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	710	Blowdown system piping

Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	720	Blowdown system controls / instrumentation
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	730	Other blowdown system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-55 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Cold and Hot Reheat Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	540	Hot reheat steam piping up to turbine stop valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	541	Cold reheat steam piping up to boiler
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	550	Reheat steam relief/safety valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	560	Other hot reheat steam valves (not including turbine stop or intercept valves)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	561	Other cold reheat steam valves (not including turbine stop or intercept valves)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	570	Other reheat steam problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-56 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Desuperheaters/Attemperators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6140	HP Desuperheater/attemperator piping - Greater than 600 PSIG.
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6141	HP Desuperheater/attemperator valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6142	HP Desuperheater/attemperator spray nozzles
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6143	HP Desuperheater/attemperator drums
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6144	Other HP desuperheater/attemperator problems

Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6145	IP Desuperheater/attemperator piping - Between 200-600 PSIG
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6146	IP Desuperheater/attemperator valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6147	IP Desuperheater/attemperator spray nozzles
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6148	IP Desuperheater/attemperator drums
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6149	Other IP desuperheater/attemperator problems
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6150	LP Desuperheater/attemperator piping - Less than 200 PSIG
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6151	LP Desuperheater/attemperator valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6152	LP Desuperheater/attemperator spray nozzles
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6153	LP Desuperheater/attemperator drums
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6154	Other LP desuperheater/attemperator problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-57 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Main Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	500	Main steam piping up to turbine stop valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	510	Main steam relief/safety valves off superheater
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	520	Other main steam valves (including vent and drain valves but not including the turbine stop valves)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	530	Other main steam system problems
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6110	HP steam piping up to turbine stop valves - Greater than 600

					PSIG (see 0790 for piping supports)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6111	HP steam relief/safety valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6112	Other HP steam valves (including vent and drain valves but not including the turbine stop valves)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6113	Other HP steam system problems
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6114	HP steam isolation/boundary valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6120	IP steam piping up to turbine stop valves - Between 200 & 600 PSIG (see 0790 for piping supports)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6121	IP steam relief/safety valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6122	Other IP steam valves (including vent and drain valves but not including the turbine stop valves)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6123	Other IP steam system problems
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6124	IP steam isolation/boundary valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6130	LP steam piping up to turbine stop valves - Less than 200 PSIG (see 0790 for piping supports)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6131	LP steam relief/safety valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6132	Other LP steam valves (including vent and drain valves but not including the turbine stop valves)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6133	Other LP steam system problems
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6134	Other main steam valves (including vent and drain valves

					but not including the turbine stop valves)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6135	LP steam isolation/boundary valves
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-58 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Startup Bypass

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6160	HP Startup bypass system piping (including drain lines up to heaters or condenser) - Greater than 600 PSIG
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6161	HP Startup bypass system valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6162	HP Startup bypass tanks or flash tanks
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6163	Other HP startup bypass system problems
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6164	HP startup bypass instrumentation and controls
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6170	IP Startup bypass system piping (including drain lines up to heaters or condenser) - Between 200-600 PSIG
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6171	IP Startup bypass system valves
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6172	IP Startup bypass tanks or flash tanks
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6173	Other IP startup bypass system problems
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6174	IP startup bypass instrumentation and controls
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6180	LP Startup bypass system piping (including drain lines up to heaters or condenser) - Less than 200 PSIG
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6181	LP Startup bypass system valves

Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6182	LP Startup bypass tanks or flash tanks
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6183	Other LP startup bypass system problems
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6184	LP startup bypass instrumentation and controls
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-59 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - Miscellaneous (Piping)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	775	Economizer piping
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	780	Headers between tube bundles
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	782	Headers and caps
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	790	Pipe hangers, brackets, supports (general)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	799	Other miscellaneous piping system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-60 Heat Recovery Steam Generator (HRSG): HRSG Boiler Tube Leaks

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6005	HP Evaporator tubes
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6006	IP Evaporator tubes
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6007	LP Evaporator tubes
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6010	HP superheater
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6011	HP reheater
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6012	HP economizer

Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6020	IP superheater
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6021	IP reheater
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6022	IP economizer
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6030	LP reheater
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6031	LP superheater
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6032	LP economizer
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6090	Other HRSG tube problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use code 0859 for tube/membrane failures.					

TABLE B05-61 Heat Recovery Steam Generator (HRSG): HRSG Boiler Water Condition

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Water Condition		1850	Boiler water condition (not feedwater water quality)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-62 Heat Recovery Steam Generator (HRSG): Miscellaneous (HRSG Boiler)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		1980	Boiler safety valve test
Co-generator Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		1990	Boiler performance testing (use code 9999 for total unit performance testing)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		1999	Boiler, miscellaneous
Co-generator Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		6000	Heat recovery steam generator to gas turbine connecting equipment. For additional codes, use Fossil Steam Cause Codes 0010 to 1999.

Co-generator Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		6100	Steam turbine to gas turbine coupling. For additional codes, use Fossil Steam Cause Codes 4000 to 4499.
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use more specific codes - other slagging and fouling problems, other control problems, etc. whenever possible. Describe miscellaneous problems in the verbal description.					

TABLE B05-63 Heat Recovery Steam Generator (HRSG): Miscellaneous HRSG Boiler Tube Problems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1300	Water side fouling
Co-generator Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1305	Fireside cleaning (which requires a full outage) Use code 1200 for cleanings that cause deratings.
Co-generator Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1310	Water side cleaning (acid cleaning)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1320	Tube supports/attachments
Co-generator Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1330	Slag fall damage
Co-generator Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1340	Tube modifications (including addition and removal of tubes)
Co-generator Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1350	Other miscellaneous boiler tube problems
Co-generator Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1360	Boiler drains system
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

INACTIVE STATES

TABLE B05-64 Inactive States: Inactive States

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Inactive States	Inactive States		2	Inactive Reserve Shutdown
Co-generator Block	Inactive States	Inactive States		9990	Retired unit
Co-generator Block	Inactive States	Inactive States		9991	Mothballed unit
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

JET ENGINE

TABLE B05-65 Jet Engine: Auxiliary Systems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Co-generator Block	Jet Engine	Auxiliary Systems		5510	Lube oil system
Co-generator Block	Jet Engine	Auxiliary Systems		5516	Power Augmentation System Equipment
Co-generator Block	Jet Engine	Auxiliary Systems		5520	Hydraulic oil system
Co-generator Block	Jet Engine	Auxiliary Systems		5530	Starting system (including motor)
Co-generator Block	Jet Engine	Auxiliary Systems		5540	Battery and charger system
Co-generator Block	Jet Engine	Auxiliary Systems		5550	Turning gear and motor
Co-generator Block	Jet Engine	Auxiliary Systems		5551	Load gear compartment
Co-generator Block	Jet Engine	Auxiliary Systems		5560	Cooling and seal air system
Co-generator Block	Jet Engine	Auxiliary Systems		5570	Cooling water system
Co-generator Block	Jet Engine	Auxiliary Systems		5580	Anti-icing system
Co-generator Block	Jet Engine	Auxiliary Systems		5590	Other auxiliary system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-66 Jet Engine: Exhaust Systems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Co-generator Block	Jet Engine	Exhaust Systems		5500	Chamber
Co-generator Block	Jet Engine	Exhaust Systems		5501	Hoods
Co-generator Block	Jet Engine	Exhaust Systems		5502	Vanes/nozzles
Co-generator Block	Jet Engine	Exhaust Systems		5503	Silencer
Co-generator Block	Jet Engine	Exhaust Systems		5504	Cones
Co-generator Block	Jet Engine	Exhaust Systems		5505	Diverter Dampers
Co-generator Block	Jet Engine	Exhaust Systems		5508	High engine exhaust temperature
Co-generator Block	Jet Engine	Exhaust Systems		5509	Other exhaust problems (including high exhaust temperature not attributable to a specific problem)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-67 Jet Engine: Fuel, Ignition, and Combustion Systems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**

Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5440	Fuel tanks
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5441	Fuel piping and valves
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5442	Fuel nozzles/vanes
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5443	Fuel filters
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5444	Liquid fuel oil pump
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5445	Liquid fuel oil transfer/forwarding pump
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5446	Liquid fuel purge system
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5447	Gas fuel system including controls and instrumentation
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5449	Other fuel system problems
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5450	Ignition system
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5451	Pilot fuel piping and valves
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5452	Pilot fuel nozzles/vanes
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5453	Pilot fuel filters
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5454	Water injection system
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5455	Fuel nozzle/vane cooling air system
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5460	Atomizing air system
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5470	Combustor casing
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5471	Combustor liner
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5472	Combustor caps

Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5473	Flame scanners
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5474	Flashback (including instrumentation)
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5475	Blade path temperature spread
Co-generator Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5479	Other combustor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-68 Jet Engine: Inlet Air System and Compressors - Compressors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Compressors	5410	High pressure shaft
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Compressors	5411	High pressure bearings
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Compressors	5412	High pressure blades/buckets
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Compressors	5413	Other high pressure problems
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Compressors	5414	Compressor diaphragms/vanes
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Compressors	5420	Low pressure shaft
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Compressors	5421	Low pressure bearings
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Compressors	5422	Low pressure blades/buckets
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Compressors	5429	Other low pressure problems
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Compressors	5430	Supercharging fans
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Compressors	5435	Compressor washing
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Compressors	5436	Compressor shaft and bearings for two-shaft machines
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Compressors	5439	Other compressor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP compressor if only one.					

TABLE B05-69 Jet Engine: Inlet Air System and Compressors - Ducts and Filters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5400	Inlet air ducts
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5401	Inlet air vanes/nozzles
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5402	Inlet air filters
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5403	Inlet and exhaust cones
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5404	Inlet air chillers
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5405	Inlet air evaporative coolers

Co-generator Block	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5406	Inlet air foggers
Co-generator Block	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5409	Other inlet air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP compressor if only one.					

TABLE B05-70 Jet Engine: Miscellaneous (Jet Engine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5600	Reduction gear
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5601	Load shaft and bearings
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5605	Main coupling between the turbine and generator
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5606	Clutch
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5610	Intercoolers
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5620	Regenerators
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5630	Heat shields
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5640	Fire detection and extinguishing system
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5641	Fire in unit
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5645	Jet Engine Control System - data highway
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5646	Jet Engine Control System - hardware problems (including card failure)
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5647	Jet Engine Control System - internal and termination wiring
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5648	Jet Engine Control System - logic problems
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5649	Jet Engine Control System - upgrades
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5650	Other controls and instrumentation problems
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5660	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5661	Engine/compressor washing
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5662	Engine exchange
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5665	Engine shafts and bearings
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5670	Hot end inspection
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5672	Boroscope inspection
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5674	General unit inspection

Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5680	Vibration (not engine) in unit not attributable to bearings or other components
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5685	Engine vibration
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5686	Jet engine lockout
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5690	Engine performance testing - individual engines (use code 9999 for total unit performance testing)
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5692	Turbine Overspeed Trip Test - Jet Engine
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5695	Synchronous condenser equipment
Co-generator Block	Jet Engine	Miscellaneous (Jet Engine)		5699	Other miscellaneous jet engine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-71 Jet Engine: Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Jet Engine	Turbine		5480	High pressure shaft
Co-generator Block	Jet Engine	Turbine		5481	High pressure bearings
Co-generator Block	Jet Engine	Turbine		5482	High pressure blades/buckets
Co-generator Block	Jet Engine	Turbine		5483	High pressure nozzles/vanes
Co-generator Block	Jet Engine	Turbine		5484	High pressure casing/expansion joint
Co-generator Block	Jet Engine	Turbine		5485	Interstage gas passages
Co-generator Block	Jet Engine	Turbine		5486	High pressure shaft seals
Co-generator Block	Jet Engine	Turbine		5487	Thrust bearing
Co-generator Block	Jet Engine	Turbine		5489	Other high pressure problems
Co-generator Block	Jet Engine	Turbine		5490	Low pressure shaft
Co-generator Block	Jet Engine	Turbine		5491	Low pressure bearings
Co-generator Block	Jet Engine	Turbine		5492	Low pressure blades/buckets
Co-generator Block	Jet Engine	Turbine		5493	Low pressure nozzles/vanes
Co-generator Block	Jet Engine	Turbine		5494	Low pressure casing/expansion joints
Co-generator Block	Jet Engine	Turbine		5497	Other low pressure problems
Co-generator Block	Jet Engine	Turbine		5498	Expansion joints
Co-generator Block	Jet Engine	Turbine		5499	Shaft seals
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP if only one.					

MISCELLANEOUS

TABLE B05-72 Miscellaneous: Instruments and Controls					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Co-generator Block	Miscellaneous	Instruments and Controls		6200	Combined cycle instruments and controls. (Report instruments and controls specific to the gas turbine, steam turbine, boiler, generator, or balance of plant using the codes for the appropriate piece of equipment.)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

PERFORMANCE

TABLE B05-73 Performance: Performance					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Co-generator Block	Performance	Performance		9997	NERC Reliability Standard Requirement
Co-generator Block	Performance	Performance		9998	Black start testing
Co-generator Block	Performance	Performance		9999	Total unit performance testing (use appropriate codes for individual component testing)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

PERSONNEL OR PROCEDURAL ERRORS

TABLE B05-74 Personnel or Procedural Errors: Personnel or Procedural Errors					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Co-generator Block	Personnel or Procedural Errors	Personnel or Procedural Errors		9900	Operator error
Co-generator Block	Personnel or Procedural Errors	Personnel or Procedural Errors		9910	Maintenance personnel error
Co-generator Block	Personnel or Procedural Errors	Personnel or Procedural Errors		9920	Contractor error

Co-generator Block	Personnel or Procedural Errors	Personnel or Procedural Errors		9930	Operating procedure error
Co-generator Block	Personnel or Procedural Errors	Personnel or Procedural Errors		9940	Maintenance procedure error
Co-generator Block	Personnel or Procedural Errors	Personnel or Procedural Errors		9950	Contractor procedure error
Co-generator Block	Personnel or Procedural Errors	Personnel or Procedural Errors		9960	Staff shortage
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

POLLUTION CONTROL EQUIPMENT

TABLE B05-75 Pollution Control Equipment: CO Reduction

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Pollution Control Equipment	CO Reduction		8840	CO Active catalyst
Co-generator Block	Pollution Control Equipment	CO Reduction		8841	CO Support materials
Co-generator Block	Pollution Control Equipment	CO Reduction		8842	CO Plugging
Co-generator Block	Pollution Control Equipment	CO Reduction		8845	Other CO reduction problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-76 Pollution Control Equipment: Continuous Emissions Monitoring Systems (CEMS)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8700	CEMS Certification and Recertification
Co-generator Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8710	SO2 analyzer problems
Co-generator Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8720	NOx analyzer problems
Co-generator Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8730	CO analyzer problems
Co-generator Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8740	CO2 analyzer problems

Co-generator Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8750	O2 analyzer problems
Co-generator Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8760	Opacity monitor problems
Co-generator Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8770	Flow monitor problems
Co-generator Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8780	Data acquisition system problems
Co-generator Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8790	Miscellaneous CEMS problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-77 Pollution Control Equipment: NOx Reduction Systems - Catalytic Air Heaters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8830	CAH NOx Active catalyst
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8831	CAH NOx Support materials
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8832	CAH NOx Plugging
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8835	Other CAH problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-78 Pollution Control Equipment: NOx Reduction Systems - Selective Catalytic Reduction Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8810	SCR NOx Reactor
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8811	SCR NOx Reagent
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8812	SCR NOx Catalyst
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8813	SCR NOx Injection grid piping/valves
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8814	SCR NOx Catalyst support material

Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8815	SCR NOx Soot blowers
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8816	SCR NOx Plugging
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8817	SCR NOx Control system
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8820	SCR NOx Ammonia injection grid piping/valves
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8821	SCR NOx Ammonia tanks, piping and valves (not injection)
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8822	SCR NOx Ammonia air blowers
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8823	SCR NOx Other ammonia system problems
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8825	Other SCR NOx problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-79 Pollution Control Equipment: NOx Reduction Systems - Selective Non-Catalytic Reduction Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8800	SNCR NOx Reagent
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8801	SNCR NOx Carrier gas
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8802	SNCR NOx Control system
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8803	SNCR Performance Testing
Co-generator Block	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8809	Other SNCR NOx problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use code 0360 for Low NOx Burners.					

REGULATORY, SAFETY, ENVIRONMENTAL

Use these codes only for events not directly attributable to equipment failures. Inspections or testing of certain equipment due to regulation are reported using the appropriate equipment cause codes, and the fact that it was a regulatory requirement noted in the verbal description section.

TABLE B05-80 Regulatory, Safety, Environmental: Other Operating Environmental Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9660	Thermal discharge limits - fossil and nuclear
Co-generator Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9663	Thermal discharge limits - gas turbines
Co-generator Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9664	Thermal discharge limits - jet engines
Co-generator Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9670	Noise limits (not for personnel safety) - fossil and nuclear
Co-generator Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9673	Noise limits (not for personnel safety) - gas turbines
Co-generator Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9674	Noise limits (not for personnel safety) - jet engines
Co-generator Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9677	Noise limits testing - fossil
Co-generator Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9678	Noise limits testing - gas turbines
Co-generator Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9679	Noise limits testing - jet engines
Co-generator Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9680	Fish kill - fossil and nuclear
Co-generator Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9683	Fish kill - gas turbines
Co-generator Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9684	Fish kill - jet engines
Co-generator Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9690	Other miscellaneous operational environmental limits - fossil and nuclear
Co-generator Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9693	Other miscellaneous operational environmental limits - gas turbines
Co-generator Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9694	Other miscellaneous operational environmental limits - jet engines
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-81 Regulatory, Safety, Environmental: Regulatory					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**

Co-generator Block	Regulatory, Safety, Environmental	Regulatory		9504	Regulatory (environmental) proceedings and hearings - regulatory agency initiated
Co-generator Block	Regulatory, Safety, Environmental	Regulatory		9506	Regulatory (environmental) proceedings and hearings - intervenor initiated
Co-generator Block	Regulatory, Safety, Environmental	Regulatory		9510	Plant modifications strictly for compliance with new or changed regulatory requirements (scrubbers, cooling towers, etc.)
Co-generator Block	Regulatory, Safety, Environmental	Regulatory		9520	Oil spill in Gulf of Mexico (OMC)
Co-generator Block	Regulatory, Safety, Environmental	Regulatory		9590	Miscellaneous regulatory (this code is primarily intended for use with event contribution code 2 to indicate that a regulatory-related factor contributed to the primary cause of the event)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-82 Regulatory, Safety, Environmental: Safety

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Regulatory, Safety, Environmental	Safety		9700	OSHA-related retrofit or inspection
Co-generator Block	Regulatory, Safety, Environmental	Safety		9720	Other safety problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-83 Regulatory, Safety, Environmental: Stack Emission

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Regulatory, Safety, Environmental	Stack Emission		9600	SO2 stack emissions - fossil
Co-generator Block	Regulatory, Safety, Environmental	Stack Emission		9603	SO2 stack emissions - gas turbines
Co-generator Block	Regulatory, Safety, Environmental	Stack Emission		9604	SO2 stack emissions - jet engines

Co-generator Block	Regulatory, Safety, Environmental	Stack Emission		9610	NOx stack emissions - fossil
Co-generator Block	Regulatory, Safety, Environmental	Stack Emission		9613	NOx stack emissions - gas turbines
Co-generator Block	Regulatory, Safety, Environmental	Stack Emission		9614	NOx stack emissions - jet engines
Co-generator Block	Regulatory, Safety, Environmental	Stack Emission		9616	CO stack emissions - fossil
Co-generator Block	Regulatory, Safety, Environmental	Stack Emission		9620	Particulate stack emissions - fossil
Co-generator Block	Regulatory, Safety, Environmental	Stack Emission		9623	Particulate stack emissions - gas turbines
Co-generator Block	Regulatory, Safety, Environmental	Stack Emission		9624	Particulate stack emissions - jet engines
Co-generator Block	Regulatory, Safety, Environmental	Stack Emission		9630	Opacity - fossil
Co-generator Block	Regulatory, Safety, Environmental	Stack Emission		9633	Opacity - gas turbines
Co-generator Block	Regulatory, Safety, Environmental	Stack Emission		9634	Opacity - jet engines
Co-generator Block	Regulatory, Safety, Environmental	Stack Emission		9650	Other stack/exhaust emissions - fossil (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
Co-generator Block	Regulatory, Safety, Environmental	Stack Emission		9653	Other stack or exhaust emissions - gas turbines (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
Co-generator Block	Regulatory, Safety, Environmental	Stack Emission		9654	Other stack or exhaust emissions - jet engines (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
Co-generator Block	Regulatory, Safety, Environmental	Stack Emission		9656	Other stack or exhaust emissions testing - fossil

Co-generator Block	Regulatory, Safety, Environmental	Stack Emission		9657	Other stack or exhaust emissions testing - gas turbines
Co-generator Block	Regulatory, Safety, Environmental	Stack Emission		9658	Other stack or exhaust emissions testing - jet engines
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Include exhaust emissions.					

STEAM TURBINE

Besides the turbine, this set includes the steam stop/control valves, turbine control system, and the turbine auxiliaries. The extraction steam codes are contained in the Balance of Plant set.

TABLE B05-84 Steam Turbine: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Steam Turbine	Controls		4290	Hydraulic system pumps
Co-generator Block	Steam Turbine	Controls		4291	Hydraulic system coolers
Co-generator Block	Steam Turbine	Controls		4292	Hydraulic system filters
Co-generator Block	Steam Turbine	Controls		4293	Hydraulic system pipes and valves
Co-generator Block	Steam Turbine	Controls		4299	Other hydraulic system problems
Co-generator Block	Steam Turbine	Controls		4300	Turbine supervisory system (use codes 4290 to 4299 for hydraulic oil)
Co-generator Block	Steam Turbine	Controls		4301	Turbine governing system
Co-generator Block	Steam Turbine	Controls		4302	Turbine trip devices (including instruments)
Co-generator Block	Steam Turbine	Controls		4303	Exhaust hood and spray controls
Co-generator Block	Steam Turbine	Controls		4304	Automatic turbine control systems - mechanical
Co-generator Block	Steam Turbine	Controls		4305	Automatic turbine control systems - mechanical - hydraulic
Co-generator Block	Steam Turbine	Controls		4306	Automatic turbine control systems - electro-hydraulic - analog
Co-generator Block	Steam Turbine	Controls		4307	Automatic turbine control systems - electro-hydraulic - digital
Co-generator Block	Steam Turbine	Controls		4308	Automatic turbine control systems - digital control and monitoring
Co-generator Block	Steam Turbine	Controls		4309	Other turbine instrument and control problems
Co-generator Block	Steam Turbine	Controls		4310	Steam Turbine Control System - data highway

Co-generator Block	Steam Turbine	Controls		4311	Steam Turbine Control System - hardware problems (including card failure)
Co-generator Block	Steam Turbine	Controls		4312	Steam Turbine Control System - internal and termination wiring
Co-generator Block	Steam Turbine	Controls		4313	Steam Turbine Control System - logic problems
Co-generator Block	Steam Turbine	Controls		4314	Steam Turbine Control System - upgrades
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-85 Steam Turbine: High Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Steam Turbine	High Pressure Turbine		4000	Outer casing
Co-generator Block	Steam Turbine	High Pressure Turbine		4001	Inner casing
Co-generator Block	Steam Turbine	High Pressure Turbine		4009	Nozzle bolting
Co-generator Block	Steam Turbine	High Pressure Turbine		4010	Nozzles and nozzle blocks
Co-generator Block	Steam Turbine	High Pressure Turbine		4011	Diaphragms
Co-generator Block	Steam Turbine	High Pressure Turbine		4012	Buckets or blades
Co-generator Block	Steam Turbine	High Pressure Turbine		4013	Diaphragms unit and shroud type
Co-generator Block	Steam Turbine	High Pressure Turbine		4014	Bucket or blade fouling
Co-generator Block	Steam Turbine	High Pressure Turbine		4015	Wheels or spindles
Co-generator Block	Steam Turbine	High Pressure Turbine		4020	Shaft seals
Co-generator Block	Steam Turbine	High Pressure Turbine		4021	Dummy rings
Co-generator Block	Steam Turbine	High Pressure Turbine		4022	Gland rings
Co-generator Block	Steam Turbine	High Pressure Turbine		4030	Rotor shaft
Co-generator Block	Steam Turbine	High Pressure Turbine		4040	Bearings
Co-generator Block	Steam Turbine	High Pressure Turbine		4041	Thrust bearings
Co-generator Block	Steam Turbine	High Pressure Turbine		4099	Other high pressure turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-86 Steam Turbine: Intermediate Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Steam Turbine	Intermediate Pressure Turbine		4100	Outer casing
Co-generator Block	Steam Turbine	Intermediate Pressure Turbine		4101	Inner casing
Co-generator Block	Steam Turbine	Intermediate Pressure Turbine		4109	Nozzle bolting

Co-generator Block	Steam Turbine	Intermediate Pressure Turbine		4110	Nozzles and nozzle blocks
Co-generator Block	Steam Turbine	Intermediate Pressure Turbine		4111	Diaphragms
Co-generator Block	Steam Turbine	Intermediate Pressure Turbine		4112	Buckets or blades
Co-generator Block	Steam Turbine	Intermediate Pressure Turbine		4113	Bucket or blade fouling
Co-generator Block	Steam Turbine	Intermediate Pressure Turbine		4115	Wheels or spindles
Co-generator Block	Steam Turbine	Intermediate Pressure Turbine		4120	Shaft seals
Co-generator Block	Steam Turbine	Intermediate Pressure Turbine		4121	Dummy rings
Co-generator Block	Steam Turbine	Intermediate Pressure Turbine		4122	Gland rings
Co-generator Block	Steam Turbine	Intermediate Pressure Turbine		4130	Rotor shaft
Co-generator Block	Steam Turbine	Intermediate Pressure Turbine		4140	Bearings
Co-generator Block	Steam Turbine	Intermediate Pressure Turbine		4141	Thrust bearings
Co-generator Block	Steam Turbine	Intermediate Pressure Turbine		4199	Other intermediate pressure turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-87 Steam Turbine: Low Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Steam Turbine	Low Pressure Turbine		4200	Outer casing
Co-generator Block	Steam Turbine	Low Pressure Turbine		4201	Inner casing
Co-generator Block	Steam Turbine	Low Pressure Turbine		4209	Nozzle bolting
Co-generator Block	Steam Turbine	Low Pressure Turbine		4210	Nozzles and nozzle blocks
Co-generator Block	Steam Turbine	Low Pressure Turbine		4211	Diaphragms
Co-generator Block	Steam Turbine	Low Pressure Turbine		4212	Buckets or blades
Co-generator Block	Steam Turbine	Low Pressure Turbine		4213	Bucket or blade fouling
Co-generator Block	Steam Turbine	Low Pressure Turbine		4215	Wheels or spindles
Co-generator Block	Steam Turbine	Low Pressure Turbine		4220	Shaft seals
Co-generator Block	Steam Turbine	Low Pressure Turbine		4221	Dummy rings
Co-generator Block	Steam Turbine	Low Pressure Turbine		4222	Gland rings
Co-generator Block	Steam Turbine	Low Pressure Turbine		4230	Rotor shaft
Co-generator Block	Steam Turbine	Low Pressure Turbine		4240	Bearings
Co-generator Block	Steam Turbine	Low Pressure Turbine		4241	Thrust bearings
Co-generator Block	Steam Turbine	Low Pressure Turbine		4250	Other low pressure turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-88 Steam Turbine: Lube Oil

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Co-generator Block	Steam Turbine	Lube Oil		4280	Lube oil pumps
Co-generator Block	Steam Turbine	Lube Oil		4281	Lube oil coolers
Co-generator Block	Steam Turbine	Lube Oil		4282	Lube oil conditioners
Co-generator Block	Steam Turbine	Lube Oil		4283	Lube oil system valves and piping
Co-generator Block	Steam Turbine	Lube Oil		4284	Lube oil pump drive
Co-generator Block	Steam Turbine	Lube Oil		4289	Other lube oil system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Do not include bearing failures due to lube oil.					

TABLE B05-89 Steam Turbine: Miscellaneous (Steam Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Co-generator Block	Steam Turbine	Miscellaneous (Steam Turbine)		4400	Major turbine overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Co-generator Block	Steam Turbine	Miscellaneous (Steam Turbine)		4401	Inspection
Co-generator Block	Steam Turbine	Miscellaneous (Steam Turbine)		4402	Minor turbine overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Co-generator Block	Steam Turbine	Miscellaneous (Steam Turbine)		4410	Turning gear and motor
Co-generator Block	Steam Turbine	Miscellaneous (Steam Turbine)		4411	Steam turbine gear box (single shaft configuration)
Co-generator Block	Steam Turbine	Miscellaneous (Steam Turbine)		4412	Steam turbine clutch (single shaft configuration)
Co-generator Block	Steam Turbine	Miscellaneous (Steam Turbine)		4415	Shaft coupling mechanism
Co-generator Block	Steam Turbine	Miscellaneous (Steam Turbine)		4420	Vibration of the turbine generator unit that cannot be attributed to a specific cause such as bearings or blades (use this code for balance moves)
Co-generator Block	Steam Turbine	Miscellaneous (Steam Turbine)		4430	Gland seal system
Co-generator Block	Steam Turbine	Miscellaneous (Steam Turbine)		4450	Water induction
Co-generator Block	Steam Turbine	Miscellaneous (Steam Turbine)		4460	Turbine overspeed trip test
Co-generator Block	Steam Turbine	Miscellaneous (Steam Turbine)		4470	Differential expansion
Co-generator Block	Steam Turbine	Miscellaneous (Steam Turbine)		4490	Turbine performance testing (use code 9999 for total unit performance testing)
Co-generator Block	Steam Turbine	Miscellaneous (Steam Turbine)		4499	Other miscellaneous steam turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-90 Steam Turbine: Piping					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Co-generator Block	Steam Turbine	Piping		4270	Crossover or under piping
Co-generator Block	Steam Turbine	Piping		4279	Miscellaneous turbine piping
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B05-91 Steam Turbine: Valves					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Co-generator Block	Steam Turbine	Valves		4260	Main stop valves
Co-generator Block	Steam Turbine	Valves		4261	Control valves
Co-generator Block	Steam Turbine	Valves		4262	Intercept valves
Co-generator Block	Steam Turbine	Valves		4263	Reheat stop valves
Co-generator Block	Steam Turbine	Valves		4264	Combined intercept valves
Co-generator Block	Steam Turbine	Valves		4265	Miscellaneous drain and vent valves
Co-generator Block	Steam Turbine	Valves		4266	Main stop valve testing
Co-generator Block	Steam Turbine	Valves		4267	Control valve testing
Co-generator Block	Steam Turbine	Valves		4268	Reheat/intercept valve testing
Co-generator Block	Steam Turbine	Valves		4269	Other turbine valves (including LP steam admission valves)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

Appendix B06: Index To Combined Cycle Unit Cause Codes

COMBINED CYCLE BLOCK UNITS

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B06-1	Balance of Plant	Auxiliary Systems	Auxiliary Steam
B06-2	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems
B06-3	Balance of Plant	Auxiliary Systems	Fire Protection System
B06-4	Balance of Plant	Auxiliary Systems	Instrument Air
B06-5	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System
B06-6	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)
B06-7	Balance of Plant	Auxiliary Systems	Open Cooling Water System
B06-8	Balance of Plant	Auxiliary Systems	Seal Air Fans
B06-9	Balance of Plant	Auxiliary Systems	Service Air
B06-10	Balance of Plant	Auxiliary Systems	Service Water (Open System)
B06-11	Balance of Plant	Circulating Water Systems	
B06-12	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators
B06-13	Balance of Plant	Condensate System	Miscellaneous (Condensate System)
B06-14	Balance of Plant	Condensate System	Polishers/Chemical Addition
B06-15	Balance of Plant	Condensate System	Pumps, Piping, and Valves
B06-16	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals
B06-17	Balance of Plant	Condensing System	Condenser Controls
B06-18	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment
B06-19	Balance of Plant	Condensing System	Miscellaneous (Condensing System)
B06-20	Balance of Plant	Condensing System	Vacuum Equipment
B06-21	Balance of Plant	Electrical	
B06-22	Balance of Plant	Extraction Steam	
B06-23	Balance of Plant	Feedwater System	
B06-24	Balance of Plant	Heater Drain Systems	
B06-25	Balance of Plant	Miscellaneous (Balance of Plant)	
B06-26	Balance of Plant	Power Station Switchyard	
B06-27	Balance of Plant	Waste Water (zero discharge) Systems	
B06-28	Expander Turbine	Expander Turbine	
B06-29	External	Catastrophe	
B06-30	External	Economic	
B06-31	External	Fuel Quality	
B06-32	External	Miscellaneous (External)	

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B06-33	Gas Turbine	Auxiliary Systems	
B06-34	Gas Turbine	Exhaust Systems	
B06-35	Gas Turbine	Fuel, Ignition, and Combustion Systems	
B06-36	Gas Turbine	Inlet Air System and Compressors	Compressors
B06-37	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters
B06-38	Gas Turbine	Miscellaneous (Gas Turbine)	
B06-39	Gas Turbine	Turbine	
B06-40	Generator	Controls	
B06-41	Generator	Cooling System	
B06-42	Generator	Exciter	
B06-43	Generator	Generator	
B06-44	Generator	Miscellaneous (Generator)	
B06-45	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply
B06-46	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)
B06-47	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems	
B06-48	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Design Limitations	
B06-49	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)
B06-50	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)
B06-51	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures	
B06-52	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections	
B06-53	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation
B06-54	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown
B06-55	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam
B06-56	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators
B06-57	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam
B06-58	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass
B06-59	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)
B06-60	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks	
B06-61	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Water Condition	
B06-62	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)	
B06-63	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems	
B06-64	Inactive States	Inactive States	
B06-65	Jet Engine	Auxiliary Systems	
B06-66	Jet Engine	Exhaust Systems	
B06-67	Jet Engine	Fuel, Ignition, and Combustion Systems	
B06-68	Jet Engine	Inlet Air System and Compressors	Compressors

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
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B06-70	Jet Engine	Miscellaneous (Jet Engine)	
B06-71	Jet Engine	Turbine	
B06-72	Miscellaneous	Instruments and Controls	
B06-73	Performance	Performance	
B06-74	Personnel or Procedural Errors	Personnel or Procedural Errors	
B06-75	Pollution Control Equipment	CO Reduction	
B06-76	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)	
B06-77	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters
B06-78	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems
B06-79	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems
B06-80	Regulatory, Safety, Environmental	Other Operating Environmental Limitations	
B06-81	Regulatory, Safety, Environmental	Regulatory	
B06-82	Regulatory, Safety, Environmental	Safety	
B06-83	Regulatory, Safety, Environmental	Stack Emission	
B06-84	Steam Turbine	Controls	
B06-85	Steam Turbine	High Pressure Turbine	
B06-86	Steam Turbine	Intermediate Pressure Turbine	
B06-87	Steam Turbine	Low Pressure Turbine	
B06-88	Steam Turbine	Lube Oil	
B06-89	Steam Turbine	Miscellaneous (Steam Turbine)	
B06-90	Steam Turbine	Piping	
B06-91	Steam Turbine	Valves	

BALANCE OF PLANT

TABLE B06-1 Balance of Plant: Auxiliary Systems - Auxiliary Steam					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3830	Auxiliary boiler
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3831	Auxiliary steam piping
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3832	Auxiliary steam valves

Combined Cycle Block	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3833	Auxiliary steam controls and instruments
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3834	Auxiliary boiler tube leaks
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3835	Auxiliary boiler burner management system
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3836	Steam transfer to other unit
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3839	Other auxiliary steam problems (also see extraction steam codes 3520 to 3529; startup bypass codes 0630 to 0660; and soot blower steam code 0870)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-2 Balance of Plant: Auxiliary Systems - Closed Cooling Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3820	Closed cooling water pumps and motors
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3821	Closed cooling water piping
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3822	Closed cooling water valves
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3823	Closed cooling water heat exchangers
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3824	Closed cooling water system fouling
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3825	Closed cooling water instrumentation
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3826	Closed cooling water strainer
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3829	Other closed cooling water system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-3 Balance of Plant: Auxiliary Systems - Fire Protection System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Combined Cycle Block	Balance of Plant	Auxiliary Systems	Fire Protection System	3860	Fire protection system pumps
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Fire Protection System	3861	Fire protection system piping
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Fire Protection System	3862	Fire protection system valves
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Fire Protection System	3863	Fire protection system fouling
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Fire Protection System	3864	Fire protection system instrumentation and controls
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Fire Protection System	3869	Other fire protection system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-4 Balance of Plant: Auxiliary Systems - Instrument Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Instrument Air	3850	Instrument air compressors
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Instrument Air	3851	Instrument air piping
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Instrument Air	3852	Instrument air valves
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Instrument Air	3853	Instrument air dryers
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Instrument Air	3854	N2 backup to instrument air
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Instrument Air	3859	Other instrument air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-5 Balance of Plant: Auxiliary Systems - Low-pressure Gas Compression System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3870	Fuel Gas Compressor and Motors
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3871	Fuel Gas Compressor Piping

Combined Cycle Block	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3872	Fuel Gas Compressor Valves
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3873	Fuel Gas Compressor Heat Exchangers
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3874	Fuel Gas Compressor Controls and Instrumentation
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3875	Fuel Gas Compressor Filters
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3876	Fuel Gas Compressor Fire System
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3879	Fuel Gas Compressor - other
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-6 Balance of Plant: Auxiliary Systems - Miscellaneous (Auxiliary Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3898	Miscellaneous plant auxiliary process and services instrumentation and controls
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3899	Other miscellaneous auxiliary system problems
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	6299	Other combined cycle block problems (Use other gas turbine problem codes, other steam turbine codes, etc., whenever appropriate.)
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	6399	Other coal gasification equipment problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-7 Balance of Plant: Auxiliary Systems - Open Cooling Water System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3800	Open cooling water pumps and motors
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3801	Open cooling water piping
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3802	Open cooling water valves

Combined Cycle Block	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3803	Open cooling water heat exchangers
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3804	Open cooling water system fouling
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3805	Open cooling water system instrumentation
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3806	Open cooling water strainer
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3809	Other open cooling water problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-8 Balance of Plant: Auxiliary Systems - Seal Air Fans

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Seal Air Fans	3880	Seal air fan
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Seal Air Fans	3881	Seal air fan drive - motor
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Seal Air Fans	3882	Seal air control dampers and drives
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Seal Air Fans	3883	Seal air filters
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Seal Air Fans	3889	Other seal air fan problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-9 Balance of Plant: Auxiliary Systems - Service Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Service Air	3840	Service air compressors
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Service Air	3841	Service air piping
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Service Air	3842	Service air valves
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Service Air	3843	Service air dryers

Combined Cycle Block	Balance of Plant	Auxiliary Systems	Service Air	3849	Other service air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-10 Balance of Plant: Auxiliary Systems - Service Water (Open System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3810	Service water pumps and motors
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3811	Service water piping
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3812	Service water valves
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3813	Service water heat exchangers
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3814	Service water system fouling
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3815	Service water strainer
Combined Cycle Block	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3819	Other service water problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-11 Balance of Plant: Circulating Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3210	Circulating water pumps
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3211	Circulating water pump motors
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3220	Circulating water piping
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3221	Circulating water piping fouling
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3230	Circulating water valves
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3231	Waterbox

Combined Cycle Block	Balance of Plant	Circulating Water Systems		3232	Condenser tube cleaning system including debris filter
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3233	Circulating water priming system
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3235	Cooling tower booster pump
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3236	Cooling tower booster motor
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3238	Cooling tower fan motors
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3239	Cooling tower fan motors - variable speed
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3240	Cooling tower fans
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3241	Cooling tower efficiency below design
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3242	Cooling tower fill damage
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3243	Cooling tower icing
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3244	Cooling tower fires
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3245	Other cooling tower problems
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3246	Cooling tower fouling
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3247	Cooling tower instrumentation
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3248	Cooling Tower Overhaul
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3250	Circulating water system instruments and controls
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3260	Traveling screens
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3261	Traveling screen fouling
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3269	Circulating water biological conditions (ie, zebra mussels)

Combined Cycle Block	Balance of Plant	Circulating Water Systems		3270	Intake system problems other than traveling screens
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3271	Intake grating fouling
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3272	Circulating water screenwash system
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3273	Debris in circulating water from outside sources (leaves, mud, etc.)
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3280	High circulating water temperature (not due to season, tower efficiency below design, or other listed equipment problem)
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3281	Circulating water tempering system
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3282	Circulating water cooling ponds
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3285	Circulating water chemistry
Combined Cycle Block	Balance of Plant	Circulating Water Systems		3299	Other circulating water system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-12 Balance of Plant: Condensate System - Low/Intermediate Pressure Heater and Deaerators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3339	LP heater head leaks
Combined Cycle Block	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3340	LP heater tube leaks
Combined Cycle Block	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3341	Other LP heater - general
Combined Cycle Block	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3342	IP heater tube leaks
Combined Cycle Block	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3343	Other IP heater - general
Combined Cycle Block	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3344	Deaerator (including level control)
Combined Cycle Block	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3345	IP heater head leaks

Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.

TABLE B06-13 Balance of Plant: Condensate System - Miscellaneous (Condensate System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3360	Condensate makeup and return (including storage tanks)
Combined Cycle Block	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3370	Condensate system controls and instrumentation (not hotwell level, heater level, or deaerator level controls; see codes 3150-3159, 3344, 3502).
Combined Cycle Block	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3380	Condensate coolers
Combined Cycle Block	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3399	Other miscellaneous condensate system problems

Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.

TABLE B06-14 Balance of Plant: Condensate System - Polishers/Chemical Addition

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Condensate System	Polishers/Chemical Addition	3350	Condensate polishing and filtering systems
Combined Cycle Block	Balance of Plant	Condensate System	Polishers/Chemical Addition	3351	Chemical addition systems
Combined Cycle Block	Balance of Plant	Condensate System	Polishers/Chemical Addition	3352	Feedwater chemistry (not specific to condenser, polishers, or chemical addition)

Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.

TABLE B06-15 Balance of Plant: Condensate System - Pumps, Piping, and Valves

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3300	Condensate water pre-treatment
Combined Cycle Block	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3310	Condensate/hotwell pumps
Combined Cycle Block	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3311	Condensate/hotwell pump motor

Combined Cycle Block	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3312	Condensate booster pump
Combined Cycle Block	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3313	Condensate booster pump motor
Combined Cycle Block	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3314	Condensate booster pump motor - variable speed
Combined Cycle Block	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3315	Condensate booster pump drive (other than 3313 and 3314)
Combined Cycle Block	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3320	Condensate piping
Combined Cycle Block	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3330	Condensate valves
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-16 Balance of Plant: Condensing System - Condenser Casing or Shell and Internals

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3120	Tube sheets
Combined Cycle Block	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3121	Expansion joint
Combined Cycle Block	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3122	Gaskets and seals
Combined Cycle Block	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3123	Hot well
Combined Cycle Block	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3124	Tube sheet fouling
Combined Cycle Block	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3129	Other condenser casing or shell and internal problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-17 Balance of Plant: Condensing System - Condenser Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Condensing System	Condenser Controls	3150	Hot well level controls
Combined Cycle Block	Balance of Plant	Condensing System	Condenser Controls	3151	Vacuum pump and air ejector controls

Combined Cycle Block	Balance of Plant	Condensing System	Condenser Controls	3152	Air-cooled condenser controls
Combined Cycle Block	Balance of Plant	Condensing System	Condenser Controls	3159	Other condensing system controls and instruments
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-18 Balance of Plant: Condensing System - Condenser Tubes and Support Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3110	Condenser tube leaks
Combined Cycle Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3111	Condenser tube fouling shell side
Combined Cycle Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3112	Condenser tube fouling tube side
Combined Cycle Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3113	Condenser tube and water box cleaning (including circulating water flow reversal)
Combined Cycle Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3114	Air-cooled condenser tubes
Combined Cycle Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3115	Air-cooled condenser pumps
Combined Cycle Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3116	Air-cooled condenser fans
Combined Cycle Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3117	Air-cooled condenser fan motors
Combined Cycle Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3118	Other Air-cooled condenser problems
Combined Cycle Block	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3119	Other condenser tube casing or shell and internal problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-19 Balance of Plant: Condensing System - Miscellaneous (Condensing System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3170	Condenser inspection (use code 3110 to report looking for tube leaks)
Combined Cycle Block	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3171	Air-cooled condenser inspections

Combined Cycle Block	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3180	Major condenser overhaul
Combined Cycle Block	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3185	Water side cathodic protection
Combined Cycle Block	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3186	Auxiliary condenser and associated equipment
Combined Cycle Block	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3190	Air leakage (for losses not attributable to previously noted equipment related codes)
Combined Cycle Block	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3199	Other miscellaneous condensing system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-20 Balance of Plant: Condensing System - Vacuum Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Condensing System	Vacuum Equipment	3130	Air ejectors
Combined Cycle Block	Balance of Plant	Condensing System	Vacuum Equipment	3131	Air ejector piping and valves
Combined Cycle Block	Balance of Plant	Condensing System	Vacuum Equipment	3132	Inter and after condensers
Combined Cycle Block	Balance of Plant	Condensing System	Vacuum Equipment	3133	Vacuum pumps
Combined Cycle Block	Balance of Plant	Condensing System	Vacuum Equipment	3134	Vacuum pump piping and valves
Combined Cycle Block	Balance of Plant	Condensing System	Vacuum Equipment	3135	Vacuum pump motor and auxiliaries
Combined Cycle Block	Balance of Plant	Condensing System	Vacuum Equipment	3139	Other air extraction system problems - general
Combined Cycle Block	Balance of Plant	Condensing System	Vacuum Equipment	3149	Loss of vacuum not attributable to a particular component such as air ejectors or valves, or high back pressure not attributable to high circulating water temperature, or vacuum losses from a known cause.
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-21 Balance of Plant: Electrical

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Electrical		3600	Switchyard transformers and associated cooling systems - external (OMC)
Combined Cycle Block	Balance of Plant	Electrical		3601	Switchyard transformers and associated cooling systems - external (not OMC)
Combined Cycle Block	Balance of Plant	Electrical		3610	Switchyard circuit breakers - external (not OMC)
Combined Cycle Block	Balance of Plant	Electrical		3611	Switchyard circuit breakers - external (OMC)
Combined Cycle Block	Balance of Plant	Electrical		3612	Switchyard system protection devices - external (OMC)
Combined Cycle Block	Balance of Plant	Electrical		3613	Switchyard system protection devices - external (not OMC)
Combined Cycle Block	Balance of Plant	Electrical		3618	Other switchyard equipment - external (not OMC)
Combined Cycle Block	Balance of Plant	Electrical		3619	Other switchyard equipment - external (OMC)
Combined Cycle Block	Balance of Plant	Electrical		3620	Main transformer
Combined Cycle Block	Balance of Plant	Electrical		3621	Unit auxiliaries transformer
Combined Cycle Block	Balance of Plant	Electrical		3622	Station service startup transformer
Combined Cycle Block	Balance of Plant	Electrical		3623	Auxiliary generators
Combined Cycle Block	Balance of Plant	Electrical		3624	Auxiliary generator voltage supply system
Combined Cycle Block	Balance of Plant	Electrical		3629	Other switchyard or high voltage system problems - external
Combined Cycle Block	Balance of Plant	Electrical		3630	400-700 volt transformers
Combined Cycle Block	Balance of Plant	Electrical		3631	400-700 volt circuit breakers
Combined Cycle Block	Balance of Plant	Electrical		3632	400-700 volt conductors and buses

Combined Cycle Block	Balance of Plant	Electrical		3633	400-700 volt insulators
Combined Cycle Block	Balance of Plant	Electrical		3634	400-700 volt protection devices
Combined Cycle Block	Balance of Plant	Electrical		3639	Other 400-700 volt problems
Combined Cycle Block	Balance of Plant	Electrical		3640	AC instrument power transformers
Combined Cycle Block	Balance of Plant	Electrical		3641	AC Circuit breakers
Combined Cycle Block	Balance of Plant	Electrical		3642	AC Conductors and buses
Combined Cycle Block	Balance of Plant	Electrical		3643	AC Inverters
Combined Cycle Block	Balance of Plant	Electrical		3644	AC Protection devices
Combined Cycle Block	Balance of Plant	Electrical		3649	Other AC instrument power problems
Combined Cycle Block	Balance of Plant	Electrical		3650	DC instrument power battery chargers
Combined Cycle Block	Balance of Plant	Electrical		3651	DC circuit breakers
Combined Cycle Block	Balance of Plant	Electrical		3652	DC conductors and buses
Combined Cycle Block	Balance of Plant	Electrical		3653	DC protection devices
Combined Cycle Block	Balance of Plant	Electrical		3659	Other DC power problems
Combined Cycle Block	Balance of Plant	Electrical		3660	4000-7000 volt transformers
Combined Cycle Block	Balance of Plant	Electrical		3661	4000-7000 volt circuit breakers
Combined Cycle Block	Balance of Plant	Electrical		3662	4000-7000 volt conductors and buses
Combined Cycle Block	Balance of Plant	Electrical		3663	4000-7000 volt insulators
Combined Cycle Block	Balance of Plant	Electrical		3664	4000-7000 volt protection devices

Combined Cycle Block	Balance of Plant	Electrical		3669	Other 4000-7000 volt problems
Combined Cycle Block	Balance of Plant	Electrical		3670	12-15kV transformers
Combined Cycle Block	Balance of Plant	Electrical		3671	12-15kV circuit breakers
Combined Cycle Block	Balance of Plant	Electrical		3672	12-15kV conductors and buses
Combined Cycle Block	Balance of Plant	Electrical		3673	12-15kV insulators
Combined Cycle Block	Balance of Plant	Electrical		3674	12-15kV protection devices
Combined Cycle Block	Balance of Plant	Electrical		3679	Other 12-15kV problems
Combined Cycle Block	Balance of Plant	Electrical		3680	Other voltage transformers
Combined Cycle Block	Balance of Plant	Electrical		3681	Other voltage circuit breakers
Combined Cycle Block	Balance of Plant	Electrical		3682	Other voltage conductors and buses
Combined Cycle Block	Balance of Plant	Electrical		3683	Other voltage insulators
Combined Cycle Block	Balance of Plant	Electrical		3684	Other voltage protection devices
Combined Cycle Block	Balance of Plant	Electrical		3689	Other voltage problems
Combined Cycle Block	Balance of Plant	Electrical		3690	Station Service Power Distribution System, General
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-22 Balance of Plant: Extraction Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Extraction Steam		3520	HP Extraction steam piping
Combined Cycle Block	Balance of Plant	Extraction Steam		3521	HP Extraction steam valves
Combined Cycle Block	Balance of Plant	Extraction Steam		3522	HP Extraction steam instruments and controls

Combined Cycle Block	Balance of Plant	Extraction Steam		3529	Other HP extraction steam system problems
Combined Cycle Block	Balance of Plant	Extraction Steam		3530	IP Extraction steam piping
Combined Cycle Block	Balance of Plant	Extraction Steam		3531	IP Extraction steam valves
Combined Cycle Block	Balance of Plant	Extraction Steam		3532	IP Extraction steam instruments and controls
Combined Cycle Block	Balance of Plant	Extraction Steam		3539	Other IP extraction steam system problems
Combined Cycle Block	Balance of Plant	Extraction Steam		3540	LP Extraction steam piping
Combined Cycle Block	Balance of Plant	Extraction Steam		3541	LP Extraction steam valves
Combined Cycle Block	Balance of Plant	Extraction Steam		3542	LP Extraction steam instruments and controls
Combined Cycle Block	Balance of Plant	Extraction Steam		3549	Other LP extraction steam system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-23 Balance of Plant: Feedwater System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Feedwater System		3401	Startup feedwater pump
Combined Cycle Block	Balance of Plant	Feedwater System		3402	Startup feedwater pump drives - all types
Combined Cycle Block	Balance of Plant	Feedwater System		3407	Feedwater pump suction screens
Combined Cycle Block	Balance of Plant	Feedwater System		3408	Feedwater pump drive - local controls
Combined Cycle Block	Balance of Plant	Feedwater System		3409	Feedwater pump drive motor - variable speed
Combined Cycle Block	Balance of Plant	Feedwater System		3410	Feedwater pump
Combined Cycle Block	Balance of Plant	Feedwater System		3411	Feedwater pump drive - motor
Combined Cycle Block	Balance of Plant	Feedwater System		3412	Feedwater pump drive - steam turbine

Combined Cycle Block	Balance of Plant	Feedwater System		3413	Feedwater pump coupling and drive shaft
Combined Cycle Block	Balance of Plant	Feedwater System		3414	Feedwater pump local controls
Combined Cycle Block	Balance of Plant	Feedwater System		3415	Feedwater pump/drive lube oil system
Combined Cycle Block	Balance of Plant	Feedwater System		3416	Other feedwater pump problems
Combined Cycle Block	Balance of Plant	Feedwater System		3417	Feedwater pump drive - main shaft
Combined Cycle Block	Balance of Plant	Feedwater System		3418	Feedwater pump drive - other
Combined Cycle Block	Balance of Plant	Feedwater System		3419	Feedwater pump drive - gear
Combined Cycle Block	Balance of Plant	Feedwater System		3420	Feedwater piping and supports
Combined Cycle Block	Balance of Plant	Feedwater System		3430	Feedwater regulating (boiler level control) valve
Combined Cycle Block	Balance of Plant	Feedwater System		3431	Other feedwater valves
Combined Cycle Block	Balance of Plant	Feedwater System		3439	HP heater head leaks
Combined Cycle Block	Balance of Plant	Feedwater System		3440	High pressure heater tube leaks
Combined Cycle Block	Balance of Plant	Feedwater System		3441	Other high pressure heater problems (see condensate system for LP and IP heater codes)
Combined Cycle Block	Balance of Plant	Feedwater System		3451	Feedwater booster pump suction screens
Combined Cycle Block	Balance of Plant	Feedwater System		3452	Feedwater booster pump drive - local controls
Combined Cycle Block	Balance of Plant	Feedwater System		3453	Feedwater booster pump drive motor - variable speed
Combined Cycle Block	Balance of Plant	Feedwater System		3454	Feedwater booster pump
Combined Cycle Block	Balance of Plant	Feedwater System		3455	Feedwater booster pump drive - motor
Combined Cycle Block	Balance of Plant	Feedwater System		3456	Feedwater booster pump drive - steam turbine

Combined Cycle Block	Balance of Plant	Feedwater System		3457	Feedwater booster pump coupling and drive shaft
Combined Cycle Block	Balance of Plant	Feedwater System		3458	Feedwater booster pump local controls
Combined Cycle Block	Balance of Plant	Feedwater System		3459	Feedwater booster pump/drive lube oil system
Combined Cycle Block	Balance of Plant	Feedwater System		3460	Other feedwater booster pump problems
Combined Cycle Block	Balance of Plant	Feedwater System		3461	Feedwater booster pump drive - main shaft
Combined Cycle Block	Balance of Plant	Feedwater System		3462	Feedwater booster pump drive - other
Combined Cycle Block	Balance of Plant	Feedwater System		3463	Feedwater booster pump drive - gear
Combined Cycle Block	Balance of Plant	Feedwater System		3499	Other feedwater system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Excluding extraction or drain systems.					

TABLE B06-24 Balance of Plant: Heater Drain Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Heater Drain Systems		3501	Heater drain pumps
Combined Cycle Block	Balance of Plant	Heater Drain Systems		3502	Heater level control
Combined Cycle Block	Balance of Plant	Heater Drain Systems		3503	Heater drain piping
Combined Cycle Block	Balance of Plant	Heater Drain Systems		3504	Heater drain valves
Combined Cycle Block	Balance of Plant	Heater Drain Systems		3505	Heater drain pump drive
Combined Cycle Block	Balance of Plant	Heater Drain Systems		3509	Other heater drain system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-25 Balance of Plant: Miscellaneous (Balance of Plant)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3950	Process computer
Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3960	Thermal derating (thermal efficiency losses in balance of plant when specific cause(s) unknown)
Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3970	Distributive Control System (DCS) - process computer
Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3971	DCS - data highway
Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3972	DCS - hardware problems (including card failure)
Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3973	DCS - internal and termination wiring
Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3974	DCS - logic problems
Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3975	DCS - upgrades
Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3979	Other DCS problems
Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3980	Programmable Logic Controller (PLC)
Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3981	PLC - data highway
Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3982	PLC - hardware problems (including card failure)
Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3983	PLC - internal and termination wiring
Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3984	PLC - logic problems
Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3985	PLC - upgrades
Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3989	Other PLC problems
Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3995	Powerhouse heating and ventilating systems
Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3996	Air conditioning systems - rooms and areas
Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3998	Balance of plant overhaul/outage

Combined Cycle Block	Balance of Plant	Miscellaneous (Balance of Plant)		3999	Other miscellaneous balance of plant problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-26 Balance of Plant: Power Station Switchyard

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Power Station Switchyard		3700	Power Station switchyard (non generating unit equipment)
Combined Cycle Block	Balance of Plant	Power Station Switchyard		3710	Transmission line (connected to powerhouse switchyard to 1st Substation)
Combined Cycle Block	Balance of Plant	Power Station Switchyard		3720	Transmission equipment at the 1st substation (see code 9300 if applicable)
Combined Cycle Block	Balance of Plant	Power Station Switchyard		3730	Transmission equipment beyond the 1st substation (see code 9300 if applicable)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-27 Balance of Plant: Waste Water (zero discharge) Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Balance of Plant	Waste Water (zero discharge) Systems		3290	Waste water (zero discharge) tanks, pumps, and motors
Combined Cycle Block	Balance of Plant	Waste Water (zero discharge) Systems		3291	Waste water (zero discharge) system fouling
Combined Cycle Block	Balance of Plant	Waste Water (zero discharge) Systems		3292	Waste water (zero discharge) piping
Combined Cycle Block	Balance of Plant	Waste Water (zero discharge) Systems		3293	Waste water (zero discharge) valves
Combined Cycle Block	Balance of Plant	Waste Water (zero discharge) Systems		3294	Waste water (zero discharge) controls and instrumentation
Combined Cycle Block	Balance of Plant	Waste Water (zero discharge) Systems		3295	Other waste water (zero discharge) problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

EXPANDER TURBINE

TABLE B06-28 Expander Turbine: Expander Turbine					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Combined Cycle Block	Expander Turbine	Expander Turbine		7800	Couplings
Combined Cycle Block	Expander Turbine	Expander Turbine		7810	Shaft
Combined Cycle Block	Expander Turbine	Expander Turbine		7820	Bearings
Combined Cycle Block	Expander Turbine	Expander Turbine		7830	Blades
Combined Cycle Block	Expander Turbine	Expander Turbine		7840	Discs
Combined Cycle Block	Expander Turbine	Expander Turbine		7850	Spacers
Combined Cycle Block	Expander Turbine	Expander Turbine		7860	Nozzles/vanes
Combined Cycle Block	Expander Turbine	Expander Turbine		7870	Heat shields
Combined Cycle Block	Expander Turbine	Expander Turbine		7880	Exhaust diffusers
Combined Cycle Block	Expander Turbine	Expander Turbine		7890	Seal oil system and seals
Combined Cycle Block	Expander Turbine	Expander Turbine		7900	Inner casing
Combined Cycle Block	Expander Turbine	Expander Turbine		7910	Outer exhaust casing
Combined Cycle Block	Expander Turbine	Expander Turbine		7920	Lube oil system
Combined Cycle Block	Expander Turbine	Expander Turbine		7930	Controls and instrumentation
Combined Cycle Block	Expander Turbine	Expander Turbine		7940	Evactor
Combined Cycle Block	Expander Turbine	Expander Turbine		7950	Major overhaul
Combined Cycle Block	Expander Turbine	Expander Turbine		7960	Other expander turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

EXTERNAL

Use this set of codes to report events caused by external factors (flood, lightning, etc.); economic factors (lack of fuel, labor strikes, etc.); operator training; and transmission system problems external to the plant.

TABLE B06-29 External: Catastrophe					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Combined Cycle Block	External	Catastrophe		9000	Flood
Combined Cycle Block	External	Catastrophe		9001	Drought
Combined Cycle Block	External	Catastrophe		9010	Fire including wildfires, not related to a specific component

Combined Cycle Block	External	Catastrophe		9020	Lightning
Combined Cycle Block	External	Catastrophe		9025	Geomagnetic disturbance
Combined Cycle Block	External	Catastrophe		9030	Earthquake
Combined Cycle Block	External	Catastrophe		9031	Tornado
Combined Cycle Block	External	Catastrophe		9035	Hurricane
Combined Cycle Block	External	Catastrophe		9036	Storms (ice, snow, etc)
Combined Cycle Block	External	Catastrophe		9040	Other catastrophe
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-30 External: Economic

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	External	Economic		0	Reserve shutdown
Combined Cycle Block	External	Economic		9130	Failure of fuel supplier to fulfill contractual obligations or a pre-arranged deal due to physical fuel disruptions or operational impairments (e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)
Combined Cycle Block	External	Economic		9131	Lack of fuel – due to contractual or tariff provisions that allow for service interruption or price fluctuations during peak demand periods.
Combined Cycle Block	External	Economic		9134	Fuel conservation
Combined Cycle Block	External	Economic		9136	Problems with Primary Fuel for Units with Secondary Fuel Operation
Combined Cycle Block	External	Economic		9137	Ground water or other water supply problems

Combined Cycle Block	External	Economic		9140	Plant modifications to burn different fuel that are not regulatory mandated
Combined Cycle Block	External	Economic		9150	Labor strikes company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.
Combined Cycle Block	External	Economic		9151	Labor strikes direct plant management grievances that result in a walkout or strike are under plant management control.
Combined Cycle Block	External	Economic		9160	Other economic problems
Combined Cycle Block	External	Economic		9180	Economic (for internal use at plants only)
Combined Cycle Block	External	Economic		9181	Economic (for internal use at plants only)
Combined Cycle Block	External	Economic		9182	Economic (for internal use at plants only)
Combined Cycle Block	External	Economic		9183	Economic (for internal use at plants only)
Combined Cycle Block	External	Economic		9184	Economic (for internal use at plants only)
Combined Cycle Block	External	Economic		9185	Economic (for internal use at plants only)
Combined Cycle Block	External	Economic		9186	Economic (for internal use at plants only)
Combined Cycle Block	External	Economic		9187	Economic (for internal use at plants only)
Combined Cycle Block	External	Economic		9188	Economic (for internal use at plants only)
Combined Cycle Block	External	Economic		9189	Economic (for internal use at plants only)
Combined Cycle Block	External	Economic		9190	Economic (for internal use at plants only)
Combined Cycle Block	External	Economic		9191	Economic (for internal use at plants only)
Combined Cycle Block	External	Economic		9192	Economic (for internal use at plants only)

Combined Cycle Block	External	Economic		9193	Economic (for internal use at plants only)
Combined Cycle Block	External	Economic		9194	Economic (for internal use at plants only)
Combined Cycle Block	External	Economic		9195	Economic (for internal use at plants only)
Combined Cycle Block	External	Economic		9196	Economic (for internal use at plants only)
Combined Cycle Block	External	Economic		9197	Economic (for internal use at plants only)
Combined Cycle Block	External	Economic		9198	Economic (for internal use at plants only)
Combined Cycle Block	External	Economic		9199	Economic (for internal use at plants only)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-31 External: Fuel Quality

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	External	Fuel Quality		9200	High ash content (OMC)
Combined Cycle Block	External	Fuel Quality		9201	High ash content (not OMC)
Combined Cycle Block	External	Fuel Quality		9205	Poor quality natural gas fuel, low heat content
Combined Cycle Block	External	Fuel Quality		9220	High sulfur content (OMC)
Combined Cycle Block	External	Fuel Quality		9221	High sulfur content (not OMC)
Combined Cycle Block	External	Fuel Quality		9230	High vanadium content (OMC)
Combined Cycle Block	External	Fuel Quality		9231	High vanadium content (not OMC)
Combined Cycle Block	External	Fuel Quality		9240	High sodium content (OMC)
Combined Cycle Block	External	Fuel Quality		9241	High sodium content (not OMC)
Combined Cycle Block	External	Fuel Quality		9260	Low BTU oil (OMC)

Combined Cycle Block	External	Fuel Quality		9261	Low BTU oil (not OMC)
Combined Cycle Block	External	Fuel Quality		9290	Other fuel quality problems (OMC)
Combined Cycle Block	External	Fuel Quality		9291	Other fuel quality problems (not OMC)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use code 9600 to 9650 if the fuel quality results in excess stack emissions through no fault in the pollution control equipment. Use the appropriate equipment code to report fouling and slagging.					

TABLE B06-32 External: Miscellaneous (External)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	External	Miscellaneous (External)		9300	Transmission system problems other than catastrophes (do not include switchyard problems in this category; see codes 3600 to 3629, 3720 to 3730)
Combined Cycle Block	External	Miscellaneous (External)		9310	Operator training
Combined Cycle Block	External	Miscellaneous (External)		9320	Other miscellaneous external problems
Combined Cycle Block	External	Miscellaneous (External)		9340	Synchronous Condenser Operation
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

GAS TURBINE

TABLE B06-33 Gas Turbine: Auxiliary Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5110	Lube oil system - general
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5111	Lube oil pumps
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5112	Lube oil coolers
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5113	Lube oil valves/piping

Combined Cycle Block	Gas Turbine	Auxiliary Systems		5114	Lube oil filters
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5115	Oil vapor extractor
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5116	Power Augmentation System Equipment
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5117	Power augmentation piping
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5118	Power augmentation valves
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5119	Power augmentation controls
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5120	Hydraulic oil system
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5121	Hydraulic oil system pumps
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5122	Hydraulic oil system piping/valves
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5130	Starting system (including motor)
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5140	Battery and charger system
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5150	Turning gear and motor
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5151	Load gear compartment
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5160	Cooling and seal air system
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5170	Cooling water system
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5180	Anti-icing system
Combined Cycle Block	Gas Turbine	Auxiliary Systems		5190	Other auxiliary system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-34 Gas Turbine: Exhaust Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Combined Cycle Block	Gas Turbine	Exhaust Systems		5100	Chamber
Combined Cycle Block	Gas Turbine	Exhaust Systems		5101	Hoods
Combined Cycle Block	Gas Turbine	Exhaust Systems		5102	Vanes/nozzles
Combined Cycle Block	Gas Turbine	Exhaust Systems		5103	Silencer
Combined Cycle Block	Gas Turbine	Exhaust Systems		5104	Cones
Combined Cycle Block	Gas Turbine	Exhaust Systems		5105	Diverter Dampers
Combined Cycle Block	Gas Turbine	Exhaust Systems		5106	Exhaust Stack
Combined Cycle Block	Gas Turbine	Exhaust Systems		5108	High engine exhaust temperature
Combined Cycle Block	Gas Turbine	Exhaust Systems		5109	Other exhaust problems (including high exhaust system temperature not attributable to a specific problem)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-35 Gas Turbine: Fuel, Ignition, and Combustion Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5040	Fuel tanks
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5041	Fuel piping and valves
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5042	Fuel nozzles/vanes
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5043	Fuel filters
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5044	Liquid fuel oil pump
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5046	Liquid fuel oil transfer/forwarding pump
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5047	Liquid fuel purge system

Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5048	Gas fuel system including controls and instrumentation
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5049	Other fuel system problems
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5050	Ignition system
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5051	Pilot fuel piping and valves
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5052	Pilot fuel nozzles/vanes
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5053	Pilot fuel filters
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5054	Water injection system
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5060	Atomizing air system
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5065	NOx water injection system including pump
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5066	NOx steam injection system
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5070	Combustor casing
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5071	Combustor liner
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5072	Combustor caps
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5073	Flame scanners
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5074	Flashback including instrumentation
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5075	Blade path temperature spread
Combined Cycle Block	Gas Turbine	Fuel, Ignition, and Combustion Systems		5079	Other combustor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-36 Gas Turbine: Inlet Air System and Compressors - Compressors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5010	High pressure shaft
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5011	High pressure bearings
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5012	High pressure blades/buckets
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5013	Compressor casing and bolts
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5014	Compressor diaphragms
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5015	Compressor seals
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5016	High pressure compressor bleed valves
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5017	Low pressure compressor bleed valves
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5019	Other high pressure problems
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5020	Low pressure shaft
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5021	Low pressure bearings
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5022	Low pressure blades/buckets
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5029	Other low pressure problems
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5030	Supercharging fans
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5035	Compressor washing
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5036	Compressor shaft and bearings for two-shaft machines
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5037	Inlet bleed heat valve
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Compressors	5039	Other compressor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-37 Gas Turbine: Inlet Air System and Compressors - Ducts and Filters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5000	Inlet air ducts
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5001	Inlet air vanes/nozzles
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5002	Inlet air filters
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5003	Inlet cone
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5004	Inlet air chillers
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5005	Inlet air evaporative coolers
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5006	Inlet air foggers
Combined Cycle Block	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5009	Other inlet air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-38 Gas Turbine: Miscellaneous (Gas Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5200	Reduction gear
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5201	Load shaft and bearings
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5205	Main coupling between the turbine and generator
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5206	Clutch
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5210	Intercoolers
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5220	Regenerators
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5230	Heat shields

Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5240	Fire detection and extinguishing system (including hazardous gas detection system)
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5241	Fire in unit
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5245	Gas Turbine Control System - data highway
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5246	Gas Turbine Control System - hardware problems (including card failure)
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5247	Gas Turbine Control System - internal and termination wiring
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5248	Gas Turbine Control System - logic problems
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5249	Gas Turbine Control System - upgrades
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5250	Other controls and instrumentation problems
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5255	Computer
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5260	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5261	Gas turbine/compressor washing
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5262	Gas turbine exchange
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5269	Combustion Inspection (CI)
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5270	Hot end inspection
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5272	Boroscope inspection
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5274	General unit inspection
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5280	Vibration (not engine) in unit not attributable to bearings or other components
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5285	Gas turbine vibration

Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5286	Gas turbine lockout
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5290	Gas turbine performance testing - individual engines (use code 9999 for total unit performance testing)
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5292	Turbine Overspeed Trip Test - Gas Turbine
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5295	Synchronous condenser equipment
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5298	Main gas filter
Combined Cycle Block	Gas Turbine	Miscellaneous (Gas Turbine)		5299	Other miscellaneous gas turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-39 Gas Turbine: Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Gas Turbine	Turbine		5080	High pressure shaft
Combined Cycle Block	Gas Turbine	Turbine		5081	High pressure bearings
Combined Cycle Block	Gas Turbine	Turbine		5082	High pressure blades/buckets
Combined Cycle Block	Gas Turbine	Turbine		5083	High pressure nozzles/vanes
Combined Cycle Block	Gas Turbine	Turbine		5084	High pressure casing/expansion joints
Combined Cycle Block	Gas Turbine	Turbine		5085	Interstage gas passages - HP
Combined Cycle Block	Gas Turbine	Turbine		5086	High pressure shaft seals
Combined Cycle Block	Gas Turbine	Turbine		5087	Thrust bearing
Combined Cycle Block	Gas Turbine	Turbine		5088	Gas turbine cooling system
Combined Cycle Block	Gas Turbine	Turbine		5089	Other high pressure problems

Combined Cycle Block	Gas Turbine	Turbine		5090	Low pressure shaft
Combined Cycle Block	Gas Turbine	Turbine		5091	Low pressure bearings
Combined Cycle Block	Gas Turbine	Turbine		5092	Low pressure blades/buckets
Combined Cycle Block	Gas Turbine	Turbine		5093	Low pressure nozzles/vanes
Combined Cycle Block	Gas Turbine	Turbine		5094	Low pressure casing/expansion joints
Combined Cycle Block	Gas Turbine	Turbine		5095	Interstage gas passages - LP
Combined Cycle Block	Gas Turbine	Turbine		5096	Low pressure shaft seals
Combined Cycle Block	Gas Turbine	Turbine		5097	Other low pressure problems
Combined Cycle Block	Gas Turbine	Turbine		5098	Expansion joints
Combined Cycle Block	Gas Turbine	Turbine		5099	HP to LP coupling
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP if only one.					

GENERATOR

This set of codes contains the generator, exciter, generator cooling systems, and generator controls. Note the main leads up to and includes the generator output breaker in this set of codes.

TABLE B06-40 Generator: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Generator	Controls		4700	Generator voltage control
Combined Cycle Block	Generator	Controls		4710	Generator metering devices
Combined Cycle Block	Generator	Controls		4720	Generator synchronization equipment
Combined Cycle Block	Generator	Controls		4730	Generator current and potential transformers

Combined Cycle Block	Generator	Controls		4740	Emergency generator trip devices
Combined Cycle Block	Generator	Controls		4750	Other generator controls and metering problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-41 Generator: Cooling System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Generator	Cooling System		4610	Hydrogen cooling system piping and valves
Combined Cycle Block	Generator	Cooling System		4611	Hydrogen coolers
Combined Cycle Block	Generator	Cooling System		4612	Hydrogen storage system
Combined Cycle Block	Generator	Cooling System		4613	Hydrogen seals
Combined Cycle Block	Generator	Cooling System		4619	Other hydrogen system problems
Combined Cycle Block	Generator	Cooling System		4620	Air cooling system
Combined Cycle Block	Generator	Cooling System		4630	Liquid cooling system
Combined Cycle Block	Generator	Cooling System		4640	Seal oil system and seals
Combined Cycle Block	Generator	Cooling System		4650	Other cooling system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Report failures caused by water leaks into generator as codes 4500, 4510, etc.					

TABLE B06-42 Generator: Exciter

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Generator	Exciter		4600	Exciter drive - motor
Combined Cycle Block	Generator	Exciter		4601	Exciter field rheostat
Combined Cycle Block	Generator	Exciter		4602	Exciter commutator and brushes

Combined Cycle Block	Generator	Exciter		4603	Solid state exciter element
Combined Cycle Block	Generator	Exciter		4604	Exciter drive - shaft
Combined Cycle Block	Generator	Exciter		4605	Exciter transformer
Combined Cycle Block	Generator	Exciter		4609	Other exciter problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-43 Generator: Generator

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Generator	Generator		4500	Rotor windings (including damper windings and fan blades on hydro units)
Combined Cycle Block	Generator	Generator		4510	Rotor collector rings
Combined Cycle Block	Generator	Generator		4511	Rotor, General
Combined Cycle Block	Generator	Generator		4512	Retaining Rings
Combined Cycle Block	Generator	Generator		4520	Stator windings, bushings, and terminals
Combined Cycle Block	Generator	Generator		4530	Stator core iron
Combined Cycle Block	Generator	Generator		4535	Stator, General
Combined Cycle Block	Generator	Generator		4536	Generator Heaters
Combined Cycle Block	Generator	Generator		4540	Brushes and brush rigging
Combined Cycle Block	Generator	Generator		4550	Generator bearings and lube oil system (including thrust bearings on hydro units)
Combined Cycle Block	Generator	Generator		4551	Generator bearings
Combined Cycle Block	Generator	Generator		4552	Generator lube oil system

Combined Cycle Block	Generator	Generator		4555	Bearing cooling system
Combined Cycle Block	Generator	Generator		4560	Generator vibration (excluding vibration due to failed bearing and other components)
Combined Cycle Block	Generator	Generator		4570	Generator casing
Combined Cycle Block	Generator	Generator		4580	Generator end bells and bolting
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-44 Generator: Miscellaneous (Generator)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Generator	Miscellaneous (Generator)		4800	Generator main leads
Combined Cycle Block	Generator	Miscellaneous (Generator)		4805	Generator Bus Duct Cooling System
Combined Cycle Block	Generator	Miscellaneous (Generator)		4810	Generator output breaker
Combined Cycle Block	Generator	Miscellaneous (Generator)		4830	Major generator overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Combined Cycle Block	Generator	Miscellaneous (Generator)		4831	Minor generator overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Combined Cycle Block	Generator	Miscellaneous (Generator)		4840	Inspection
Combined Cycle Block	Generator	Miscellaneous (Generator)		4841	Generator doble testing
Combined Cycle Block	Generator	Miscellaneous (Generator)		4842	Reactive and capability testing
Combined Cycle Block	Generator	Miscellaneous (Generator)		4850	Core monitor alarm
Combined Cycle Block	Generator	Miscellaneous (Generator)		4860	Generator neutral grounding equipment
Combined Cycle Block	Generator	Miscellaneous (Generator)		4899	Other miscellaneous generator problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

HEAT RECOVERY STEAM GENERATOR (HRSG)

(Waste Heat Boiler)

TABLE B06-45 Heat Recovery Steam Generator (HRSG): HRSG Boiler Air and Gas Systems - Air Supply					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1400	Forced draft fans
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1401	Forced draft fan dampers
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1407	Forced draft fan lubrication system
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1410	Forced draft fan motors
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1411	Forced draft fan motors - variable speed
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1412	Forced draft fan drives (other than motor)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1415	Forced draft fan controls
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1420	Other forced draft fan problems
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1430	Air supply ducts from FD fan
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1431	Air supply dampers from FD fan
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1432	Air supply duct expansion joints
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1440	Air supply dampers
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1450	Other air supply problems
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1456	Induced draft fan dampers
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1536	Flue gas recirculating fan dampers
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-46 Heat Recovery Steam Generator (HRSG): HRSG Boiler Air and Gas Systems - Miscellaneous (Boiler Air and Gas Systems)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1590	Stacks (use code 8430 for stack problems due to pollution control equipment)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1591	Stack damper and linkage
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1592	Stack damper linkage motors
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1599	Other miscellaneous boiler air and gas system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-47 Heat Recovery Steam Generator (HRSG): HRSG Boiler Control Systems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1700	Feedwater controls (report local controls - feedwater pump, feedwater regulator valve, etc., - with component or system)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1710	Combustion/steam condition controls (report local controls - burners, pulverizers, etc., - with component or system)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1720	Desuperheater/attemperator controls
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1730	Boiler explosion or implosion
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1740	Boiler drum gage glasses / level indicator
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1750	Burner management system
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1760	Feedwater instrumentation (not local controls)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1761	Combustion/Steam condition instrumentation (not local controls)

Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1762	Desuperheater/attemperator instrumentation (not local controls)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1799	Other boiler instrumentation and control problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Iincluding instruments which input to the controls.					

TABLE B06-48 Heat Recovery Steam Generator (HRSG): HRSG Boiler Design Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Design Limitations		1900	Improper balance between tube sections not due to fouling or plugging
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Design Limitations		1910	Inadequate air not due to equipment problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-49 Heat Recovery Steam Generator (HRSG): HRSG Boiler Fuel Supply - Burners (Duct Burners)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	358	Oil burner piping and valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	359	Gas burner piping and valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	360	Burners
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	361	Burner orifices
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	370	Burner instruments and controls (except light off)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	380	Light off (igniter) systems (including fuel supply)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	385	Igniters
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	410	Other burner problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-50 Heat Recovery Steam Generator (HRSG): HRSG Boiler Fuel Supply - Oil and Gas Systems (except light off)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	440	Fuel oil pumps (general)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	441	Fuel oil pumps (burner supply)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	442	Fuel oil pumps (forwarding/transfer)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	443	Fuel oil (burner supply) pump drives
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	444	Fuel oil (forwarding/transfer) pump drives
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	450	Fuel oil heaters
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	460	Fuel oil atomizers
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	470	Oil and gas fires
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	480	Other oil and gas fuel supply problems (see codes 0360-0410 for burner problems)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-51 Heat Recovery Steam Generator (HRSG): HRSG Boiler Internals and Structures					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		800	Drums and drum internals (single drum only)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		801	HP Drum (including drum level trips not attributable to other causes)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		802	IP Drum (including drum level trips not attributable to other causes)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		803	LP Drum (including drum level trips not attributable to other causes)

Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		810	Boiler supports and structures (use code 1320 for tube supports)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		820	Casing
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		830	Doors
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		840	Refractory and insulation
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		845	Windbox expansion joints
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		847	Other expansion joints
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		848	Inlet panel
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		850	Other internal or structural problems
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		855	Drum relief/safety valves (single drum only)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		856	HP Drum relief/safety valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		857	IP Drum relief/safety valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		858	LP Drum relief/safety valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		859	Tube external fins/membranes
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-52 Heat Recovery Steam Generator (HRSG): HRSG Boiler Overhaul and Inspections

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1800	Major boiler overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1801	Minor boiler overhaul (less than 720 hours) (use for non-specific

					overhaul only; see page B-CCGT-2)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1810	Other boiler inspections
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1811	Boiler Inspections - problem identification / investigation
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1812	Boiler Inspections - scheduled or routine
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1820	Chemical cleaning/steam blows
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-53 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - Boiler Recirculation

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	740	Boiler recirculation pumps
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	741	Boiler recirculation pumps - motors
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	750	Boiler recirculation piping including downcomers
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	760	Boiler recirculation valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	770	Other boiler recirculation problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-54 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - Feedwater and Blowdown

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	670	Feedwater piping downstream of feedwater regulating valve
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	680	Feedwater valves (not feedwater regulating valve)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	690	Other feedwater problems downstream of feedwater regulating valve (use codes 3401 to 3499 for remainder of feedwater system)

Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	700	Blowdown system valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	710	Blowdown system piping
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	720	Blowdown system controls / instrumentation
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	730	Other blowdown system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-55 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Cold and Hot Reheat Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	540	Hot reheat steam piping up to turbine stop valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	541	Cold reheat steam piping up to boiler
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	550	Reheat steam relief/safety valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	560	Other hot reheat steam valves (not including turbine stop or intercept valves)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	561	Other cold reheat steam valves (not including turbine stop or intercept valves)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	570	Other reheat steam problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-56 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Desuperheaters/Attemperators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6140	HP Desuperheater/attemperator piping - Greater than 600 PSIG.
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6141	HP Desuperheater/attemperator valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6142	HP Desuperheater/attemperator spray nozzles

Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6143	HP Desuperheater/attemperator drums
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6144	Other HP desuperheater/attemperator problems
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6145	IP Desuperheater/attemperator piping - Between 200-600 PSIG
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6146	IP Desuperheater/attemperator valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6147	IP Desuperheater/attemperator spray nozzles
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6148	IP Desuperheater/attemperator drums
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6149	Other IP desuperheater/attemperator problems
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6150	LP Desuperheater/attemperator piping - Less than 200 PSIG
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6151	LP Desuperheater/attemperator valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6152	LP Desuperheater/attemperator spray nozzles
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6153	LP Desuperheater/attemperator drums
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6154	Other LP desuperheater/attemperator problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-57 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Main Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	500	Main steam piping up to turbine stop valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	510	Main steam relief/safety valves off superheater
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	520	Other main steam valves (including vent and drain valves

					but not including the turbine stop valves)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	530	Other main steam system problems
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6110	HP steam piping up to turbine stop valves - Greater than 600 PSIG (see 0790 for piping supports)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6111	HP steam relief/safety valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6112	Other HP steam valves (including vent and drain valves but not including the turbine stop valves)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6113	Other HP steam system problems
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6114	HP steam isolation/boundary valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6120	IP steam piping up to turbine stop valves - Between 200 & 600 PSIG (see 0790 for piping supports)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6121	IP steam relief/safety valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6122	Other IP steam valves (including vent and drain valves but not including the turbine stop valves)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6123	Other IP steam system problems
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6124	IP steam isolation/boundary valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6130	LP steam piping up to turbine stop valves - Less than 200 PSIG (see 0790 for piping supports)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6131	LP steam relief/safety valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6132	Other LP steam valves (including vent and drain valves but not

					including the turbine stop valves)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6133	Other LP steam system problems
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6134	Other main steam valves (including vent and drain valves but not including the turbine stop valves)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6135	LP steam isolation/boundary valves
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-58 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Startup Bypass

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6160	HP Startup bypass system piping (including drain lines up to heaters or condenser) - Greater than 600 PSIG
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6161	HP Startup bypass system valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6162	HP Startup bypass tanks or flash tanks
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6163	Other HP startup bypass system problems
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6164	HP startup bypass instrumentation and controls
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6170	IP Startup bypass system piping (including drain lines up to heaters or condenser) - Between 200-600 PSIG
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6171	IP Startup bypass system valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6172	IP Startup bypass tanks or flash tanks
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6173	Other IP startup bypass system problems
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6174	IP startup bypass instrumentation and controls

Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6180	LP Startup bypass system piping (including drain lines up to heaters or condenser) - Less than 200 PSIG
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6181	LP Startup bypass system valves
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6182	LP Startup bypass tanks or flash tanks
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6183	Other LP startup bypass system problems
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6184	LP startup bypass instrumentation and controls
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-59 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - Miscellaneous (Piping)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	775	Economizer piping
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	780	Headers between tube bundles
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	782	Headers and caps
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	790	Pipe hangers, brackets, supports (general)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	799	Other miscellaneous piping system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-60 Heat Recovery Steam Generator (HRSG): HRSG Boiler Tube Leaks

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6005	HP Evaporator tubes
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6006	IP Evaporator tubes
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6007	LP Evaporator tubes

Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6010	HP superheater
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6011	HP reheater
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6012	HP economizer
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6020	IP superheater
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6021	IP reheater
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6022	IP economizer
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6030	LP reheater
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6031	LP superheater
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6032	LP economizer
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6090	Other HRSG tube problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use code 0859 for tube/membrane failures.					

TABLE B06-61 Heat Recovery Steam Generator (HRSG): HRSG Boiler Water Condition

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Water Condition		1850	Boiler water condition (not feedwater water quality)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-62 Heat Recovery Steam Generator (HRSG): Miscellaneous (HRSG Boiler)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		1980	Boiler safety valve test
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		1990	Boiler performance testing (use code 9999 for total unit performance testing)

Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		1999	Boiler, miscellaneous
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		6000	Heat recovery steam generator to gas turbine connecting equipment. For additional codes, use Fossil Steam Cause Codes 0010 to 1999.
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		6100	Steam turbine to gas turbine coupling. For additional codes, use Fossil Steam Cause Codes 4000 to 4499.
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use more specific codes - other slagging and fouling problems, other control problems, etc. whenever possible. Describe miscellaneous problems in the verbal description.					

TABLE B06-63 Heat Recovery Steam Generator (HRSG): Miscellaneous HRSG Boiler Tube Problems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1300	Water side fouling
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1305	Fireside cleaning (which requires a full outage) Use code 1200 for cleanings that cause deratings.
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1310	Water side cleaning (acid cleaning)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1320	Tube supports/attachments
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1330	Slag fall damage
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1340	Tube modifications (including addition and removal of tubes)
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1350	Other miscellaneous boiler tube problems
Combined Cycle Block	Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1360	Boiler drains system
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

INACTIVE STATES

TABLE B06-64 Inactive States: Inactive States

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Inactive States	Inactive States		2	Inactive Reserve Shutdown
Combined Cycle Block	Inactive States	Inactive States		9990	Retired unit
Combined Cycle Block	Inactive States	Inactive States		9991	Mothballed unit
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

JET ENGINE

TABLE B06-65 Jet Engine: Auxiliary Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Jet Engine	Auxiliary Systems		5510	Lube oil system
Combined Cycle Block	Jet Engine	Auxiliary Systems		5516	Power Augmentation System Equipment
Combined Cycle Block	Jet Engine	Auxiliary Systems		5520	Hydraulic oil system
Combined Cycle Block	Jet Engine	Auxiliary Systems		5530	Starting system (including motor)
Combined Cycle Block	Jet Engine	Auxiliary Systems		5540	Battery and charger system
Combined Cycle Block	Jet Engine	Auxiliary Systems		5550	Turning gear and motor
Combined Cycle Block	Jet Engine	Auxiliary Systems		5551	Load gear compartment
Combined Cycle Block	Jet Engine	Auxiliary Systems		5560	Cooling and seal air system
Combined Cycle Block	Jet Engine	Auxiliary Systems		5570	Cooling water system
Combined Cycle Block	Jet Engine	Auxiliary Systems		5580	Anti-icing system
Combined Cycle Block	Jet Engine	Auxiliary Systems		5590	Other auxiliary system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-66 Jet Engine: Exhaust Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Jet Engine	Exhaust Systems		5500	Chamber
Combined Cycle Block	Jet Engine	Exhaust Systems		5501	Hoods
Combined Cycle Block	Jet Engine	Exhaust Systems		5502	Vanes/nozzles
Combined Cycle Block	Jet Engine	Exhaust Systems		5503	Silencer
Combined Cycle Block	Jet Engine	Exhaust Systems		5504	Cones
Combined Cycle Block	Jet Engine	Exhaust Systems		5505	Diverter Dampers
Combined Cycle Block	Jet Engine	Exhaust Systems		5508	High engine exhaust temperature
Combined Cycle Block	Jet Engine	Exhaust Systems		5509	Other exhaust problems (including high exhaust temperature not attributable to a specific problem)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-67 Jet Engine: Fuel, Ignition, and Combustion Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5440	Fuel tanks
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5441	Fuel piping and valves
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5442	Fuel nozzles/vanes
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5443	Fuel filters
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5444	Liquid fuel oil pump
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5445	Liquid fuel oil transfer/forwarding pump
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5446	Liquid fuel purge system

Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5447	Gas fuel system including controls and instrumentation
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5449	Other fuel system problems
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5450	Ignition system
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5451	Pilot fuel piping and valves
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5452	Pilot fuel nozzles/vanes
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5453	Pilot fuel filters
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5454	Water injection system
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5455	Fuel nozzle/vane cooling air system
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5460	Atomizing air system
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5470	Combustor casing
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5471	Combustor liner
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5472	Combustor caps
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5473	Flame scanners
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5474	Flashback (including instrumentation)
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5475	Blade path temperature spread
Combined Cycle Block	Jet Engine	Fuel, Ignition, and Combustion Systems		5479	Other combustor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-68 Jet Engine: Inlet Air System and Compressors - Compressors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Compressors	5410	High pressure shaft

Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Compressors	5411	High pressure bearings
Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Compressors	5412	High pressure blades/buckets
Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Compressors	5413	Other high pressure problems
Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Compressors	5414	Compressor diaphragms/vanes
Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Compressors	5420	Low pressure shaft
Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Compressors	5421	Low pressure bearings
Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Compressors	5422	Low pressure blades/buckets
Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Compressors	5429	Other low pressure problems
Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Compressors	5430	Supercharging fans
Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Compressors	5435	Compressor washing
Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Compressors	5436	Compressor shaft and bearings for two-shaft machines
Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Compressors	5439	Other compressor problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP compressor if only one.					

TABLE B06-69 Jet Engine: Inlet Air System and Compressors - Ducts and Filters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5400	Inlet air ducts
Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5401	Inlet air vanes/nozzles
Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5402	Inlet air filters
Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5403	Inlet and exhaust cones
Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5404	Inlet air chillers

Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5405	Inlet air evaporative coolers
Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5406	Inlet air foggers
Combined Cycle Block	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5409	Other inlet air problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP compressor if only one.					

TABLE B06-70 Jet Engine: Miscellaneous (Jet Engine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5600	Reduction gear
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5601	Load shaft and bearings
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5605	Main coupling between the turbine and generator
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5606	Clutch
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5610	Intercoolers
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5620	Regenerators
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5630	Heat shields
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5640	Fire detection and extinguishing system
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5641	Fire in unit
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5645	Jet Engine Control System - data highway
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5646	Jet Engine Control System - hardware problems (including card failure)
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5647	Jet Engine Control System - internal and termination wiring
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5648	Jet Engine Control System - logic problems
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5649	Jet Engine Control System - upgrades

Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5650	Other controls and instrumentation problems
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5660	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5661	Engine/compressor washing
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5662	Engine exchange
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5665	Engine shafts and bearings
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5670	Hot end inspection
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5672	Boroscope inspection
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5674	General unit inspection
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5680	Vibration (not engine) in unit not attributable to bearings or other components
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5685	Engine vibration
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5686	Jet engine lockout
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5690	Engine performance testing - individual engines (use code 9999 for total unit performance testing)
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5692	Turbine Overspeed Trip Test - Jet Engine
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5695	Synchronous condenser equipment
Combined Cycle Block	Jet Engine	Miscellaneous (Jet Engine)		5699	Other miscellaneous jet engine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-71 Jet Engine: Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Jet Engine	Turbine		5480	High pressure shaft

Combined Cycle Block	Jet Engine	Turbine		5481	High pressure bearings
Combined Cycle Block	Jet Engine	Turbine		5482	High pressure blades/buckets
Combined Cycle Block	Jet Engine	Turbine		5483	High pressure nozzles/vanes
Combined Cycle Block	Jet Engine	Turbine		5484	High pressure casing/expansion joint
Combined Cycle Block	Jet Engine	Turbine		5485	Interstage gas passages
Combined Cycle Block	Jet Engine	Turbine		5486	High pressure shaft seals
Combined Cycle Block	Jet Engine	Turbine		5487	Thrust bearing
Combined Cycle Block	Jet Engine	Turbine		5489	Other high pressure problems
Combined Cycle Block	Jet Engine	Turbine		5490	Low pressure shaft
Combined Cycle Block	Jet Engine	Turbine		5491	Low pressure bearings
Combined Cycle Block	Jet Engine	Turbine		5492	Low pressure blades/buckets
Combined Cycle Block	Jet Engine	Turbine		5493	Low pressure nozzles/vanes
Combined Cycle Block	Jet Engine	Turbine		5494	Low pressure casing/expansion joints
Combined Cycle Block	Jet Engine	Turbine		5497	Other low pressure problems
Combined Cycle Block	Jet Engine	Turbine		5498	Expansion joints
Combined Cycle Block	Jet Engine	Turbine		5499	Shaft seals
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use HP if only one.					

MISCELLANEOUS

TABLE B06-72 Miscellaneous: Instruments and Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Miscellaneous	Instruments and Controls		6200	Combined cycle instruments and controls. (Report instruments and controls specific to the gas turbine, steam turbine, boiler, generator, or balance of plant using the codes for the appropriate piece of equipment.)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

PERFORMANCE

TABLE B06-73 Performance: Performance

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Performance	Performance		9997	NERC Reliability Standard Requirement
Combined Cycle Block	Performance	Performance		9998	Black start testing
Combined Cycle Block	Performance	Performance		9999	Total unit performance testing (use appropriate codes for individual component testing)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

PERSONNEL OR PROCEDURAL ERRORS

TABLE B06-74 Personnel or Procedural Errors: Personnel or Procedural Errors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Personnel or Procedural Errors	Personnel or Procedural Errors		9900	Operator error
Combined Cycle Block	Personnel or Procedural Errors	Personnel or Procedural Errors		9910	Maintenance personnel error
Combined Cycle Block	Personnel or Procedural Errors	Personnel or Procedural Errors		9920	Contractor error
Combined Cycle Block	Personnel or Procedural Errors	Personnel or Procedural Errors		9930	Operating procedure error
Combined Cycle Block	Personnel or Procedural Errors	Personnel or Procedural Errors		9940	Maintenance procedure error

Combined Cycle Block	Personnel or Procedural Errors	Personnel or Procedural Errors		9950	Contractor procedure error
Combined Cycle Block	Personnel or Procedural Errors	Personnel or Procedural Errors		9960	Staff shortage
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

POLLUTION CONTROL EQUIPMENT

TABLE B06-75 Pollution Control Equipment: CO Reduction

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Pollution Control Equipment	CO Reduction		8840	CO Active catalyst
Combined Cycle Block	Pollution Control Equipment	CO Reduction		8841	CO Support materials
Combined Cycle Block	Pollution Control Equipment	CO Reduction		8842	CO Plugging
Combined Cycle Block	Pollution Control Equipment	CO Reduction		8845	Other CO reduction problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-76 Pollution Control Equipment: Continuous Emissions Monitoring Systems (CEMS)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8700	CEMS Certification and Recertification
Combined Cycle Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8710	SO2 analyzer problems
Combined Cycle Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8720	NOx analyzer problems
Combined Cycle Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8730	CO analyzer problems
Combined Cycle Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8740	CO2 analyzer problems
Combined Cycle Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8750	O2 analyzer problems
Combined Cycle Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8760	Opacity monitor problems

Combined Cycle Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8770	Flow monitor problems
Combined Cycle Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8780	Data acquisition system problems
Combined Cycle Block	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8790	Miscellaneous CEMS problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-77 Pollution Control Equipment: NOx Reduction Systems - Catalytic Air Heaters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8830	CAH NOx Active catalyst
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8831	CAH NOx Support materials
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8832	CAH NOx Plugging
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8835	Other CAH problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-78 Pollution Control Equipment: NOx Reduction Systems - Selective Catalytic Reduction Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8810	SCR NOx Reactor
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8811	SCR NOx Reagent
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8812	SCR NOx Catalyst
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8813	SCR NOx Injection grid piping/valves
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8814	SCR NOx Catalyst support material
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8815	SCR NOx Soot blowers
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8816	SCR NOx Plugging

Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8817	SCR NOx Control system
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8820	SCR NOx Ammonia injection grid piping/valves
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8821	SCR NOx Ammonia tanks, piping and valves (not injection)
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8822	SCR NOx Ammonia air blowers
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8823	SCR NOx Other ammonia system problems
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8825	Other SCR NOx problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-79 Pollution Control Equipment: NOx Reduction Systems - Selective Non-Catalytic Reduction Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8800	SNCR NOx Reagent
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8801	SNCR NOx Carrier gas
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8802	SNCR NOx Control system
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8803	SNCR Performance Testing
Combined Cycle Block	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8809	Other SNCR NOx problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Use code 0360 for Low NOx Burners.					

REGULATORY, SAFETY, ENVIRONMENTAL

Use these codes only for events not directly attributable to equipment failures. Inspections or testing of certain equipment due to regulation are reported using the appropriate equipment cause codes, and the fact that it was a regulatory requirement noted in the verbal description section.

TABLE B06-80 Regulatory, Safety, Environmental: Other Operating Environmental Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Combined Cycle Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9660	Thermal discharge limits - fossil and nuclear
Combined Cycle Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9663	Thermal discharge limits - gas turbines
Combined Cycle Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9664	Thermal discharge limits - jet engines
Combined Cycle Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9670	Noise limits (not for personnel safety) - fossil and nuclear
Combined Cycle Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9673	Noise limits (not for personnel safety) - gas turbines
Combined Cycle Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9674	Noise limits (not for personnel safety) - jet engines
Combined Cycle Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9677	Noise limits testing - fossil
Combined Cycle Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9678	Noise limits testing - gas turbines
Combined Cycle Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9679	Noise limits testing - jet engines
Combined Cycle Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9680	Fish kill - fossil and nuclear
Combined Cycle Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9683	Fish kill - gas turbines
Combined Cycle Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9684	Fish kill - jet engines
Combined Cycle Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9690	Other miscellaneous operational environmental limits - fossil and nuclear
Combined Cycle Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9693	Other miscellaneous operational environmental limits - gas turbines
Combined Cycle Block	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9694	Other miscellaneous operational environmental limits - jet engines
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-81 Regulatory, Safety, Environmental: Regulatory

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Combined Cycle Block	Regulatory, Safety, Environmental	Regulatory		9504	Regulatory (environmental) proceedings and hearings - regulatory agency initiated
Combined Cycle Block	Regulatory, Safety, Environmental	Regulatory		9506	Regulatory (environmental) proceedings and hearings - intervenor initiated
Combined Cycle Block	Regulatory, Safety, Environmental	Regulatory		9510	Plant modifications strictly for compliance with new or changed regulatory requirements (scrubbers, cooling towers, etc.)
Combined Cycle Block	Regulatory, Safety, Environmental	Regulatory		9520	Oil spill in Gulf of Mexico (OMC)
Combined Cycle Block	Regulatory, Safety, Environmental	Regulatory		9590	Miscellaneous regulatory (this code is primarily intended for use with event contribution code 2 to indicate that a regulatory-related factor contributed to the primary cause of the event)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-82 Regulatory, Safety, Environmental: Safety

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Regulatory, Safety, Environmental	Safety		9700	OSHA-related retrofit or inspection
Combined Cycle Block	Regulatory, Safety, Environmental	Safety		9720	Other safety problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-83 Regulatory, Safety, Environmental: Stack Emission

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Regulatory, Safety, Environmental	Stack Emission		9600	SO2 stack emissions - fossil
Combined Cycle Block	Regulatory, Safety, Environmental	Stack Emission		9603	SO2 stack emissions - gas turbines
Combined Cycle Block	Regulatory, Safety, Environmental	Stack Emission		9604	SO2 stack emissions - jet engines

Combined Cycle Block	Regulatory, Safety, Environmental	Stack Emission		9610	NOx stack emissions - fossil
Combined Cycle Block	Regulatory, Safety, Environmental	Stack Emission		9613	NOx stack emissions - gas turbines
Combined Cycle Block	Regulatory, Safety, Environmental	Stack Emission		9614	NOx stack emissions - jet engines
Combined Cycle Block	Regulatory, Safety, Environmental	Stack Emission		9616	CO stack emissions - fossil
Combined Cycle Block	Regulatory, Safety, Environmental	Stack Emission		9620	Particulate stack emissions - fossil
Combined Cycle Block	Regulatory, Safety, Environmental	Stack Emission		9623	Particulate stack emissions - gas turbines
Combined Cycle Block	Regulatory, Safety, Environmental	Stack Emission		9624	Particulate stack emissions - jet engines
Combined Cycle Block	Regulatory, Safety, Environmental	Stack Emission		9630	Opacity - fossil
Combined Cycle Block	Regulatory, Safety, Environmental	Stack Emission		9633	Opacity - gas turbines
Combined Cycle Block	Regulatory, Safety, Environmental	Stack Emission		9634	Opacity - jet engines
Combined Cycle Block	Regulatory, Safety, Environmental	Stack Emission		9650	Other stack/exhaust emissions - fossil (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
Combined Cycle Block	Regulatory, Safety, Environmental	Stack Emission		9653	Other stack or exhaust emissions - gas turbines (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
Combined Cycle Block	Regulatory, Safety, Environmental	Stack Emission		9654	Other stack or exhaust emissions - jet engines (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
Combined Cycle Block	Regulatory, Safety, Environmental	Stack Emission		9656	Other stack or exhaust emissions testing - fossil

Combined Cycle Block	Regulatory, Safety, Environmental	Stack Emission		9657	Other stack or exhaust emissions testing - gas turbines
Combined Cycle Block	Regulatory, Safety, Environmental	Stack Emission		9658	Other stack or exhaust emissions testing - jet engines
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Include exhaust emissions.					

STEAM TURBINE

Besides the turbine, this set includes the steam stop/control valves, turbine control system, and the turbine auxiliaries. The extraction steam codes are contained in the Balance of Plant set.

TABLE B06-84 Steam Turbine: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Steam Turbine	Controls		4290	Hydraulic system pumps
Combined Cycle Block	Steam Turbine	Controls		4291	Hydraulic system coolers
Combined Cycle Block	Steam Turbine	Controls		4292	Hydraulic system filters
Combined Cycle Block	Steam Turbine	Controls		4293	Hydraulic system pipes and valves
Combined Cycle Block	Steam Turbine	Controls		4299	Other hydraulic system problems
Combined Cycle Block	Steam Turbine	Controls		4300	Turbine supervisory system (use codes 4290 to 4299 for hydraulic oil)
Combined Cycle Block	Steam Turbine	Controls		4301	Turbine governing system
Combined Cycle Block	Steam Turbine	Controls		4302	Turbine trip devices (including instruments)
Combined Cycle Block	Steam Turbine	Controls		4303	Exhaust hood and spray controls
Combined Cycle Block	Steam Turbine	Controls		4304	Automatic turbine control systems - mechanical
Combined Cycle Block	Steam Turbine	Controls		4305	Automatic turbine control systems - mechanical - hydraulic
Combined Cycle Block	Steam Turbine	Controls		4306	Automatic turbine control systems - electro-hydraulic - analog
Combined Cycle Block	Steam Turbine	Controls		4307	Automatic turbine control systems - electro-hydraulic - digital

Combined Cycle Block	Steam Turbine	Controls		4308	Automatic turbine control systems - digital control and monitoring
Combined Cycle Block	Steam Turbine	Controls		4309	Other turbine instrument and control problems
Combined Cycle Block	Steam Turbine	Controls		4310	Steam Turbine Control System - data highway
Combined Cycle Block	Steam Turbine	Controls		4311	Steam Turbine Control System - hardware problems (including card failure)
Combined Cycle Block	Steam Turbine	Controls		4312	Steam Turbine Control System - internal and termination wiring
Combined Cycle Block	Steam Turbine	Controls		4313	Steam Turbine Control System - logic problems
Combined Cycle Block	Steam Turbine	Controls		4314	Steam Turbine Control System - upgrades
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-85 Steam Turbine: High Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Steam Turbine	High Pressure Turbine		4000	Outer casing
Combined Cycle Block	Steam Turbine	High Pressure Turbine		4001	Inner casing
Combined Cycle Block	Steam Turbine	High Pressure Turbine		4009	Nozzle bolting
Combined Cycle Block	Steam Turbine	High Pressure Turbine		4010	Nozzles and nozzle blocks
Combined Cycle Block	Steam Turbine	High Pressure Turbine		4011	Diaphragms
Combined Cycle Block	Steam Turbine	High Pressure Turbine		4012	Buckets or blades
Combined Cycle Block	Steam Turbine	High Pressure Turbine		4013	Diaphragms unit and shroud type
Combined Cycle Block	Steam Turbine	High Pressure Turbine		4014	Bucket or blade fouling
Combined Cycle Block	Steam Turbine	High Pressure Turbine		4015	Wheels or spindles

Combined Cycle Block	Steam Turbine	High Pressure Turbine		4020	Shaft seals
Combined Cycle Block	Steam Turbine	High Pressure Turbine		4021	Dummy rings
Combined Cycle Block	Steam Turbine	High Pressure Turbine		4022	Gland rings
Combined Cycle Block	Steam Turbine	High Pressure Turbine		4030	Rotor shaft
Combined Cycle Block	Steam Turbine	High Pressure Turbine		4040	Bearings
Combined Cycle Block	Steam Turbine	High Pressure Turbine		4041	Thrust bearings
Combined Cycle Block	Steam Turbine	High Pressure Turbine		4099	Other high pressure turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-86 Steam Turbine: Intermediate Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Steam Turbine	Intermediate Pressure Turbine		4100	Outer casing
Combined Cycle Block	Steam Turbine	Intermediate Pressure Turbine		4101	Inner casing
Combined Cycle Block	Steam Turbine	Intermediate Pressure Turbine		4109	Nozzle bolting
Combined Cycle Block	Steam Turbine	Intermediate Pressure Turbine		4110	Nozzles and nozzle blocks
Combined Cycle Block	Steam Turbine	Intermediate Pressure Turbine		4111	Diaphragms
Combined Cycle Block	Steam Turbine	Intermediate Pressure Turbine		4112	Buckets or blades
Combined Cycle Block	Steam Turbine	Intermediate Pressure Turbine		4113	Bucket or blade fouling
Combined Cycle Block	Steam Turbine	Intermediate Pressure Turbine		4115	Wheels or spindles
Combined Cycle Block	Steam Turbine	Intermediate Pressure Turbine		4120	Shaft seals
Combined Cycle Block	Steam Turbine	Intermediate Pressure Turbine		4121	Dummy rings

Combined Cycle Block	Steam Turbine	Intermediate Pressure Turbine		4122	Gland rings
Combined Cycle Block	Steam Turbine	Intermediate Pressure Turbine		4130	Rotor shaft
Combined Cycle Block	Steam Turbine	Intermediate Pressure Turbine		4140	Bearings
Combined Cycle Block	Steam Turbine	Intermediate Pressure Turbine		4141	Thrust bearings
Combined Cycle Block	Steam Turbine	Intermediate Pressure Turbine		4199	Other intermediate pressure turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-87 Steam Turbine: Low Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Steam Turbine	Low Pressure Turbine		4200	Outer casing
Combined Cycle Block	Steam Turbine	Low Pressure Turbine		4201	Inner casing
Combined Cycle Block	Steam Turbine	Low Pressure Turbine		4209	Nozzle bolting
Combined Cycle Block	Steam Turbine	Low Pressure Turbine		4210	Nozzles and nozzle blocks
Combined Cycle Block	Steam Turbine	Low Pressure Turbine		4211	Diaphragms
Combined Cycle Block	Steam Turbine	Low Pressure Turbine		4212	Buckets or blades
Combined Cycle Block	Steam Turbine	Low Pressure Turbine		4213	Bucket or blade fouling
Combined Cycle Block	Steam Turbine	Low Pressure Turbine		4215	Wheels or spindles
Combined Cycle Block	Steam Turbine	Low Pressure Turbine		4220	Shaft seals
Combined Cycle Block	Steam Turbine	Low Pressure Turbine		4221	Dummy rings
Combined Cycle Block	Steam Turbine	Low Pressure Turbine		4222	Gland rings
Combined Cycle Block	Steam Turbine	Low Pressure Turbine		4230	Rotor shaft

Combined Cycle Block	Steam Turbine	Low Pressure Turbine		4240	Bearings
Combined Cycle Block	Steam Turbine	Low Pressure Turbine		4241	Thrust bearings
Combined Cycle Block	Steam Turbine	Low Pressure Turbine		4250	Other low pressure turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-88 Steam Turbine: Lube Oil

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Steam Turbine	Lube Oil		4280	Lube oil pumps
Combined Cycle Block	Steam Turbine	Lube Oil		4281	Lube oil coolers
Combined Cycle Block	Steam Turbine	Lube Oil		4282	Lube oil conditioners
Combined Cycle Block	Steam Turbine	Lube Oil		4283	Lube oil system valves and piping
Combined Cycle Block	Steam Turbine	Lube Oil		4284	Lube oil pump drive
Combined Cycle Block	Steam Turbine	Lube Oil		4289	Other lube oil system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899. 2) Do not include bearing failures due to lube oil.					

TABLE B06-89 Steam Turbine: Miscellaneous (Steam Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Steam Turbine	Miscellaneous (Steam Turbine)		4400	Major turbine overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Combined Cycle Block	Steam Turbine	Miscellaneous (Steam Turbine)		4401	Inspection
Combined Cycle Block	Steam Turbine	Miscellaneous (Steam Turbine)		4402	Minor turbine overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Combined Cycle Block	Steam Turbine	Miscellaneous (Steam Turbine)		4410	Turning gear and motor

Combined Cycle Block	Steam Turbine	Miscellaneous (Steam Turbine)		4411	Steam turbine gear box (single shaft configuration)
Combined Cycle Block	Steam Turbine	Miscellaneous (Steam Turbine)		4412	Steam turbine clutch (single shaft configuration)
Combined Cycle Block	Steam Turbine	Miscellaneous (Steam Turbine)		4415	Shaft coupling mechanism
Combined Cycle Block	Steam Turbine	Miscellaneous (Steam Turbine)		4420	Vibration of the turbine generator unit that cannot be attributed to a specific cause such as bearings or blades (use this code for balance moves)
Combined Cycle Block	Steam Turbine	Miscellaneous (Steam Turbine)		4430	Gland seal system
Combined Cycle Block	Steam Turbine	Miscellaneous (Steam Turbine)		4450	Water induction
Combined Cycle Block	Steam Turbine	Miscellaneous (Steam Turbine)		4460	Turbine overspeed trip test
Combined Cycle Block	Steam Turbine	Miscellaneous (Steam Turbine)		4470	Differential expansion
Combined Cycle Block	Steam Turbine	Miscellaneous (Steam Turbine)		4490	Turbine performance testing (use code 9999 for total unit performance testing)
Combined Cycle Block	Steam Turbine	Miscellaneous (Steam Turbine)		4499	Other miscellaneous steam turbine problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-90 Steam Turbine: Piping

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Steam Turbine	Piping		4270	Crossover or under piping
Combined Cycle Block	Steam Turbine	Piping		4279	Miscellaneous turbine piping
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B06-91 Steam Turbine: Valves

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Combined Cycle Block	Steam Turbine	Valves		4260	Main stop valves

Combined Cycle Block	Steam Turbine	Valves		4261	Control valves
Combined Cycle Block	Steam Turbine	Valves		4262	Intercept valves
Combined Cycle Block	Steam Turbine	Valves		4263	Reheat stop valves
Combined Cycle Block	Steam Turbine	Valves		4264	Combined intercept valves
Combined Cycle Block	Steam Turbine	Valves		4265	Miscellaneous drain and vent valves
Combined Cycle Block	Steam Turbine	Valves		4266	Main stop valve testing
Combined Cycle Block	Steam Turbine	Valves		4267	Control valve testing
Combined Cycle Block	Steam Turbine	Valves		4268	Reheat/intercept valve testing
Combined Cycle Block	Steam Turbine	Valves		4269	Other turbine valves (including LP steam admission valves)
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

Appendix B07: Index To Fluidized Bed Combustion Unit Cause Codes

FLUIDIZED BED COMBUSTION UNITS

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B07-1	Balance of Plant	Auxiliary Systems	Auxiliary Steam
B07-2	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems
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B07-37	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners
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B07-40	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts
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B07-76	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)
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BALANCE OF PLANT

TABLE B07-1 Balance of Plant: Auxiliary Systems - Auxiliary Steam					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3830	Auxiliary boiler
Fluidized Bed	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3831	Auxiliary steam piping
Fluidized Bed	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3832	Auxiliary steam valves
Fluidized Bed	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3833	Auxiliary steam controls and instruments
Fluidized Bed	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3834	Auxiliary boiler tube leaks
Fluidized Bed	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3835	Auxiliary boiler burner management system
Fluidized Bed	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3836	Steam transfer to other unit
Fluidized Bed	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3839	Other auxiliary steam problems (also see extraction steam codes 3520 to 3529; startup bypass codes 0630 to 0660; and soot blower steam code 0870)
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-2 Balance of Plant: Auxiliary Systems - Closed Cooling Water Systems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3820	Closed cooling water pumps and motors
Fluidized Bed	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3821	Closed cooling water piping
Fluidized Bed	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3822	Closed cooling water valves
Fluidized Bed	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3823	Closed cooling water heat exchangers
Fluidized Bed	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3824	Closed cooling water system fouling
Fluidized Bed	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3825	Closed cooling water instrumentation
Fluidized Bed	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3826	Closed cooling water strainer
Fluidized Bed	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3829	Other closed cooling water system problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-3 Balance of Plant: Auxiliary Systems - Fire Protection System					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Balance of Plant	Auxiliary Systems	Fire Protection System	3860	Fire protection system pumps

Fluidized Bed	Balance of Plant	Auxiliary Systems	Fire Protection System	3861	Fire protection system piping
Fluidized Bed	Balance of Plant	Auxiliary Systems	Fire Protection System	3862	Fire protection system valves
Fluidized Bed	Balance of Plant	Auxiliary Systems	Fire Protection System	3863	Fire protection system fouling
Fluidized Bed	Balance of Plant	Auxiliary Systems	Fire Protection System	3864	Fire protection system instrumentation and controls
Fluidized Bed	Balance of Plant	Auxiliary Systems	Fire Protection System	3869	Other fire protection system problems
Notes: 1) For use with Gas Turbine Codes 300-399 or 700-799, Steam Turbine Codes 100-199, and Block Identifier Codes 800-899.					

TABLE B07-4 Balance of Plant: Auxiliary Systems - Instrument Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Balance of Plant	Auxiliary Systems	Instrument Air	3850	Instrument air compressors
Fluidized Bed	Balance of Plant	Auxiliary Systems	Instrument Air	3851	Instrument air piping
Fluidized Bed	Balance of Plant	Auxiliary Systems	Instrument Air	3852	Instrument air valves
Fluidized Bed	Balance of Plant	Auxiliary Systems	Instrument Air	3853	Instrument air dryers
Fluidized Bed	Balance of Plant	Auxiliary Systems	Instrument Air	3854	N2 backup to instrument air
Fluidized Bed	Balance of Plant	Auxiliary Systems	Instrument Air	3859	Other instrument air problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-5 Balance of Plant: Auxiliary Systems - Low-pressure Gas Compression System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3870	Fuel Gas Compressor and Motors
Fluidized Bed	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3871	Fuel Gas Compressor Piping
Fluidized Bed	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3872	Fuel Gas Compressor Valves
Fluidized Bed	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3873	Fuel Gas Compressor Heat Exchangers
Fluidized Bed	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3874	Fuel Gas Compressor Controls and Instrumentation
Fluidized Bed	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3875	Fuel Gas Compressor Filters
Fluidized Bed	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3876	Fuel Gas Compressor Fire System
Fluidized Bed	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3879	Fuel Gas Compressor - other
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-6 Balance of Plant: Auxiliary Systems - Miscellaneous (Auxiliary Systems)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3898	Miscellaneous plant auxiliary process and services instrumentation and controls
Fluidized Bed	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3899	Other miscellaneous auxiliary system problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-7 Balance of Plant: Auxiliary Systems - Open Cooling Water System					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3800	Open cooling water pumps and motors
Fluidized Bed	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3801	Open cooling water piping
Fluidized Bed	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3802	Open cooling water valves
Fluidized Bed	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3803	Open cooling water heat exchangers
Fluidized Bed	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3804	Open cooling water system fouling
Fluidized Bed	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3805	Open cooling water system instrumentation
Fluidized Bed	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3806	Open cooling water strainer
Fluidized Bed	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3809	Other open cooling water problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-8 Balance of Plant: Auxiliary Systems - Seal Air Fans					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Balance of Plant	Auxiliary Systems	Seal Air Fans	3880	Seal air fan
Fluidized Bed	Balance of Plant	Auxiliary Systems	Seal Air Fans	3881	Seal air fan drive - motor
Fluidized Bed	Balance of Plant	Auxiliary Systems	Seal Air Fans	3882	Seal air control dampers and drives
Fluidized Bed	Balance of Plant	Auxiliary Systems	Seal Air Fans	3883	Seal air filters
Fluidized Bed	Balance of Plant	Auxiliary Systems	Seal Air Fans	3889	Other seal air fan problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-9 Balance of Plant: Auxiliary Systems - Service Air					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**

Fluidized Bed	Balance of Plant	Auxiliary Systems	Service Air	3840	Service air compressors
Fluidized Bed	Balance of Plant	Auxiliary Systems	Service Air	3841	Service air piping
Fluidized Bed	Balance of Plant	Auxiliary Systems	Service Air	3842	Service air valves
Fluidized Bed	Balance of Plant	Auxiliary Systems	Service Air	3843	Service air dryers
Fluidized Bed	Balance of Plant	Auxiliary Systems	Service Air	3844	Soot blowing air compressor and system
Fluidized Bed	Balance of Plant	Auxiliary Systems	Service Air	3849	Other service air problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-10 Balance of Plant: Auxiliary Systems - Service Water (Open System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3810	Service water pumps and motors
Fluidized Bed	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3811	Service water piping
Fluidized Bed	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3812	Service water valves
Fluidized Bed	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3813	Service water heat exchangers
Fluidized Bed	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3814	Service water system fouling
Fluidized Bed	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3815	Service water strainer
Fluidized Bed	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3819	Other service water problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-11 Balance of Plant: Circulating Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Balance of Plant	Circulating Water Systems		3210	Circulating water pumps
Fluidized Bed	Balance of Plant	Circulating Water Systems		3211	Circulating water pump motors
Fluidized Bed	Balance of Plant	Circulating Water Systems		3220	Circulating water piping
Fluidized Bed	Balance of Plant	Circulating Water Systems		3221	Circulating water piping fouling
Fluidized Bed	Balance of Plant	Circulating Water Systems		3230	Circulating water valves
Fluidized Bed	Balance of Plant	Circulating Water Systems		3231	Waterbox
Fluidized Bed	Balance of Plant	Circulating Water Systems		3232	Condenser tube cleaning system including debris filter
Fluidized Bed	Balance of Plant	Circulating Water Systems		3233	Circulating water priming system
Fluidized Bed	Balance of Plant	Circulating Water Systems		3235	Cooling tower booster pump
Fluidized Bed	Balance of Plant	Circulating Water Systems		3236	Cooling tower booster motor
Fluidized Bed	Balance of Plant	Circulating Water Systems		3238	Cooling tower fan motors
Fluidized Bed	Balance of Plant	Circulating Water Systems		3239	Cooling tower fan motors - variable speed
Fluidized Bed	Balance of Plant	Circulating Water Systems		3240	Cooling tower fans

Fluidized Bed	Balance of Plant	Circulating Water Systems		3241	Cooling tower efficiency below design
Fluidized Bed	Balance of Plant	Circulating Water Systems		3242	Cooling tower fill damage
Fluidized Bed	Balance of Plant	Circulating Water Systems		3243	Cooling tower icing
Fluidized Bed	Balance of Plant	Circulating Water Systems		3244	Cooling tower fires
Fluidized Bed	Balance of Plant	Circulating Water Systems		3245	Other cooling tower problems
Fluidized Bed	Balance of Plant	Circulating Water Systems		3246	Cooling tower fouling
Fluidized Bed	Balance of Plant	Circulating Water Systems		3247	Cooling tower instrumentation
Fluidized Bed	Balance of Plant	Circulating Water Systems		3248	Cooling Tower Overhaul
Fluidized Bed	Balance of Plant	Circulating Water Systems		3250	Circulating water system instruments and controls
Fluidized Bed	Balance of Plant	Circulating Water Systems		3260	Traveling screens
Fluidized Bed	Balance of Plant	Circulating Water Systems		3261	Traveling screen fouling
Fluidized Bed	Balance of Plant	Circulating Water Systems		3269	Circulating water biological conditions (ie, zebra mussels)
Fluidized Bed	Balance of Plant	Circulating Water Systems		3270	Intake system problems other than traveling screens
Fluidized Bed	Balance of Plant	Circulating Water Systems		3271	Intake grating fouling
Fluidized Bed	Balance of Plant	Circulating Water Systems		3272	Circulating water screenwash system
Fluidized Bed	Balance of Plant	Circulating Water Systems		3273	Debris in circulating water from outside sources (leaves, mud, etc.)
Fluidized Bed	Balance of Plant	Circulating Water Systems		3274	Ice blockages at intake structures including frazil ice, sheets, blocks of ice, etc.
Fluidized Bed	Balance of Plant	Circulating Water Systems		3280	High circulating water temperature (not due to season, tower efficiency below design, or other listed equipment problem)
Fluidized Bed	Balance of Plant	Circulating Water Systems		3281	Circulating water tempering system
Fluidized Bed	Balance of Plant	Circulating Water Systems		3282	Circulating water cooling ponds
Fluidized Bed	Balance of Plant	Circulating Water Systems		3285	Circulating water chemistry
Fluidized Bed	Balance of Plant	Circulating Water Systems		3299	Other circulating water system problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-12 Balance of Plant: Condensate System - Low/Intermediate Pressure Heater and Deaerators					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**

Fluidized Bed	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3339	LP heater head leaks
Fluidized Bed	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3340	LP heater tube leaks
Fluidized Bed	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3341	Other LP heater - general
Fluidized Bed	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3342	IP heater tube leaks
Fluidized Bed	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3343	Other IP heater - general
Fluidized Bed	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3344	Deaerator (including level control)
Fluidized Bed	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3345	IP heater head leaks
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-13 Balance of Plant: Condensate System - Miscellaneous (Condensate System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3360	Condensate makeup and return (including storage tanks)
Fluidized Bed	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3370	Condensate system controls and instrumentation (not hotwell level, heater level, or deaerator level controls; see codes 3150-3159, 3344, 3502).
Fluidized Bed	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3380	Condensate coolers
Fluidized Bed	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3399	Other miscellaneous condensate system problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-14 Balance of Plant: Condensate System - Polishers/Chemical Addition

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Balance of Plant	Condensate System	Polishers/Chemical Addition	3350	Condensate polishing and filtering systems
Fluidized Bed	Balance of Plant	Condensate System	Polishers/Chemical Addition	3351	Chemical addition systems

Fluidized Bed	Balance of Plant	Condensate System	Polishers/Chemical Addition	3352	Feedwater chemistry (not specific to condenser, polishers, or chemical addition)
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-15 Balance of Plant: Condensate System - Pumps, Piping, and Valves

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3300	Condensate water pre-treatment
Fluidized Bed	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3310	Condensate/hotwell pumps
Fluidized Bed	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3311	Condensate/hotwell pump motor
Fluidized Bed	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3312	Condensate booster pump
Fluidized Bed	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3313	Condensate booster pump motor
Fluidized Bed	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3314	Condensate booster pump motor - variable speed
Fluidized Bed	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3315	Condensate booster pump drive (other than 3313 and 3314)
Fluidized Bed	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3320	Condensate piping
Fluidized Bed	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3330	Condensate valves
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-16 Balance of Plant: Condensing System - Condenser Casing or Shell and Internals

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3120	Tube sheets
Fluidized Bed	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3121	Expansion joint
Fluidized Bed	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3122	Gaskets and seals
Fluidized Bed	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3123	Hot well
Fluidized Bed	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3124	Tube sheet fouling
Fluidized Bed	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3129	Other condenser casing or shell and internal problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-17 Balance of Plant: Condensing System - Condenser Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Balance of Plant	Condensing System	Condenser Controls	3150	Hot well level controls
Fluidized Bed	Balance of Plant	Condensing System	Condenser Controls	3151	Vacuum pump and air ejector controls
Fluidized Bed	Balance of Plant	Condensing System	Condenser Controls	3152	Air-cooled condenser controls
Fluidized Bed	Balance of Plant	Condensing System	Condenser Controls	3159	Other condensing system controls and instruments
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-18 Balance of Plant: Condensing System - Condenser Tubes and Support Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3110	Condenser tube leaks
Fluidized Bed	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3111	Condenser tube fouling shell side
Fluidized Bed	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3112	Condenser tube fouling tube side
Fluidized Bed	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3113	Condenser tube and water box cleaning (including circulating water flow reversal)
Fluidized Bed	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3114	Air-cooled condenser tubes
Fluidized Bed	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3115	Air-cooled condenser pumps
Fluidized Bed	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3116	Air-cooled condenser fans
Fluidized Bed	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3117	Air-cooled condenser fan motors
Fluidized Bed	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3118	Other Air-cooled condenser problems
Fluidized Bed	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3119	Other condenser tube casing or shell and internal problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-19 Balance of Plant: Condensing System - Miscellaneous (Condensing System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Fluidized Bed	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3170	Condenser inspection (use code 3110 to report looking for tube leaks)
Fluidized Bed	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3171	Air-cooled condenser inspections
Fluidized Bed	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3180	Major condenser overhaul
Fluidized Bed	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3185	Water side cathodic protection
Fluidized Bed	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3186	Auxiliary condenser and associated equipment
Fluidized Bed	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3190	Air leakage (for losses not attributable to previously noted equipment related codes)
Fluidized Bed	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3199	Other miscellaneous condensing system problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-20 Balance of Plant: Condensing System - Vacuum Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Balance of Plant	Condensing System	Vacuum Equipment	3130	Air ejectors
Fluidized Bed	Balance of Plant	Condensing System	Vacuum Equipment	3131	Air ejector piping and valves
Fluidized Bed	Balance of Plant	Condensing System	Vacuum Equipment	3132	Inter and after condensers
Fluidized Bed	Balance of Plant	Condensing System	Vacuum Equipment	3133	Vacuum pumps
Fluidized Bed	Balance of Plant	Condensing System	Vacuum Equipment	3134	Vacuum pump piping and valves
Fluidized Bed	Balance of Plant	Condensing System	Vacuum Equipment	3135	Vacuum pump motor and auxiliaries
Fluidized Bed	Balance of Plant	Condensing System	Vacuum Equipment	3139	Other air extraction system problems - general
Fluidized Bed	Balance of Plant	Condensing System	Vacuum Equipment	3149	Loss of vacuum not attributable to a particular component such as air ejectors or valves, or high back pressure not attributable to high circulating water temperature, or vacuum losses from a known cause.
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-21 Balance of Plant: Electrical

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Balance of Plant	Electrical		3600	Switchyard transformers and associated cooling systems - external (OMC)

Fluidized Bed	Balance of Plant	Electrical		3601	Switchyard transformers and associated cooling systems - external (not OMC)
Fluidized Bed	Balance of Plant	Electrical		3610	Switchyard circuit breakers - external (not OMC)
Fluidized Bed	Balance of Plant	Electrical		3611	Switchyard circuit breakers - external (OMC)
Fluidized Bed	Balance of Plant	Electrical		3612	Switchyard system protection devices - external (OMC)
Fluidized Bed	Balance of Plant	Electrical		3613	Switchyard system protection devices - external (not OMC)
Fluidized Bed	Balance of Plant	Electrical		3618	Other switchyard equipment - external (not OMC)
Fluidized Bed	Balance of Plant	Electrical		3619	Other switchyard equipment - external (OMC)
Fluidized Bed	Balance of Plant	Electrical		3620	Main transformer
Fluidized Bed	Balance of Plant	Electrical		3621	Unit auxiliaries transformer
Fluidized Bed	Balance of Plant	Electrical		3622	Station service startup transformer
Fluidized Bed	Balance of Plant	Electrical		3623	Auxiliary generators
Fluidized Bed	Balance of Plant	Electrical		3624	Auxiliary generator voltage supply system
Fluidized Bed	Balance of Plant	Electrical		3629	Other switchyard or high voltage system problems - external
Fluidized Bed	Balance of Plant	Electrical		3630	400-700 volt transformers
Fluidized Bed	Balance of Plant	Electrical		3631	400-700 volt circuit breakers
Fluidized Bed	Balance of Plant	Electrical		3632	400-700 volt conductors and buses
Fluidized Bed	Balance of Plant	Electrical		3633	400-700 volt insulators
Fluidized Bed	Balance of Plant	Electrical		3634	400-700 volt protection devices
Fluidized Bed	Balance of Plant	Electrical		3639	Other 400-700 volt problems
Fluidized Bed	Balance of Plant	Electrical		3640	AC instrument power transformers
Fluidized Bed	Balance of Plant	Electrical		3641	AC Circuit breakers
Fluidized Bed	Balance of Plant	Electrical		3642	AC Conductors and buses
Fluidized Bed	Balance of Plant	Electrical		3643	AC Inverters
Fluidized Bed	Balance of Plant	Electrical		3644	AC Protection devices
Fluidized Bed	Balance of Plant	Electrical		3649	Other AC instrument power problems
Fluidized Bed	Balance of Plant	Electrical		3650	DC instrument power battery chargers
Fluidized Bed	Balance of Plant	Electrical		3651	DC circuit breakers
Fluidized Bed	Balance of Plant	Electrical		3652	DC conductors and buses

Fluidized Bed	Balance of Plant	Electrical		3653	DC protection devices
Fluidized Bed	Balance of Plant	Electrical		3659	Other DC power problems
Fluidized Bed	Balance of Plant	Electrical		3660	4000-7000 volt transformers
Fluidized Bed	Balance of Plant	Electrical		3661	4000-7000 volt circuit breakers
Fluidized Bed	Balance of Plant	Electrical		3662	4000-7000 volt conductors and buses
Fluidized Bed	Balance of Plant	Electrical		3663	4000-7000 volt insulators
Fluidized Bed	Balance of Plant	Electrical		3664	4000-7000 volt protection devices
Fluidized Bed	Balance of Plant	Electrical		3669	Other 4000-7000 volt problems
Fluidized Bed	Balance of Plant	Electrical		3670	12-15kV transformers
Fluidized Bed	Balance of Plant	Electrical		3671	12-15kV circuit breakers
Fluidized Bed	Balance of Plant	Electrical		3672	12-15kV conductors and buses
Fluidized Bed	Balance of Plant	Electrical		3673	12-15kV insulators
Fluidized Bed	Balance of Plant	Electrical		3674	12-15kV protection devices
Fluidized Bed	Balance of Plant	Electrical		3679	Other 12-15kV problems
Fluidized Bed	Balance of Plant	Electrical		3680	Other voltage transformers
Fluidized Bed	Balance of Plant	Electrical		3681	Other voltage circuit breakers
Fluidized Bed	Balance of Plant	Electrical		3682	Other voltage conductors and buses
Fluidized Bed	Balance of Plant	Electrical		3683	Other voltage insulators
Fluidized Bed	Balance of Plant	Electrical		3684	Other voltage protection devices
Fluidized Bed	Balance of Plant	Electrical		3689	Other voltage problems
Fluidized Bed	Balance of Plant	Electrical		3690	Station Service Power Distribution System, General
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-22 Balance of Plant: Extraction Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Balance of Plant	Extraction Steam		3520	HP Extraction steam piping
Fluidized Bed	Balance of Plant	Extraction Steam		3521	HP Extraction steam valves
Fluidized Bed	Balance of Plant	Extraction Steam		3522	HP Extraction steam instruments and controls
Fluidized Bed	Balance of Plant	Extraction Steam		3529	Other HP extraction steam system problems
Fluidized Bed	Balance of Plant	Extraction Steam		3530	IP Extraction steam piping
Fluidized Bed	Balance of Plant	Extraction Steam		3531	IP Extraction steam valves
Fluidized Bed	Balance of Plant	Extraction Steam		3532	IP Extraction steam instruments and controls
Fluidized Bed	Balance of Plant	Extraction Steam		3539	Other IP extraction steam system problems

Fluidized Bed	Balance of Plant	Extraction Steam		3540	LP Extraction steam piping
Fluidized Bed	Balance of Plant	Extraction Steam		3541	LP Extraction steam valves
Fluidized Bed	Balance of Plant	Extraction Steam		3542	LP Extraction steam instruments and controls
Fluidized Bed	Balance of Plant	Extraction Steam		3549	Other LP extraction steam system problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-23 Balance of Plant: Feedwater System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Balance of Plant	Feedwater System		3401	Startup feedwater pump
Fluidized Bed	Balance of Plant	Feedwater System		3402	Startup feedwater pump drives - all types
Fluidized Bed	Balance of Plant	Feedwater System		3407	Feedwater pump suction screens
Fluidized Bed	Balance of Plant	Feedwater System		3408	Feedwater pump drive - local controls
Fluidized Bed	Balance of Plant	Feedwater System		3409	Feedwater pump drive motor - variable speed
Fluidized Bed	Balance of Plant	Feedwater System		3410	Feedwater pump
Fluidized Bed	Balance of Plant	Feedwater System		3411	Feedwater pump drive - motor
Fluidized Bed	Balance of Plant	Feedwater System		3412	Feedwater pump drive - steam turbine
Fluidized Bed	Balance of Plant	Feedwater System		3413	Feedwater pump coupling and drive shaft
Fluidized Bed	Balance of Plant	Feedwater System		3414	Feedwater pump local controls
Fluidized Bed	Balance of Plant	Feedwater System		3415	Feedwater pump/drive lube oil system
Fluidized Bed	Balance of Plant	Feedwater System		3416	Other feedwater pump problems
Fluidized Bed	Balance of Plant	Feedwater System		3417	Feedwater pump drive - main shaft
Fluidized Bed	Balance of Plant	Feedwater System		3418	Feedwater pump drive - other
Fluidized Bed	Balance of Plant	Feedwater System		3419	Feedwater pump drive - gear
Fluidized Bed	Balance of Plant	Feedwater System		3420	Feedwater piping and supports
Fluidized Bed	Balance of Plant	Feedwater System		3430	Feedwater regulating (boiler level control) valve
Fluidized Bed	Balance of Plant	Feedwater System		3431	Other feedwater valves
Fluidized Bed	Balance of Plant	Feedwater System		3439	HP heater head leaks
Fluidized Bed	Balance of Plant	Feedwater System		3440	High pressure heater tube leaks

Fluidized Bed	Balance of Plant	Feedwater System		3441	Other high pressure heater problems (see condensate system for LP and IP heater codes)
Fluidized Bed	Balance of Plant	Feedwater System		3451	Feedwater booster pump suction screens
Fluidized Bed	Balance of Plant	Feedwater System		3452	Feedwater booster pump drive - local controls
Fluidized Bed	Balance of Plant	Feedwater System		3453	Feedwater booster pump drive motor - variable speed
Fluidized Bed	Balance of Plant	Feedwater System		3454	Feedwater booster pump
Fluidized Bed	Balance of Plant	Feedwater System		3455	Feedwater booster pump drive - motor
Fluidized Bed	Balance of Plant	Feedwater System		3456	Feedwater booster pump drive - steam turbine
Fluidized Bed	Balance of Plant	Feedwater System		3457	Feedwater booster pump coupling and drive shaft
Fluidized Bed	Balance of Plant	Feedwater System		3458	Feedwater booster pump local controls
Fluidized Bed	Balance of Plant	Feedwater System		3459	Feedwater booster pump/drive lube oil system
Fluidized Bed	Balance of Plant	Feedwater System		3460	Other feedwater booster pump problems
Fluidized Bed	Balance of Plant	Feedwater System		3461	Feedwater booster pump drive - main shaft
Fluidized Bed	Balance of Plant	Feedwater System		3462	Feedwater booster pump drive - other
Fluidized Bed	Balance of Plant	Feedwater System		3463	Feedwater booster pump drive - gear
Fluidized Bed	Balance of Plant	Feedwater System		3499	Other feedwater system problems
Notes: 1) For use with Unit Codes 650-699. 2) Excluding extraction or drain systems.					

TABLE B07-24 Balance of Plant: Heater Drain Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Balance of Plant	Heater Drain Systems		3501	Heater drain pumps
Fluidized Bed	Balance of Plant	Heater Drain Systems		3502	Heater level control
Fluidized Bed	Balance of Plant	Heater Drain Systems		3503	Heater drain piping
Fluidized Bed	Balance of Plant	Heater Drain Systems		3504	Heater drain valves
Fluidized Bed	Balance of Plant	Heater Drain Systems		3505	Heater drain pump drive
Fluidized Bed	Balance of Plant	Heater Drain Systems		3509	Other heater drain system problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-25 Balance of Plant: Miscellaneous (Balance of Plant)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3950	Process computer
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3960	Thermal derating (thermal efficiency losses in balance of plant when specific cause(s) unknown)
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3970	Distributive Control System (DCS) - process computer
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3971	DCS - data highway
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3972	DCS - hardware problems (including card failure)
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3973	DCS - internal and termination wiring
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3974	DCS - logic problems
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3975	DCS - upgrades
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3979	Other DCS problems
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3980	Programmable Logic Controller (PLC)
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3981	PLC - data highway
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3982	PLC - hardware problems (including card failure)
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3983	PLC - internal and termination wiring
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3984	PLC - logic problems
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3985	PLC - upgrades
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3989	Other PLC problems
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3995	Powerhouse heating and ventilating systems
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3996	Air conditioning systems - rooms and areas
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3998	Balance of plant overhaul/outage
Fluidized Bed	Balance of Plant	Miscellaneous (Balance of Plant)		3999	Other miscellaneous balance of plant problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-26 Balance of Plant: Power Station Switchyard					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Balance of Plant	Power Station Switchyard		3700	Power Station switchyard (non generating unit equipment)

Fluidized Bed	Balance of Plant	Power Station Switchyard		3710	Transmission line (connected to powerhouse switchyard to 1st Substation)
Fluidized Bed	Balance of Plant	Power Station Switchyard		3720	Transmission equipment at the 1st substation (see code 9300 if applicable)
Fluidized Bed	Balance of Plant	Power Station Switchyard		3730	Transmission equipment beyond the 1st substation (see code 9300 if applicable)
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-27 Balance of Plant: Waste Water (zero discharge) Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Balance of Plant	Waste Water (zero discharge) Systems		3290	Waste water (zero discharge) tanks, pumps, and motors
Fluidized Bed	Balance of Plant	Waste Water (zero discharge) Systems		3291	Waste water (zero discharge) system fouling
Fluidized Bed	Balance of Plant	Waste Water (zero discharge) Systems		3292	Waste water (zero discharge) piping
Fluidized Bed	Balance of Plant	Waste Water (zero discharge) Systems		3293	Waste water (zero discharge) valves
Fluidized Bed	Balance of Plant	Waste Water (zero discharge) Systems		3294	Waste water (zero discharge) controls and instrumentation
Fluidized Bed	Balance of Plant	Waste Water (zero discharge) Systems		3295	Other waste water (zero discharge) problems
Notes: 1) For use with Unit Codes 650-699.					

BOILER

This set of codes contains the following:

- Boiler.
- Boiler internals (tubes, refractory, supports, etc.) .
- All the fuel handling, storage fuel preparation, and burning equipment.
- The forced/induced draft air system.
- Slag and ash removal except for particulate and gas cleanup. These latter items are covered under pollution control equipment.

- The main steam and reheat steam systems up to but not including the turbine stop or isolation valves.
- The feedwater system downstream of the final valve prior to entry into the economizer or boiler.
- Boiler blowdown systems.
- The startup bypass system including drains up to the heaters or condenser.
- Boiler water chemistry problems not due to problems in the condensate/feedwater system, the chemical addition system, or the demineralizer/polisher system.
- The instruments and controls associated with the above equipment.

TABLE B07-28 Boiler: Bed Material Preparation System (FBC only)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Bed Material Preparation System (FBC only)		160	Bed material tanks/hoppers
Fluidized Bed	Boiler	Bed Material Preparation System (FBC only)		162	Bed material conveyors
Fluidized Bed	Boiler	Bed Material Preparation System (FBC only)		163	Bed material feeders
Fluidized Bed	Boiler	Bed Material Preparation System (FBC only)		164	Bed material feeder motors
Fluidized Bed	Boiler	Bed Material Preparation System (FBC only)		165	Bed material crushers
Fluidized Bed	Boiler	Bed Material Preparation System (FBC only)		166	Bed material crusher motors
Fluidized Bed	Boiler	Bed Material Preparation System (FBC only)		167	Bed material screens
Fluidized Bed	Boiler	Bed Material Preparation System (FBC only)		168	Bed material blowers/fans
Fluidized Bed	Boiler	Bed Material Preparation System (FBC only)		169	Bed material blower/fan motors
Fluidized Bed	Boiler	Bed Material Preparation System (FBC only)		170	Bed material cyclone
Fluidized Bed	Boiler	Bed Material Preparation System (FBC only)		171	Bed material baghouse
Fluidized Bed	Boiler	Bed Material Preparation System (FBC only)		172	Bed material drying equipment
Fluidized Bed	Boiler	Bed Material Preparation System (FBC only)		173	Bed material pneumatic transport system including piping and valves
Fluidized Bed	Boiler	Bed Material Preparation System (FBC only)		174	Other bed material handling equipment

Notes: 1) For use with Unit Codes 650-699.

TABLE B07-29 Boiler: Bed Material Removal System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Bed Material Removal System		930	Bed material coolers
Fluidized Bed	Boiler	Bed Material Removal System		931	Bed material transport piping/valves
Fluidized Bed	Boiler	Bed Material Removal System		932	Bed material transport tanks/hoppers

Fluidized Bed	Boiler	Bed Material Removal System		933	Bed material fans/blowers
Fluidized Bed	Boiler	Bed Material Removal System		934	Bed material fan/blower motors
Fluidized Bed	Boiler	Bed Material Removal System		935	Bed material disposal conditioner
Fluidized Bed	Boiler	Bed Material Removal System		936	Bed material conveyors
Fluidized Bed	Boiler	Bed Material Removal System		937	Bed material mechanical separators and baghouse
Fluidized Bed	Boiler	Bed Material Removal System		950	Other bed material system problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-30 Boiler: Bed Solids Recirculation

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Bed Solids Recirculation		951	Char reinjection feeders
Fluidized Bed	Boiler	Bed Solids Recirculation		952	Char reinjection piping/valves
Fluidized Bed	Boiler	Bed Solids Recirculation		953	Char reinjection controls
Fluidized Bed	Boiler	Bed Solids Recirculation		959	Other char reinjection equipment problems
Fluidized Bed	Boiler	Bed Solids Recirculation		960	Char transport piping and valves
Fluidized Bed	Boiler	Bed Solids Recirculation		961	Char transfer tanks/hoppers
Fluidized Bed	Boiler	Bed Solids Recirculation		962	Char conditioner
Fluidized Bed	Boiler	Bed Solids Recirculation		969	Other char equipment problems
Fluidized Bed	Boiler	Bed Solids Recirculation		970	Flue gas-solids separator
Fluidized Bed	Boiler	Bed Solids Recirculation		971	Flue gas-solids separator piping and valves
Fluidized Bed	Boiler	Bed Solids Recirculation		972	Flue gas-solids separator controls
Fluidized Bed	Boiler	Bed Solids Recirculation		973	Flue gas-solids separator refractory
Fluidized Bed	Boiler	Bed Solids Recirculation		980	High pressure loop seal recirculation fans/blowers
Fluidized Bed	Boiler	Bed Solids Recirculation		981	High pressure loop seal recirculation fan/blower motors
Fluidized Bed	Boiler	Bed Solids Recirculation		982	High pressure loop seal recirculation fan/blower controls
Fluidized Bed	Boiler	Bed Solids Recirculation		989	Other bed solids recirculation problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-31 Boiler: Boiler Air and Gas Systems - Air Supply

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Air Supply	1400	Forced draft fans*
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Air Supply	1401	Forced draft fan dampers
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Air Supply	1407	Forced draft fan lubrication system*
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Air Supply	1410	Forced draft fan motors*
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Air Supply	1411	Forced draft fan motors - variable speed*
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Air Supply	1412	Forced draft fan drives (other than motor)*
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Air Supply	1413	Forced draft fan couplings
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Air Supply	1415	Forced draft fan controls*
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Air Supply	1420	Other forced draft fan problems*
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Air Supply	1421	Secondary air fans/blowers
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Air Supply	1422	Secondary air fan/blower motors - single speed
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Air Supply	1423	Secondary air fan/blower motors - variable speed
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Air Supply	1424	Secondary air fan/blower controls
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Air Supply	1430	Air supply ducts from FD fan
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Air Supply	1431	Air supply dampers from FD fan
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Air Supply	1432	Air supply duct expansion joints
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Air Supply	1440	Air supply dampers
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Air Supply	1450	Other air supply problems
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Air Supply	1451	Fluidized Air Fan (FBC Only)
Notes: 1) For use with Unit Codes 650-699. 2) Excluding burner pipes, wind boxes, primary air, or pulverize exhausters. 3) * For FBC units, this is the same as primary air fans and their motors.					

TABLE B07-32 Boiler: Boiler Air and Gas Systems - Flue Gas

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1455	Induced draft fans
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1456	Induced draft fan dampers
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1457	Induced draft fan lubrication systems
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1460	Induced draft fan fouling
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1470	Induced draft fan motors and drives
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1471	Induced draft fan motors - variable speed

Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1472	Inducted draft fan coupling
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1475	Induced draft fan controls
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1476	Induced draft fan speed changer
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1480	Other induced draft fan problems
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1487	Air heater (tubular)
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1488	Air heater (regenerative)
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1489	Air heater (heat pipe, plate-type)
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1492	Air heater fouling (tubular)
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1493	Air heater fouling (regenerative)
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1495	Other air heater fouling (heat pipe, plate-type)
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1500	Air heater soot blowers
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1510	Flue gas ducts (except recirculation)
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1512	Flue gas expansion joints
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1520	Flue gas dampers (except recirculation)
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas	1530	Other flue gas problems
Notes: 1) For use with Unit Codes 650-699. 2) Excluding burner pipes, wind boxes, primary air, or pulverize exhausters.					

TABLE B07-33 Boiler: Boiler Air and Gas Systems - Flue Gas Recirculation

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1535	Flue gas recirculating fan
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1536	Flue gas recirculating fan dampers
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1537	Flue gas recirculating fan lubrication systems
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1540	Flue gas recirculation fan fouling
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1550	Flue gas recirculation fan motors
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1555	Flue gas recirculation fan controls
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1560	Other flue gas recirculation fan problems
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1570	Flue gas recirculation ducts
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1572	Flue gas recirculation duct expansion joints
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1580	Flue gas recirculation dampers
Notes: 1) For use with Unit Codes 650-699. 2) Excluding burner pipes, wind boxes, primary air, or pulverize exhausters.					

TABLE B07-34 Boiler: Boiler Air and Gas Systems - Miscellaneous (Boiler Air and Gas Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1590	Stacks (use code 8430 for stack problems due to pollution control equipment)
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1591	Stack damper and linkage
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1592	Stack damper linkage motors
Fluidized Bed	Boiler	Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1599	Other miscellaneous boiler air and gas system problems
Notes: 1) For use with Unit Codes 650-699. 2) Excluding burner pipes, wind boxes, primary air, or pulverize exhausters.					

TABLE B07-35 Boiler: Boiler Control Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Control Systems		1700	Feedwater controls (report local controls - feedwater pump, feedwater regulator valve, etc., - with component or system)
Fluidized Bed	Boiler	Boiler Control Systems		1710	Combustion/steam condition controls (report local controls - burners, pulverizers, etc., - with component or system)
Fluidized Bed	Boiler	Boiler Control Systems		1720	Desuperheater/attemperator controls
Fluidized Bed	Boiler	Boiler Control Systems		1730	Boiler explosion or implosion
Fluidized Bed	Boiler	Boiler Control Systems		1740	Boiler drum gage glasses / level indicator
Fluidized Bed	Boiler	Boiler Control Systems		1741	Furnace and water gauge television auxiliary system
Fluidized Bed	Boiler	Boiler Control Systems		1750	Burner management system
Fluidized Bed	Boiler	Boiler Control Systems		1760	Feedwater instrumentation (not local controls)
Fluidized Bed	Boiler	Boiler Control Systems		1761	Combustion/Steam condition instrumentation (not local controls)
Fluidized Bed	Boiler	Boiler Control Systems		1762	Desuperheater/attemperator instrumentation (not local controls)
Fluidized Bed	Boiler	Boiler Control Systems		1799	Other boiler instrumentation and control problems

Notes: 1) For use with Unit Codes 650-699. 2) Including instruments that input to the controls.

TABLE B07-36 Boiler: Boiler Design Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Design Limitations		1900	Improper balance between tube sections not due to fouling or plugging
Fluidized Bed	Boiler	Boiler Design Limitations		1910	Inadequate air not due to equipment problems

Notes: 1) For use with Unit Codes 650-699.

TABLE B07-37 Boiler: Boiler Fuel Supply from Bunkers to Boiler - Burners

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	358	Oil burner piping and valves
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	359	Gas burner piping and valves
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	360	Burners
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	361	Burner orifices
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	362	Burner tilts
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	365	Bed warmup burners (FBC only)
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	366	Duct burners (FBC only)
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	370	Burner instruments and controls (except light off)
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	375	Burner instruments and controls (FBC light-off system)
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	380	Light off (igniter) systems (including fuel supply)
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	385	Igniters
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	390	Burner wind boxes and dampers
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	400	Burner wind box fires
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	410	Other burner problems

Notes: 1) For use with Unit Codes 650-699.

TABLE B07-38 Boiler: Boiler Fuel Supply from Bunkers to Boiler - Cyclone

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	415	Cyclone feeders
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	420	Cyclone crusher

Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	425	Cyclone dampers
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	426	Cyclone air ducts
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	430	Cyclone furnace
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	435	Other cyclone problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-39 Boiler: Boiler Fuel Supply from Bunkers to Boiler - Oil and Gas Systems (except light off)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	440	Fuel oil pumps (general)
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	441	Fuel oil pumps (burner supply)
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	442	Fuel oil pumps (forwarding/transfer)
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	443	Fuel oil (burner supply) pump drives
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	444	Fuel oil (forwarding/transfer) pump drives
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	450	Fuel oil heaters
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	460	Fuel oil atomizers
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	470	Oil and gas fires
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	475	Fuel lance (FBC only)
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	480	Other oil and gas fuel supply problems (see codes 0360-0410 for burner problems)
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-40 Boiler: Boiler Fuel Supply from Bunkers to Boiler - Pulverizers, Primary Air Fans, and Associated Ducts

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	200	Pulverizer exhauster fan (for indirect firing)
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	205	Pulverizer exhauster fan drive

Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	210	Pulverizer heater (for indirect firing)
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	220	Pulverizer system cyclone separator
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	230	Pulverizer bag filter
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	240	Pulverized coal bin
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	250	Pulverizer feeders
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	253	Pulverizer feeder motor
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	255	Pulverizer feeder coal scales
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	256	Seal air system (air to pulverizers)
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	260	Primary air fan
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	262	Primary air fan lube oil system
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	263	Primary air fan drives
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	264	Other primary air fan problems
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	265	Primary air heater
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	266	Primary air heater fouling
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	267	Primary air flow instrumentation
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	270	Primary air duct and dampers
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	280	Pulverizer fires
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	290	Pulverizer reduced capacity due to wear
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	300	Pulverizer motors and drives

Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	310	Pulverizer mills
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	312	Pulverizer mill classifiers
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	313	Pulverizer mill trunnion seals
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	314	Pulverizer mill ball charger hopper (ball mills only)
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	315	Pulverizer mill coal level controls
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	320	Foreign object in Pulverizers mill
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	325	Pulverizer skidding
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	330	Pulverizer coal leak (pulverizers only)
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	331	Pulverizer system coal leaks (other than pulverizers, see code 0330)
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	335	Pulverizer lube oil system
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	338	Pulverizer control systems (temperature and pressure)
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	340	Other pulverizer problems
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	344	Pulverizer inspection
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	345	Pulverizer overhaul
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	346	Pulverizer pyrite removal system
Fluidized Bed	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	350	Pulverized fuel and air piping (from pulverizer to wind box) (see code 0898 for pulverizer reject system problems)
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-41 Boiler: Boiler Fuel Supply to Bunker - Coal Handling Equipment up Through Bunkers					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**

Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	10	Thaw shed failure or fire
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	20	Coal car dumpers, shakers, and unloaders
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	22	Unloading/receiving hopper (train/truck)
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	24	Rotary plow
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	26	Dust suppression system
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	28	Dust collection system
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	30	Coal conveyors and feeders
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	35	Metal detector/collector (including magnetic separator)
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	40	Coal elevators
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	50	Coal storage fires
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	60	Coal crushers including motors
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	70	Coal samplers
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	75	Storage silos/hoppers
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	80	Stackers/reclaimers
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	84	Coal conveyor scales storage coal pile
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	85	Bunker feeder coal scales
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	90	Bunker fires
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	95	Bunker flow problems
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	100	Bunker gates

Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	105	Bunker structures
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	106	Coal drying system (see additional codes 0125-0127)
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	107	Screen (prior to bunkers)
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	110	Other coal fuel supply problems up through bunkers
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	125	Coal crusher dryer hammers (see code 0106)
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	126	Coal crusher lube oil system (see code 0106)
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	127	Other coal crusher dryer problems (see code 0106)
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-42 Boiler: Boiler Fuel Supply to Bunker - Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	111	Solid fuel feeder conveyors
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	112	Solid fuel feed tanks/hoppers
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	113	Solid fuel tank/hopper fires
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	114	Solid fuel volumetric feeder
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	115	Solid fuel gravimetric feeder
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	116	Solid fuel feeder motors
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	117	Solid fuel pneumatic transport system including piping and valves
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	118	Solid fuel drying system including screens
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	119	Solid fuel crushers
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	120	Solid fuel crusher motors

Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	121	Other solid fuel feed problems
Fluidized Bed	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	129	Other coal processing system problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-43 Boiler: Boiler Internals and Structures

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Internals and Structures		800	Drums and drum internals (single drum only)
Fluidized Bed	Boiler	Boiler Internals and Structures		810	Boiler supports and structures (use code 1320 for tube supports)
Fluidized Bed	Boiler	Boiler Internals and Structures		811	Convection pass enclosure (FBC only)
Fluidized Bed	Boiler	Boiler Internals and Structures		812	Distribution plate (FBC only)
Fluidized Bed	Boiler	Boiler Internals and Structures		813	Lower furnace (in-bed) tube supports (FBC only)
Fluidized Bed	Boiler	Boiler Internals and Structures		814	In-bed bubble caps (FBC only)
Fluidized Bed	Boiler	Boiler Internals and Structures		820	Casing
Fluidized Bed	Boiler	Boiler Internals and Structures		830	Doors
Fluidized Bed	Boiler	Boiler Internals and Structures		840	Refractory and insulation
Fluidized Bed	Boiler	Boiler Internals and Structures		845	Windbox expansion joints
Fluidized Bed	Boiler	Boiler Internals and Structures		846	Convection pass expansion joints (FBC only)
Fluidized Bed	Boiler	Boiler Internals and Structures		847	Other expansion joints
Fluidized Bed	Boiler	Boiler Internals and Structures		850	Other internal or structural problems
Fluidized Bed	Boiler	Boiler Internals and Structures		855	Drum relief/safety valves (single drum only)
Fluidized Bed	Boiler	Boiler Internals and Structures		859	Tube external fins/membranes
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-44 Boiler: Boiler Overhaul and Inspections

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Overhaul and Inspections		1800	Major boiler overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)

Fluidized Bed	Boiler	Boiler Overhaul and Inspections		1801	Minor boiler overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Fluidized Bed	Boiler	Boiler Overhaul and Inspections		1810	Other boiler inspections
Fluidized Bed	Boiler	Boiler Overhaul and Inspections		1811	Boiler Inspections - problem identification / investigation
Fluidized Bed	Boiler	Boiler Overhaul and Inspections		1812	Boiler Inspections - scheduled or routine
Fluidized Bed	Boiler	Boiler Overhaul and Inspections		1820	Chemical cleaning/steam blows
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-45 Boiler: Boiler Piping System - Boiler Recirculation

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Piping System	Boiler Recirculation	740	Boiler recirculation pumps
Fluidized Bed	Boiler	Boiler Piping System	Boiler Recirculation	741	Boiler recirculation pumps - motors
Fluidized Bed	Boiler	Boiler Piping System	Boiler Recirculation	750	Boiler recirculation piping including downcomers
Fluidized Bed	Boiler	Boiler Piping System	Boiler Recirculation	760	Boiler recirculation valves
Fluidized Bed	Boiler	Boiler Piping System	Boiler Recirculation	770	Other boiler recirculation problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-46 Boiler: Boiler Piping System - Cold and Hot Reheat Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	540	Hot reheat steam piping up to turbine stop valves
Fluidized Bed	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	541	Cold reheat steam piping up to boiler
Fluidized Bed	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	550	Reheat steam relief/safety valves
Fluidized Bed	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	560	Other hot reheat steam valves (not including turbine stop or intercept valves)
Fluidized Bed	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	561	Other cold reheat steam valves (not including turbine stop or intercept valves)
Fluidized Bed	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	570	Other reheat steam problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-47 Boiler: Boiler Piping System - Desuperheaters/Attemperators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Piping System	Desuperheaters/Attemperators	580	Desuperheater/attemperator piping
Fluidized Bed	Boiler	Boiler Piping System	Desuperheaters/Attemperators	590	Desuperheater/attemperator valves
Fluidized Bed	Boiler	Boiler Piping System	Desuperheaters/Attemperators	600	Desuperheater/attemperator spray nozzles
Fluidized Bed	Boiler	Boiler Piping System	Desuperheaters/Attemperators	610	Desuperheater/attemperator drums
Fluidized Bed	Boiler	Boiler Piping System	Desuperheaters/Attemperators	620	Other desuperheater/attemperator problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-48 Boiler: Boiler Piping System - Feedwater and Blowdown

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Piping System	Feedwater and Blowdown	670	Feedwater piping downstream of feedwater regulating valve
Fluidized Bed	Boiler	Boiler Piping System	Feedwater and Blowdown	680	Feedwater valves (not feedwater regulating valve)
Fluidized Bed	Boiler	Boiler Piping System	Feedwater and Blowdown	690	Other feedwater problems downstream of feedwater regulating valve (use codes 3401 to 3499 for remainder of feedwater system)
Fluidized Bed	Boiler	Boiler Piping System	Feedwater and Blowdown	700	Blowdown system valves
Fluidized Bed	Boiler	Boiler Piping System	Feedwater and Blowdown	710	Blowdown system piping
Fluidized Bed	Boiler	Boiler Piping System	Feedwater and Blowdown	720	Blowdown system controls / instrumentation
Fluidized Bed	Boiler	Boiler Piping System	Feedwater and Blowdown	730	Other blowdown system problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-49 Boiler: Boiler Piping System - Main Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Piping System	Main Steam	500	Main steam piping up to turbine stop valves
Fluidized Bed	Boiler	Boiler Piping System	Main Steam	510	Main steam relief/safety valves off superheater
Fluidized Bed	Boiler	Boiler Piping System	Main Steam	520	Other main steam valves (including vent and drain valves but not including the turbine stop valves)

Fluidized Bed	Boiler	Boiler Piping System	Main Steam	530	Other main steam system problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-50 Boiler: Boiler Piping System - Miscellaneous (Piping)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Piping System	Miscellaneous (Piping)	775	Economizer piping
Fluidized Bed	Boiler	Boiler Piping System	Miscellaneous (Piping)	780	Headers between tube bundles
Fluidized Bed	Boiler	Boiler Piping System	Miscellaneous (Piping)	782	Headers and caps
Fluidized Bed	Boiler	Boiler Piping System	Miscellaneous (Piping)	790	Pipe hangers, brackets, supports (general)
Fluidized Bed	Boiler	Boiler Piping System	Miscellaneous (Piping)	799	Other miscellaneous piping system problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-51 Boiler: Boiler Piping System - Startup Bypass

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Piping System	Startup Bypass	630	Startup bypass system piping (including drain lines up to heaters or condenser)
Fluidized Bed	Boiler	Boiler Piping System	Startup Bypass	640	Startup bypass system valves
Fluidized Bed	Boiler	Boiler Piping System	Startup Bypass	650	Startup bypass tanks or flash tanks
Fluidized Bed	Boiler	Boiler Piping System	Startup Bypass	655	Steam by-pass system instrumentation and controls
Fluidized Bed	Boiler	Boiler Piping System	Startup Bypass	660	Other startup bypass system problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-52 Boiler: Boiler Tube Fireside Slagging or Fouling

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Tube Fireside Slagging or Fouling		1100	Waterwall (Furnace wall)
Fluidized Bed	Boiler	Boiler Tube Fireside Slagging or Fouling		1105	Generating tubes
Fluidized Bed	Boiler	Boiler Tube Fireside Slagging or Fouling		1110	Cyclone Furnace (in cyclone area only)
Fluidized Bed	Boiler	Boiler Tube Fireside Slagging or Fouling		1120	Convection Pass Wall
Fluidized Bed	Boiler	Boiler Tube Fireside Slagging or Fouling		1130	Boiler screen, wing wall, or slag screen (water tubes only)
Fluidized Bed	Boiler	Boiler Tube Fireside Slagging or Fouling		1140	First superheater

Fluidized Bed	Boiler	Boiler Tube Fireside Slagging or Fouling		1150	Second superheater
Fluidized Bed	Boiler	Boiler Tube Fireside Slagging or Fouling		1160	First reheater
Fluidized Bed	Boiler	Boiler Tube Fireside Slagging or Fouling		1170	Second reheater
Fluidized Bed	Boiler	Boiler Tube Fireside Slagging or Fouling		1180	Economizer
Fluidized Bed	Boiler	Boiler Tube Fireside Slagging or Fouling		1190	Other tube slagging or fouling
Fluidized Bed	Boiler	Boiler Tube Fireside Slagging or Fouling		1191	Bed agglomeration (FBC only)
Fluidized Bed	Boiler	Boiler Tube Fireside Slagging or Fouling		1200	Operation at reduced power to avoid slagging or fouling (use codes 1100 to 1190 to report power reductions for slag accumulation or slag removal)
Notes: 1) For use with Unit Codes 650-699. 2) Use codes 0860 and 0870 for fouling or slagging due to unavailability of soot blowers or their air or steam supply.					

TABLE B07-53 Boiler: Boiler Tube Leaks

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Boiler Tube Leaks		1000	Waterwall (Furnace wall)
Fluidized Bed	Boiler	Boiler Tube Leaks		1005	Generating tubes
Fluidized Bed	Boiler	Boiler Tube Leaks		1006	In-bed reheat tubes (FBC only - includes external heat exchangers)
Fluidized Bed	Boiler	Boiler Tube Leaks		1010	Cyclone furnace (in cyclone area only)
Fluidized Bed	Boiler	Boiler Tube Leaks		1020	Convection pass wall (water tubes only)
Fluidized Bed	Boiler	Boiler Tube Leaks		1030	Boiler screen, wing wall, or slag screen (water tubes only)
Fluidized Bed	Boiler	Boiler Tube Leaks		1035	Platen superheater
Fluidized Bed	Boiler	Boiler Tube Leaks		1040	First superheater
Fluidized Bed	Boiler	Boiler Tube Leaks		1045	In-bed superheater tubes (FBC only - includes external heat exchangers)
Fluidized Bed	Boiler	Boiler Tube Leaks		1050	Second superheater
Fluidized Bed	Boiler	Boiler Tube Leaks		1055	External superheater link tubing
Fluidized Bed	Boiler	Boiler Tube Leaks		1060	First reheater
Fluidized Bed	Boiler	Boiler Tube Leaks		1070	Second reheater
Fluidized Bed	Boiler	Boiler Tube Leaks		1075	External reheater link tubing
Fluidized Bed	Boiler	Boiler Tube Leaks		1080	Economizer
Fluidized Bed	Boiler	Boiler Tube Leaks		1085	In-bed evaporative tubes (FBC only - includes external heat exchangers)
Fluidized Bed	Boiler	Boiler Tube Leaks		1090	Other boiler tube leaks
Notes: 1) For use with Unit Codes 650-699. 2) Use code 0859 for tube/membrane failures.					

TABLE B07-54 Boiler: Boiler Water Condition					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Boiler	Boiler Water Condition		1850	Boiler water condition (not feedwater water quality)
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-55 Boiler: External Fluidized Bed Heat Exchanger					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Boiler	External Fluidized Bed Heat Exchanger		990	Refractory
Fluidized Bed	Boiler	External Fluidized Bed Heat Exchanger		991	Tube leaks
Fluidized Bed	Boiler	External Fluidized Bed Heat Exchanger		992	Tube supports
Fluidized Bed	Boiler	External Fluidized Bed Heat Exchanger		999	Other heat exchanger problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-56 Boiler: Miscellaneous (Boiler)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Boiler	Miscellaneous (Boiler)		1980	Boiler safety valve test
Fluidized Bed	Boiler	Miscellaneous (Boiler)		1990	Boiler performance testing (use code 9999 for total unit performance testing)
Fluidized Bed	Boiler	Miscellaneous (Boiler)		1999	Boiler, miscellaneous
Notes: 1) For use with Unit Codes 650-699. 2) Use more specific codes - other slagging and fouling problems, other control problems, etc. - whenever possible. Describe miscellaneous problems in the verbal description.					

TABLE B07-57 Boiler: Miscellaneous Boiler Tube Problems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Boiler	Miscellaneous Boiler Tube Problems		1300	Water side fouling
Fluidized Bed	Boiler	Miscellaneous Boiler Tube Problems		1305	Fireside cleaning (which requires a full outage) Use code 1200 for cleanings that cause deratings.
Fluidized Bed	Boiler	Miscellaneous Boiler Tube Problems		1310	Water side cleaning (acid cleaning)
Fluidized Bed	Boiler	Miscellaneous Boiler Tube Problems		1320	Tube supports/attachments
Fluidized Bed	Boiler	Miscellaneous Boiler Tube Problems		1330	Slag fall damage

Fluidized Bed	Boiler	Miscellaneous Boiler Tube Problems		1340	Tube modifications (including addition and removal of tubes)
Fluidized Bed	Boiler	Miscellaneous Boiler Tube Problems		1350	Other miscellaneous boiler tube problems
Fluidized Bed	Boiler	Miscellaneous Boiler Tube Problems		1360	Boiler drains system
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-58 Boiler: Slag and Ash Removal

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Slag and Ash Removal		860	Soot blowers - air (see code 3844 for air delivery system)
Fluidized Bed	Boiler	Slag and Ash Removal		870	Soot blowers - steam
Fluidized Bed	Boiler	Slag and Ash Removal		871	Soot blowers - sonic
Fluidized Bed	Boiler	Slag and Ash Removal		872	Soot blowers - water
Fluidized Bed	Boiler	Slag and Ash Removal		873	Soot blower drives
Fluidized Bed	Boiler	Slag and Ash Removal		876	Soot blower controls
Fluidized Bed	Boiler	Slag and Ash Removal		880	Fly Ash Removal System (not precipitators, scrubbers, mechanical collectors, or baghouses)
Fluidized Bed	Boiler	Slag and Ash Removal		885	Fly ash Removal System - wet transport
Fluidized Bed	Boiler	Slag and Ash Removal		890	Bottom ash systems (wet or dry)
Fluidized Bed	Boiler	Slag and Ash Removal		891	Bottom ash hoppers (including gates)
Fluidized Bed	Boiler	Slag and Ash Removal		892	Bottom ash clinker grinders
Fluidized Bed	Boiler	Slag and Ash Removal		893	Bottom ash water pumps and motors
Fluidized Bed	Boiler	Slag and Ash Removal		894	Bottom ash piping and valves
Fluidized Bed	Boiler	Slag and Ash Removal		895	Ashpit trouble
Fluidized Bed	Boiler	Slag and Ash Removal		896	Bottom ash dewatering bin system, instruments and controls
Fluidized Bed	Boiler	Slag and Ash Removal		897	Bottom ash rotary (drag chain type) conveyor and motor
Fluidized Bed	Boiler	Slag and Ash Removal		898	Bottom ash pyrite hopper (pulverizer reject) system
Fluidized Bed	Boiler	Slag and Ash Removal		899	Bottom ash controls and instrumentation
Fluidized Bed	Boiler	Slag and Ash Removal		900	Slag tap (cyclone furnace)
Fluidized Bed	Boiler	Slag and Ash Removal		910	Slag tap (other than cyclone furnace)

Fluidized Bed	Boiler	Slag and Ash Removal		920	Other slag and ash removal problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-59 Boiler: Sorbent Supply (FBC only) - Sorbent Feed Equipment from Bunkers to Boiler (FBC only)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	150	Sorbent feed conveyors
Fluidized Bed	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	151	Sorbent feed tanks/hoppers
Fluidized Bed	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	152	Sorbent feed volumetric feeder
Fluidized Bed	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	153	Sorbent feed gravimetric feeder
Fluidized Bed	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	154	Sorbent feed feeder motors
Fluidized Bed	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	155	Sorbent feed pneumatic transport system including piping and valves
Fluidized Bed	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	156	Other sorbent feed problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-60 Boiler: Sorbent Supply (FBC only) - Sorbent Handling System up Through Bunkers (FBC only)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	130	Sorbent handling tanks/hoppers
Fluidized Bed	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	131	Sorbent handling conveyors
Fluidized Bed	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	132	Sorbent handling feeders
Fluidized Bed	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	133	Sorbent handling feeder motors
Fluidized Bed	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	134	Sorbent handling crushers
Fluidized Bed	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	135	Sorbent handling crusher motors
Fluidized Bed	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	136	Sorbent handling blowers/fans

Fluidized Bed	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	137	Sorbent handling blower/fan motors
Fluidized Bed	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	138	Sorbent handling baghouse
Fluidized Bed	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	139	Sorbent handling drying equipment
Fluidized Bed	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	140	Sorbent handling screens
Fluidized Bed	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	141	Other sorbent handling equipment problems
Notes: 1) For use with Unit Codes 650-699.					

EXTERNAL

Use this set of codes to report events caused by external factors (flood, lightning, etc.); economic factors (lack of fuel, labor strikes, etc.); operator training; and transmission system problems external to the plant.

TABLE B07-61 External: Catastrophe

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	External	Catastrophe		9000	Flood
Fluidized Bed	External	Catastrophe		9001	Drought
Fluidized Bed	External	Catastrophe		9010	Fire including wildfires, not related to a specific component
Fluidized Bed	External	Catastrophe		9020	Lightning
Fluidized Bed	External	Catastrophe		9025	Geomagnetic disturbance
Fluidized Bed	External	Catastrophe		9030	Earthquake
Fluidized Bed	External	Catastrophe		9031	Tornado
Fluidized Bed	External	Catastrophe		9035	Hurricane
Fluidized Bed	External	Catastrophe		9036	Storms (ice, snow, etc)
Fluidized Bed	External	Catastrophe		9040	Other catastrophe
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-62 External: Economic

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	External	Economic		0	Reserve shutdown
Fluidized Bed	External	Economic		9130	Failure of fuel supplier to fulfill contractual obligations or a pre-

					arranged deal due to physical fuel disruptions or operational impairments (e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)
Fluidized Bed	External	Economic		9131	Lack of fuel – due to contractual or tariff provisions that allow for service interruption or price fluctuations during peak demand periods.
Fluidized Bed	External	Economic		9132	Wet Fuel - Biomass
Fluidized Bed	External	Economic		9134	Fuel conservation
Fluidized Bed	External	Economic		9136	Problems with Primary Fuel for Units with Secondary Fuel Operation
Fluidized Bed	External	Economic		9137	Ground water or other water supply problems
Fluidized Bed	External	Economic		9140	Plant modifications to burn different fuel that are not regulatory mandated
Fluidized Bed	External	Economic		9150	Labor strikes company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.
Fluidized Bed	External	Economic		9151	Labor strikes direct plant management grievances that result in a walkout or strike are under plant management control.
Fluidized Bed	External	Economic		9160	Other economic problems
Fluidized Bed	External	Economic		9180	Economic (for internal use at plants only)
Fluidized Bed	External	Economic		9181	Economic (for internal use at plants only)
Fluidized Bed	External	Economic		9182	Economic (for internal use at plants only)
Fluidized Bed	External	Economic		9183	Economic (for internal use at plants only)
Fluidized Bed	External	Economic		9184	Economic (for internal use at plants only)
Fluidized Bed	External	Economic		9185	Economic (for internal use at plants only)

Fluidized Bed	External	Economic		9186	Economic (for internal use at plants only)
Fluidized Bed	External	Economic		9187	Economic (for internal use at plants only)
Fluidized Bed	External	Economic		9188	Economic (for internal use at plants only)
Fluidized Bed	External	Economic		9189	Economic (for internal use at plants only)
Fluidized Bed	External	Economic		9190	Economic (for internal use at plants only)
Fluidized Bed	External	Economic		9191	Economic (for internal use at plants only)
Fluidized Bed	External	Economic		9192	Economic (for internal use at plants only)
Fluidized Bed	External	Economic		9193	Economic (for internal use at plants only)
Fluidized Bed	External	Economic		9194	Economic (for internal use at plants only)
Fluidized Bed	External	Economic		9195	Economic (for internal use at plants only)
Fluidized Bed	External	Economic		9196	Economic (for internal use at plants only)
Fluidized Bed	External	Economic		9197	Economic (for internal use at plants only)
Fluidized Bed	External	Economic		9198	Economic (for internal use at plants only)
Fluidized Bed	External	Economic		9199	Economic (for internal use at plants only)
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-63 External: Fuel Quality

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	External	Fuel Quality		9200	High ash content (OMC)
Fluidized Bed	External	Fuel Quality		9201	High ash content (not OMC)
Fluidized Bed	External	Fuel Quality		9205	Poor quality natural gas fuel, low heat content
Fluidized Bed	External	Fuel Quality		9210	Low grindability (OMC)
Fluidized Bed	External	Fuel Quality		9211	Low grindability (not OMC)

Fluidized Bed	External	Fuel Quality		9220	High sulfur content (OMC)
Fluidized Bed	External	Fuel Quality		9221	High sulfur content (not OMC)
Fluidized Bed	External	Fuel Quality		9230	High vanadium content (OMC)
Fluidized Bed	External	Fuel Quality		9231	High vanadium content (not OMC)
Fluidized Bed	External	Fuel Quality		9240	High sodium content (OMC)
Fluidized Bed	External	Fuel Quality		9241	High sodium content (not OMC)
Fluidized Bed	External	Fuel Quality		9250	Low BTU coal (OMC)
Fluidized Bed	External	Fuel Quality		9251	Low BTU coal (not OMC)
Fluidized Bed	External	Fuel Quality		9260	Low BTU oil (OMC)
Fluidized Bed	External	Fuel Quality		9261	Low BTU oil (not OMC)
Fluidized Bed	External	Fuel Quality		9270	Wet coal (OMC)
Fluidized Bed	External	Fuel Quality		9271	Wet coal (not OMC)
Fluidized Bed	External	Fuel Quality		9272	Wet Fuel (other than coal)
Fluidized Bed	External	Fuel Quality		9280	Frozen coal (OMC)
Fluidized Bed	External	Fuel Quality		9281	Frozen coal (not OMC)
Fluidized Bed	External	Fuel Quality		9290	Other fuel quality problems (OMC)
Fluidized Bed	External	Fuel Quality		9291	Other fuel quality problems (not OMC)
Notes: 1) For use with Unit Codes 650-699. 2) Use code 9600 to 9650 if the fuel quality results in excess stack emissions through no fault in the pollution control equipment. Use the appropriate equipment code to report fouling and slagging.					

TABLE B07-64 External: Miscellaneous (External)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	External	Miscellaneous (External)		9300	Transmission system problems other than catastrophes (do not include switchyard problems in this category; see codes 3600 to 3629, 3720 to 3730)
Fluidized Bed	External	Miscellaneous (External)		9305	Ash disposal problem
Fluidized Bed	External	Miscellaneous (External)		9310	Operator training
Fluidized Bed	External	Miscellaneous (External)		9320	Other miscellaneous external problems
Fluidized Bed	External	Miscellaneous (External)		9340	Synchronous Condenser Operation
Notes: 1) For use with Unit Codes 650-699.					

GENERATOR

This set of codes contains the generator, exciter, generator cooling systems, and generator controls. Note the main leads up to and includes the generator output breaker in this set of codes.

TABLE B07-65 Generator: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Generator	Controls		4700	Generator voltage control
Fluidized Bed	Generator	Controls		4710	Generator metering devices
Fluidized Bed	Generator	Controls		4720	Generator synchronization equipment
Fluidized Bed	Generator	Controls		4730	Generator current and potential transformers
Fluidized Bed	Generator	Controls		4740	Emergency generator trip devices
Fluidized Bed	Generator	Controls		4750	Other generator controls and metering problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-66 Generator: Cooling System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Generator	Cooling System		4610	Hydrogen cooling system piping and valves
Fluidized Bed	Generator	Cooling System		4611	Hydrogen coolers
Fluidized Bed	Generator	Cooling System		4612	Hydrogen storage system
Fluidized Bed	Generator	Cooling System		4613	Hydrogen seals
Fluidized Bed	Generator	Cooling System		4619	Other hydrogen system problems
Fluidized Bed	Generator	Cooling System		4620	Air cooling system
Fluidized Bed	Generator	Cooling System		4630	Liquid cooling system
Fluidized Bed	Generator	Cooling System		4640	Seal oil system and seals
Fluidized Bed	Generator	Cooling System		4650	Other cooling system problems
Notes: 1) For use with Unit Codes 650-699. 2) Report failures caused by water leaks into generator as codes 4500, 4510, etc.					

TABLE B07-67 Generator: Exciter

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Generator	Exciter		4600	Exciter drive - motor
Fluidized Bed	Generator	Exciter		4601	Exciter field rheostat
Fluidized Bed	Generator	Exciter		4602	Exciter commutator and brushes
Fluidized Bed	Generator	Exciter		4603	Solid state exciter element
Fluidized Bed	Generator	Exciter		4604	Exciter drive - shaft
Fluidized Bed	Generator	Exciter		4605	Exciter transformer
Fluidized Bed	Generator	Exciter		4609	Other exciter problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-68 Generator: Generator					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Generator	Generator		4500	Rotor windings (including damper windings and fan blades on hydro units)
Fluidized Bed	Generator	Generator		4510	Rotor collector rings
Fluidized Bed	Generator	Generator		4511	Rotor, General
Fluidized Bed	Generator	Generator		4512	Retaining Rings
Fluidized Bed	Generator	Generator		4520	Stator windings, bushings, and terminals
Fluidized Bed	Generator	Generator		4530	Stator core iron
Fluidized Bed	Generator	Generator		4535	Stator, General
Fluidized Bed	Generator	Generator		4536	Generator Heaters
Fluidized Bed	Generator	Generator		4540	Brushes and brush rigging
Fluidized Bed	Generator	Generator		4550	Generator bearings and lube oil system (including thrust bearings on hydro units)
Fluidized Bed	Generator	Generator		4551	Generator bearings
Fluidized Bed	Generator	Generator		4552	Generator lube oil system
Fluidized Bed	Generator	Generator		4555	Bearing cooling system
Fluidized Bed	Generator	Generator		4560	Generator vibration (excluding vibration due to failed bearing and other components)
Fluidized Bed	Generator	Generator		4570	Generator casing
Fluidized Bed	Generator	Generator		4580	Generator end bells and bolting
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-69 Generator: Miscellaneous (Generator)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Generator	Miscellaneous (Generator)		4800	Generator main leads
Fluidized Bed	Generator	Miscellaneous (Generator)		4805	Generator Bus Duct Cooling System
Fluidized Bed	Generator	Miscellaneous (Generator)		4810	Generator output breaker
Fluidized Bed	Generator	Miscellaneous (Generator)		4830	Major overhaul (720 hrs or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Fluidized Bed	Generator	Miscellaneous (Generator)		4831	Minor generator overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Fluidized Bed	Generator	Miscellaneous (Generator)		4840	Inspection
Fluidized Bed	Generator	Miscellaneous (Generator)		4841	Generator doble testing

Fluidized Bed	Generator	Miscellaneous (Generator)		4842	Reactive and capability testing
Fluidized Bed	Generator	Miscellaneous (Generator)		4850	Core monitor alarm
Fluidized Bed	Generator	Miscellaneous (Generator)		4860	Generator neutral grounding equipment
Fluidized Bed	Generator	Miscellaneous (Generator)		4899	Other miscellaneous generator problems
Notes: 1) For use with Unit Codes 650-699.					

INACTIVE STATES

TABLE B07-70 Inactive States: Inactive States

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Inactive States	Inactive States		2	Inactive Reserve Shutdown
Fluidized Bed	Inactive States	Inactive States		9990	Retired unit
Fluidized Bed	Inactive States	Inactive States		9991	Mothballed unit
Notes: 1) For use with Unit Codes 650-699.					

PERFORMANCE

TABLE B07-71 Performance: Performance

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Performance	Performance		9997	NERC Reliability Standard Requirement
Fluidized Bed	Performance	Performance		9998	Black start testing
Fluidized Bed	Performance	Performance		9999	Total unit performance testing (use appropriate codes for individual component testing)
Notes: 1) For use with Unit Codes 650-699.					

PERSONNEL OR PROCEDURAL ERRORS

TABLE B07-72 Personnel or Procedural Errors: Personnel or Procedural Errors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Personnel or Procedural Errors	Personnel or Procedural Errors		9900	Operator error
Fluidized Bed	Personnel or Procedural Errors	Personnel or Procedural Errors		9910	Maintenance personnel error
Fluidized Bed	Personnel or Procedural Errors	Personnel or Procedural Errors		9920	Contractor error

Fluidized Bed	Personnel or Procedural Errors	Personnel or Procedural Errors		9930	Operating procedure error
Fluidized Bed	Personnel or Procedural Errors	Personnel or Procedural Errors		9940	Maintenance procedure error
Fluidized Bed	Personnel or Procedural Errors	Personnel or Procedural Errors		9950	Contractor procedure error
Fluidized Bed	Personnel or Procedural Errors	Personnel or Procedural Errors		9960	Staff shortage
Notes: 1) For use with Unit Codes 650-699.					

POLLUTION CONTROL EQUIPMENT

Use this set of codes to report problems with flue gas desulphurization equipment and stack gas particulate removal equipment. If outages or deratings occur due to reasons other than equipment problems, use the set of codes for Regulatory, Safety, Environmental stack emission limits. Use code 9510 for outages or deratings required to install pollution control equipment. Use codes 9600 to 9650 only when the pollution control equipment problems are not responsible for exceeding emission limits

TABLE B07-73 Pollution Control Equipment: CO Reduction

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Pollution Control Equipment	CO Reduction		8840	CO Active catalyst
Fluidized Bed	Pollution Control Equipment	CO Reduction		8841	CO Support materials
Fluidized Bed	Pollution Control Equipment	CO Reduction		8842	CO Plugging
Fluidized Bed	Pollution Control Equipment	CO Reduction		8845	Other CO reduction problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-74 Pollution Control Equipment: Continuous Emissions Monitoring Systems (CEMS)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8700	CEMS Certification and Recertification
Fluidized Bed	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8710	SO2 analyzer problems
Fluidized Bed	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8720	NOx analyzer problems
Fluidized Bed	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8730	CO analyzer problems
Fluidized Bed	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8740	CO2 analyzer problems

Fluidized Bed	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8750	O2 analyzer problems
Fluidized Bed	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8760	Opacity monitor problems
Fluidized Bed	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8770	Flow monitor problems
Fluidized Bed	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8780	Data acquisition system problems
Fluidized Bed	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8790	Miscellaneous CEMS problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-75 Pollution Control Equipment: Dry Scrubbers - Dry Scrubber

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8528	Dry scrubber instruments and controls
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8529	Gas dispersers
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8530	Spray towers
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8531	Spray machine/atomizer
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8532	Spray machine/atomizer motors
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8533	Spray machine/atomizer lubrication systems
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8534	Spray machine/atomizer vibration problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-76 Pollution Control Equipment: Dry Scrubbers - Miscellaneous (Dry Scrubber)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8544	Mechanical failures
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8545	Electrical failures

Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8546	Major overhaul
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8547	Inspection
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8548	Testing
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8549	Other dry scrubber problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-77 Pollution Control Equipment: Dry Scrubbers - Piping, Ducting, and Dampers

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8522	Piping
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8523	Valves
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8524	Strainers or filters
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8525	Ducting
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8526	Dampers
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8527	Other piping, ducting, and damper problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-78 Pollution Control Equipment: Dry Scrubbers - Reagent\Slurry Supply

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8500	Slurry storage and feed tanks
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8501	Reagent storage, feed bins, and conveyors
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8502	Weigh feeders
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8503	Screw conveyors

Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8504	Mills/slakers
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8505	Scalping screens
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8506	Slurry pipelines
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8507	Reagent uploading and transfer systems
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8508	Reagent unavailability
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8510	Slurry mixers and agitators
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8520	Slurry transfer pumps and motors
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8521	Reagent/slurry problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-79 Pollution Control Equipment: Dry Scrubbers - Waste Disposal and Recovery

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8535	Fly ash conveyors
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8536	Bucket elevators
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8537	Weigh hoppers
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8538	Recycle storage and feed tanks including agitators
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8539	Recycle slurry transfer pumps
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8540	Waste disposal
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8541	Recycle feed bins
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8542	Recycle feed bins aeration systems
Fluidized Bed	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8543	Powder coolers

Notes: 1) For use with Unit Codes 650-699.

TABLE B07-80 Pollution Control Equipment: Miscellaneous (Pollution Control Equipment)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8565	Electrostatic Precipitator rebuild/overhaul
Fluidized Bed	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8600	Flue gas additives (furnace injection)
Fluidized Bed	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8601	SO3 mitigation
Fluidized Bed	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8620	Mercury Abatement Equipment
Fluidized Bed	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8650	Baghouse systems, general
Fluidized Bed	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8651	Bag failures and rebagging
Fluidized Bed	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8652	Shakers and rappers
Fluidized Bed	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8653	Inflation and deflation fans and motors
Fluidized Bed	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8654	Baghouse booster fans and motors
Fluidized Bed	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8655	Structural duct work and dampers
Fluidized Bed	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8656	Controls and instrumentation
Fluidized Bed	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8657	Ash handling system and hoppers
Fluidized Bed	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8658	Slurry system from precipitators
Fluidized Bed	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8670	Emission monitors (other than CEMS)
Fluidized Bed	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8699	Other miscellaneous pollution control equipment problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-81 Pollution Control Equipment: NOx Reduction Systems - Catalytic Air Heaters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8830	CAH NOx Active catalyst
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8831	CAH NOx Support materials
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8832	CAH NOx Plugging
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8835	Other CAH problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-82 Pollution Control Equipment: NOx Reduction Systems - Selective Catalytic Reduction Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8810	SCR NOx Reactor
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8811	SCR NOx Reagent
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8812	SCR NOx Catalyst
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8813	SCR NOx Injection grid piping/valves
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8814	SCR NOx Catalyst support material
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8815	SCR NOx Soot blowers
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8816	SCR NOx Plugging
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8817	SCR NOx Control system
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8820	SCR NOx Ammonia injection grid piping/valves
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8821	SCR NOx Ammonia tanks, piping and valves (not injection)
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8822	SCR NOx Ammonia air blowers
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8823	SCR NOx Other ammonia system problems

Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8825	Other SCR NOx problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-83 Pollution Control Equipment: NOx Reduction Systems - Selective Non-Catalytic Reduction Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8800	SNCR NOx Reagent
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8801	SNCR NOx Carrier gas
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8802	SNCR NOx Control system
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8803	SNCR Performance Testing
Fluidized Bed	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8809	Other SNCR NOx problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-84 Pollution Control Equipment: Precipitators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Pollution Control Equipment	Precipitators		8550	Electrostatic precipitator fouling
Fluidized Bed	Pollution Control Equipment	Precipitators		8551	Electrostatic precipitator field out of service
Fluidized Bed	Pollution Control Equipment	Precipitators		8560	Electrostatic precipitator problems
Fluidized Bed	Pollution Control Equipment	Precipitators		8570	Mechanical precipitator fouling
Fluidized Bed	Pollution Control Equipment	Precipitators		8580	Mechanical precipitator problems
Fluidized Bed	Pollution Control Equipment	Precipitators		8590	Other precipitator problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-85 Pollution Control Equipment: Wet Scrubbers - Chemical Supply

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8000	Chemical feed storage, mill feeders, and conveyors
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8002	Screw conveyors
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8003	Bucket elevators
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8006	Weigh feeders
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8010	Crushers/mills
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8020	Mill slurry tanks supply problems
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8030	Classifiers
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8040	Slurry transfer pumps and motors
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8050	Chemical unavailability
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8099	Other chemical supply problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-86 Pollution Control Equipment: Wet Scrubbers - Miscellaneous (Wet Scrubber)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8400	Scrubber gas discharge reheaters - general
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8402	Scrubber gas discharge reheaters - vibration
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8404	Scrubber gas discharge reheaters - tube leaks
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8406	Scrubber gas discharge reheaters - ducts
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8410	Scrubber instruments and controls
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8415	Liquid level controls
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8420	Heat tracer

Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8425	Miscellaneous mechanical failures
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8426	Miscellaneous electrical failures
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8430	Stack damage related to scrubber system
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8440	Major overhaul
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8450	Inspection
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8460	Testing
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8470	SO2 monitor
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8499	Other miscellaneous wet scrubber problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-87 Pollution Control Equipment: Wet Scrubbers - Piping, Ducting, Dampers, and Fans

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8200	Piping
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8210	Valves
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8220	Strainers or filters
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8225	Drain pots
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8230	Ducting
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8235	Demister
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8240	Bypass dampers
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8250	Dampers other than bypass
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8260	Scrubber booster I.D. fan (fan specific to the scrubber)

Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8261	Scrubber booster I.D. fan drive
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8262	Scrubber booster I.D. fan vibration (fan specific to the scrubber)
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8264	Scrubber booster I.D. fan blades (fan specific to the scrubber)
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8270	Scrubber booster F.D. fan (fan specific to the scrubber)
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8271	Scrubber booster F.D. fan drive
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8272	Scrubber booster F.D. fan vibration (fan specific to the scrubber)
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8274	Scrubber booster F.D. fan blades (fan specific to the scrubber)
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8280	Reagent feed piping
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8290	Demister wash piping assembly
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8299	Other piping, ducting, damper, and fan problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-88 Pollution Control Equipment: Wet Scrubbers - Waste Disposal and Recovery

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8300	Waste disposal/recovery tanks
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8310	Waste disposal/recovery pumps
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8320	Waste disposal ponds
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8325	Ash disposal problems
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8330	Dewatering equipment (thickener, centrifuge, etc.)
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8335	Dryers
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8340	Centrifuge/vacuum filter

Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8345	Calciners
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8349	Other waste disposal and recovery problems
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8399	Solids conveying and mixing system problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-89 Pollution Control Equipment: Wet Scrubbers - Wet Scrubber

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8100	Scrubber/absorber tower or module
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8110	Spray nozzles
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8115	Disc scrubber throats
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8120	Spray pumps and motors
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8125	Scrubber recycle (liquid) pumps
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8127	Scrubber recycle (liquid) pump motors
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8130	Recirculation tanks including agitators
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8140	Reaction tanks including agitators
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8150	Tubes
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8160	Mist eliminators/demisters and washdown
Fluidized Bed	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8199	Other scrubber problems
Notes: 1) For use with Unit Codes 650-699.					

REGULATORY, SAFETY, ENVIRONMENTAL

Use these codes only for events not directly attributable to equipment failures. Inspections or testing of certain equipment due to regulation are reported using the appropriate equipment cause codes, and the fact that it was a regulatory requirement noted in the verbal description section.

TABLE B07-90 Regulatory, Safety, Environmental: Other Operating Environmental Limitations					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9660	Thermal discharge limits - fossil and nuclear
Fluidized Bed	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9670	Noise limits (not for personnel safety) – fossil and nuclear
Fluidized Bed	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9677	Noise limits testing - fossil
Fluidized Bed	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9680	Fish kill - fossil and nuclear
Fluidized Bed	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9690	Other miscellaneous operational environmental limits - fossil and nuclear
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-91 Regulatory, Safety, Environmental: Regulatory					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Regulatory, Safety, Environmental	Regulatory		9504	Regulatory (environmental) proceedings and hearings - regulatory agency initiated
Fluidized Bed	Regulatory, Safety, Environmental	Regulatory		9506	Regulatory (environmental) proceedings and hearings - intervenor initiated
Fluidized Bed	Regulatory, Safety, Environmental	Regulatory		9510	Plant modifications strictly for compliance with new or changed regulatory requirements (scrubbers, cooling towers, etc.)
Fluidized Bed	Regulatory, Safety, Environmental	Regulatory		9520	Oil spill in Gulf of Mexico (OMC)
Fluidized Bed	Regulatory, Safety, Environmental	Regulatory		9590	Miscellaneous regulatory (this code is primarily intended for use with event contribution code 2 to indicate that a regulatory-related factor contributed to the primary cause of the event)
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-92 Regulatory, Safety, Environmental: Safety					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Regulatory, Safety, Environmental	Safety		9700	OSHA-related retrofit or inspection
Fluidized Bed	Regulatory, Safety, Environmental	Safety		9720	Other safety problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-93 Regulatory, Safety, Environmental: Stack Emission					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Regulatory, Safety, Environmental	Stack Emission		9600	SO2 stack emissions - fossil
Fluidized Bed	Regulatory, Safety, Environmental	Stack Emission		9610	NOx stack emissions - fossil
Fluidized Bed	Regulatory, Safety, Environmental	Stack Emission		9616	CO stack emissions - fossil
Fluidized Bed	Regulatory, Safety, Environmental	Stack Emission		9620	Particulate stack emissions - fossil
Fluidized Bed	Regulatory, Safety, Environmental	Stack Emission		9630	Opacity - fossil
Fluidized Bed	Regulatory, Safety, Environmental	Stack Emission		9650	Other stack/exhaust emissions - fossil (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
Fluidized Bed	Regulatory, Safety, Environmental	Stack Emission		9656	Other stack or exhaust emissions testing - fossil
Notes: 1) For use with Unit Codes 650-699. 2) Include exhaust emissions.					

STEAM TURBINE

Besides the turbine, this set includes the steam stop/control valves, turbine control system, and the turbine auxiliaries. The extraction steam codes are contained in the Balance of Plant set.

TABLE B07-94 Steam Turbine: Controls					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**

Fluidized Bed	Steam Turbine	Controls		4290	Hydraulic system pumps
Fluidized Bed	Steam Turbine	Controls		4291	Hydraulic system coolers
Fluidized Bed	Steam Turbine	Controls		4292	Hydraulic system filters
Fluidized Bed	Steam Turbine	Controls		4293	Hydraulic system pipes and valves
Fluidized Bed	Steam Turbine	Controls		4299	Other hydraulic system problems
Fluidized Bed	Steam Turbine	Controls		4300	Turbine supervisory system (use codes 4290 to 4299 for hydraulic oil)
Fluidized Bed	Steam Turbine	Controls		4301	Turbine governing system
Fluidized Bed	Steam Turbine	Controls		4302	Turbine trip devices (including instruments)
Fluidized Bed	Steam Turbine	Controls		4303	Exhaust hood and spray controls
Fluidized Bed	Steam Turbine	Controls		4304	Automatic turbine control systems - mechanical
Fluidized Bed	Steam Turbine	Controls		4305	Automatic turbine control systems - mechanical - hydraulic
Fluidized Bed	Steam Turbine	Controls		4306	Automatic turbine control systems - electro- hydraulic - analog
Fluidized Bed	Steam Turbine	Controls		4307	Automatic turbine control systems - electro- hydraulic - digital
Fluidized Bed	Steam Turbine	Controls		4308	Automatic turbine control systems - digital control and monitoring
Fluidized Bed	Steam Turbine	Controls		4309	Other turbine instrument and control problems
Fluidized Bed	Steam Turbine	Controls		4310	Steam Turbine Control System - data highway
Fluidized Bed	Steam Turbine	Controls		4311	Steam Turbine Control System - hardware problems (including card failure)
Fluidized Bed	Steam Turbine	Controls		4312	Steam Turbine Control System - internal and termination wiring
Fluidized Bed	Steam Turbine	Controls		4313	Steam Turbine Control System - logic problems
Fluidized Bed	Steam Turbine	Controls		4314	Steam Turbine Control System - upgrades
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-95 Steam Turbine: High Pressure Turbine					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fluidized Bed	Steam Turbine	High Pressure Turbine		4000	Outer casing

Fluidized Bed	Steam Turbine	High Pressure Turbine		4001	Inner casing
Fluidized Bed	Steam Turbine	High Pressure Turbine		4009	Nozzle bolting
Fluidized Bed	Steam Turbine	High Pressure Turbine		4010	Nozzles and nozzle blocks
Fluidized Bed	Steam Turbine	High Pressure Turbine		4011	Diaphragms
Fluidized Bed	Steam Turbine	High Pressure Turbine		4012	Buckets or blades
Fluidized Bed	Steam Turbine	High Pressure Turbine		4013	Diaphragms unit and shroud type
Fluidized Bed	Steam Turbine	High Pressure Turbine		4014	Bucket or blade fouling
Fluidized Bed	Steam Turbine	High Pressure Turbine		4015	Wheels or spindles
Fluidized Bed	Steam Turbine	High Pressure Turbine		4020	Shaft seals
Fluidized Bed	Steam Turbine	High Pressure Turbine		4021	Dummy rings
Fluidized Bed	Steam Turbine	High Pressure Turbine		4022	Gland rings
Fluidized Bed	Steam Turbine	High Pressure Turbine		4030	Rotor shaft
Fluidized Bed	Steam Turbine	High Pressure Turbine		4040	Bearings
Fluidized Bed	Steam Turbine	High Pressure Turbine		4041	Thrust bearings
Fluidized Bed	Steam Turbine	High Pressure Turbine		4099	Other high pressure turbine problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-96 Steam Turbine: Intermediate Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Steam Turbine	Intermediate Pressure Turbine		4100	Outer casing
Fluidized Bed	Steam Turbine	Intermediate Pressure Turbine		4101	Inner casing
Fluidized Bed	Steam Turbine	Intermediate Pressure Turbine		4109	Nozzle bolting
Fluidized Bed	Steam Turbine	Intermediate Pressure Turbine		4110	Nozzles and nozzle blocks
Fluidized Bed	Steam Turbine	Intermediate Pressure Turbine		4111	Diaphragms
Fluidized Bed	Steam Turbine	Intermediate Pressure Turbine		4112	Buckets or blades
Fluidized Bed	Steam Turbine	Intermediate Pressure Turbine		4113	Bucket or blade fouling
Fluidized Bed	Steam Turbine	Intermediate Pressure Turbine		4115	Wheels or spindles
Fluidized Bed	Steam Turbine	Intermediate Pressure Turbine		4120	Shaft seals
Fluidized Bed	Steam Turbine	Intermediate Pressure Turbine		4121	Dummy rings
Fluidized Bed	Steam Turbine	Intermediate Pressure Turbine		4122	Gland rings
Fluidized Bed	Steam Turbine	Intermediate Pressure Turbine		4130	Rotor shaft
Fluidized Bed	Steam Turbine	Intermediate Pressure Turbine		4140	Bearings
Fluidized Bed	Steam Turbine	Intermediate Pressure Turbine		4141	Thrust bearings
Fluidized Bed	Steam Turbine	Intermediate Pressure Turbine		4199	Other intermediate pressure turbine problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-97 Steam Turbine: Low Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Steam Turbine	Low Pressure Turbine		4200	Outer casing
Fluidized Bed	Steam Turbine	Low Pressure Turbine		4201	Inner casing
Fluidized Bed	Steam Turbine	Low Pressure Turbine		4209	Nozzle bolting
Fluidized Bed	Steam Turbine	Low Pressure Turbine		4210	Nozzles and nozzle blocks
Fluidized Bed	Steam Turbine	Low Pressure Turbine		4211	Diaphragms
Fluidized Bed	Steam Turbine	Low Pressure Turbine		4212	Buckets or blades
Fluidized Bed	Steam Turbine	Low Pressure Turbine		4213	Bucket or blade fouling
Fluidized Bed	Steam Turbine	Low Pressure Turbine		4215	Wheels or spindles
Fluidized Bed	Steam Turbine	Low Pressure Turbine		4220	Shaft seals
Fluidized Bed	Steam Turbine	Low Pressure Turbine		4221	Dummy rings
Fluidized Bed	Steam Turbine	Low Pressure Turbine		4222	Gland rings
Fluidized Bed	Steam Turbine	Low Pressure Turbine		4230	Rotor shaft
Fluidized Bed	Steam Turbine	Low Pressure Turbine		4240	Bearings
Fluidized Bed	Steam Turbine	Low Pressure Turbine		4241	Thrust bearings
Fluidized Bed	Steam Turbine	Low Pressure Turbine		4250	Other low pressure turbine problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-98 Steam Turbine: Lube Oil

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Steam Turbine	Lube Oil		4280	Lube oil pumps
Fluidized Bed	Steam Turbine	Lube Oil		4281	Lube oil coolers
Fluidized Bed	Steam Turbine	Lube Oil		4282	Lube oil conditioners
Fluidized Bed	Steam Turbine	Lube Oil		4283	Lube oil system valves and piping
Fluidized Bed	Steam Turbine	Lube Oil		4284	Lube oil pump drive
Fluidized Bed	Steam Turbine	Lube Oil		4289	Other lube oil system problems
Notes: 1) For use with Unit Codes 650-699. 2) Do not include bearing failures due to lube oil.					

TABLE B07-99 Steam Turbine: Miscellaneous (Steam Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Steam Turbine	Miscellaneous (Steam Turbine)		4400	Major turbine overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Fluidized Bed	Steam Turbine	Miscellaneous (Steam Turbine)		4401	Inspection

Fluidized Bed	Steam Turbine	Miscellaneous (Steam Turbine)		4402	Minor turbine overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Fluidized Bed	Steam Turbine	Miscellaneous (Steam Turbine)		4410	Turning gear and motor
Fluidized Bed	Steam Turbine	Miscellaneous (Steam Turbine)		4411	Steam turbine gear box (single shaft configuration)
Fluidized Bed	Steam Turbine	Miscellaneous (Steam Turbine)		4412	Steam turbine clutch (single shaft configuration)
Fluidized Bed	Steam Turbine	Miscellaneous (Steam Turbine)		4415	Shaft coupling mechanism
Fluidized Bed	Steam Turbine	Miscellaneous (Steam Turbine)		4420	Vibration of the turbine generator unit that cannot be attributed to a specific cause such as bearings or blades (use this code for balance moves)
Fluidized Bed	Steam Turbine	Miscellaneous (Steam Turbine)		4430	Gland seal system
Fluidized Bed	Steam Turbine	Miscellaneous (Steam Turbine)		4450	Water induction
Fluidized Bed	Steam Turbine	Miscellaneous (Steam Turbine)		4460	Turbine overspeed trip test
Fluidized Bed	Steam Turbine	Miscellaneous (Steam Turbine)		4470	Differential expansion
Fluidized Bed	Steam Turbine	Miscellaneous (Steam Turbine)		4490	Turbine performance testing (use code 9999 for total unit performance testing)
Fluidized Bed	Steam Turbine	Miscellaneous (Steam Turbine)		4499	Other miscellaneous steam turbine problems
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-100 Steam Turbine: Piping

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Steam Turbine	Piping		4270	Crossover or under piping
Fluidized Bed	Steam Turbine	Piping		4279	Miscellaneous turbine piping
Notes: 1) For use with Unit Codes 650-699.					

TABLE B07-101 Steam Turbine: Valves

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fluidized Bed	Steam Turbine	Valves		4260	Main stop valves
Fluidized Bed	Steam Turbine	Valves		4261	Control valves
Fluidized Bed	Steam Turbine	Valves		4262	Intercept valves
Fluidized Bed	Steam Turbine	Valves		4263	Reheat stop valves
Fluidized Bed	Steam Turbine	Valves		4264	Combined intercept valves
Fluidized Bed	Steam Turbine	Valves		4265	Miscellaneous drain and vent valves

Fluidized Bed	Steam Turbine	Valves		4266	Main stop valve testing
Fluidized Bed	Steam Turbine	Valves		4267	Control valve testing
Fluidized Bed	Steam Turbine	Valves		4268	Reheat/intercept valve testing
Fluidized Bed	Steam Turbine	Valves		4269	Other turbine valves (including LP steam admission valves)
Notes: 1) For use with Unit Codes 650-699.					

Appendix B08: Index To Fossil-Steam Unit Cause Codes

FOSSIL-STEAM UNITS

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B08-1	Balance of Plant	Auxiliary Systems	Auxiliary Steam
B08-2	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems
B08-3	Balance of Plant	Auxiliary Systems	Fire Protection System
B08-4	Balance of Plant	Auxiliary Systems	Instrument Air
B08-5	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System
B08-6	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)
B08-7	Balance of Plant	Auxiliary Systems	Open Cooling Water System
B08-8	Balance of Plant	Auxiliary Systems	Seal Air Fans
B08-9	Balance of Plant	Auxiliary Systems	Service Air
B08-10	Balance of Plant	Auxiliary Systems	Service Water (Open System)
B08-11	Balance of Plant	Circulating Water Systems	
B08-12	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators
B08-13	Balance of Plant	Condensate System	Miscellaneous (Condensate System)
B08-14	Balance of Plant	Condensate System	Polishers/Chemical Addition
B08-15	Balance of Plant	Condensate System	Pumps, Piping, and Valves
B08-16	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals
B08-17	Balance of Plant	Condensing System	Condenser Controls
B08-18	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment
B08-19	Balance of Plant	Condensing System	Miscellaneous (Condensing System)
B08-20	Balance of Plant	Condensing System	Vacuum Equipment
B08-21	Balance of Plant	Electrical	
B08-22	Balance of Plant	Extraction Steam	
B08-23	Balance of Plant	Feedwater System	
B08-24	Balance of Plant	Heater Drain Systems	
B08-25	Balance of Plant	Miscellaneous (Balance of Plant)	
B08-26	Balance of Plant	Power Station Switchyard	
B08-27	Balance of Plant	Waste Water (zero discharge) Systems	
B08-28	Boiler	Boiler Air and Gas Systems	Air Supply
B08-29	Boiler	Boiler Air and Gas Systems	Flue Gas
B08-30	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation
B08-31	Boiler	Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)
B08-32	Boiler	Boiler Control Systems	

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B08-33	Boiler	Boiler Design Limitations	
B08-34	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners
B08-35	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone
B08-36	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)
B08-37	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts
B08-38	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers
B08-39	Boiler	Boiler Internals and Structures	
B08-40	Boiler	Boiler Overhaul and Inspections	
B08-41	Boiler	Boiler Piping System	Boiler Recirculation
B08-42	Boiler	Boiler Piping System	Cold and Hot Reheat Steam
B08-43	Boiler	Boiler Piping System	Desuperheaters/Attemperators
B08-44	Boiler	Boiler Piping System	Feedwater and Blowdown
B08-45	Boiler	Boiler Piping System	Main Steam
B08-46	Boiler	Boiler Piping System	Miscellaneous (Piping)
B08-47	Boiler	Boiler Piping System	Startup Bypass
B08-48	Boiler	Boiler Tube Fireside Slagging or Fouling	
B08-49	Boiler	Boiler Tube Leaks	
B08-50	Boiler	Boiler Water Condition	
B08-51	Boiler	Miscellaneous (Boiler)	
B08-52	Boiler	Miscellaneous Boiler Tube Problems	
B08-53	Boiler	Slag and Ash Removal	
B08-54	External	Catastrophe	
B08-55	External	Economic	
B08-56	External	Fuel Quality	
B08-57	External	Miscellaneous (External)	
B08-58	Generator	Controls	
B08-59	Generator	Cooling System	
B08-60	Generator	Exciter	
B08-61	Generator	Generator	
B08-62	Generator	Miscellaneous (Generator)	
B08-63	Inactive States	Inactive States	
B08-64	Performance	Performance	
B08-65	Personnel or Procedural Errors	Personnel or Procedural Errors	
B08-66	Pollution Control Equipment	CO Reduction	
B08-67	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)	
B08-68	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B08-69	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)
B08-70	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers
B08-71	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply
B08-72	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery
B08-73	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)	
B08-74	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters
B08-75	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems
B08-76	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems
B08-77	Pollution Control Equipment	Precipitators	
B08-78	Pollution Control Equipment	Wet Scrubbers	Chemical Supply
B08-79	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)
B08-80	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans
B08-81	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery
B08-82	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber
B08-83	Regulatory, Safety, Environmental	Other Operating Environmental Limitations	
B08-84	Regulatory, Safety, Environmental	Regulatory	
B08-85	Regulatory, Safety, Environmental	Safety	
B08-86	Regulatory, Safety, Environmental	Stack Emission	
B08-87	Steam Turbine	Controls	
B08-88	Steam Turbine	High Pressure Turbine	
B08-89	Steam Turbine	Intermediate Pressure Turbine	
B08-90	Steam Turbine	Low Pressure Turbine	
B08-91	Steam Turbine	Lube Oil	
B08-92	Steam Turbine	Miscellaneous (Steam Turbine)	
B08-93	Steam Turbine	Piping	
B08-94	Steam Turbine	Valves	

BALANCE OF PLANT

TABLE B08-1 Balance of Plant: Auxiliary Systems - Auxiliary Steam					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fossil-Steam	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3830	Auxiliary boiler
Fossil-Steam	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3831	Auxiliary steam piping

Fossil-Steam	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3832	Auxiliary steam valves
Fossil-Steam	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3833	Auxiliary steam controls and instruments
Fossil-Steam	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3834	Auxiliary boiler tube leaks
Fossil-Steam	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3835	Auxiliary boiler burner management system
Fossil-Steam	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3836	Steam transfer to other unit
Fossil-Steam	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3839	Other auxiliary steam problems (also see extraction steam codes 3520 to 3529; startup bypass codes 0630 to 0660; and soot blower steam code 0870)
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-2 Balance of Plant: Auxiliary Systems - Closed Cooling Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3820	Closed cooling water pumps and motors
Fossil-Steam	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3821	Closed cooling water piping
Fossil-Steam	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3822	Closed cooling water valves
Fossil-Steam	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3823	Closed cooling water heat exchangers
Fossil-Steam	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3824	Closed cooling water system fouling
Fossil-Steam	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3825	Closed cooling water instrumentation
Fossil-Steam	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3826	Closed cooling water strainer
Fossil-Steam	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3829	Other closed cooling water system problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-3 Balance of Plant: Auxiliary Systems - Fire Protection System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Auxiliary Systems	Fire Protection System	3860	Fire protection system pumps
Fossil-Steam	Balance of Plant	Auxiliary Systems	Fire Protection System	3861	Fire protection system piping
Fossil-Steam	Balance of Plant	Auxiliary Systems	Fire Protection System	3862	Fire protection system valves
Fossil-Steam	Balance of Plant	Auxiliary Systems	Fire Protection System	3863	Fire protection system fouling
Fossil-Steam	Balance of Plant	Auxiliary Systems	Fire Protection System	3864	Fire protection system instrumentation and controls
Fossil-Steam	Balance of Plant	Auxiliary Systems	Fire Protection System	3869	Other fire protection system problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-4 Balance of Plant: Auxiliary Systems - Instrument Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Auxiliary Systems	Instrument Air	3850	Instrument air compressors
Fossil-Steam	Balance of Plant	Auxiliary Systems	Instrument Air	3851	Instrument air piping
Fossil-Steam	Balance of Plant	Auxiliary Systems	Instrument Air	3852	Instrument air valves
Fossil-Steam	Balance of Plant	Auxiliary Systems	Instrument Air	3853	Instrument air dryers
Fossil-Steam	Balance of Plant	Auxiliary Systems	Instrument Air	3854	N2 backup to instrument air
Fossil-Steam	Balance of Plant	Auxiliary Systems	Instrument Air	3859	Other instrument air problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-5 Balance of Plant: Auxiliary Systems - Low-pressure Gas Compression System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3870	Fuel Gas Compressor and Motors

Fossil-Steam	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3871	Fuel Gas Compressor Piping
Fossil-Steam	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3872	Fuel Gas Compressor Valves
Fossil-Steam	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3873	Fuel Gas Compressor Heat Exchangers
Fossil-Steam	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3874	Fuel Gas Compressor Controls and Instrumentation
Fossil-Steam	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3875	Fuel Gas Compressor Filters
Fossil-Steam	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3876	Fuel Gas Compressor Fire System
Fossil-Steam	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3879	Fuel Gas Compressor - other
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-6 Balance of Plant: Auxiliary Systems - Miscellaneous (Auxiliary Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3898	Miscellaneous plant auxiliary process and services instrumentation and controls
Fossil-Steam	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3899	Other miscellaneous auxiliary system problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-7 Balance of Plant: Auxiliary Systems - Open Cooling Water System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3800	Open cooling water pumps and motors
Fossil-Steam	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3801	Open cooling water piping
Fossil-Steam	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3802	Open cooling water valves
Fossil-Steam	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3803	Open cooling water heat exchangers
Fossil-Steam	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3804	Open cooling water system fouling

Fossil-Steam	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3805	Open cooling water system instrumentation
Fossil-Steam	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3806	Open cooling water strainer
Fossil-Steam	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3809	Other open cooling water problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-8 Balance of Plant: Auxiliary Systems - Seal Air Fans

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Auxiliary Systems	Seal Air Fans	3880	Seal air fan
Fossil-Steam	Balance of Plant	Auxiliary Systems	Seal Air Fans	3881	Seal air fan drive - motor
Fossil-Steam	Balance of Plant	Auxiliary Systems	Seal Air Fans	3882	Seal air control dampers and drives
Fossil-Steam	Balance of Plant	Auxiliary Systems	Seal Air Fans	3883	Seal air filters
Fossil-Steam	Balance of Plant	Auxiliary Systems	Seal Air Fans	3889	Other seal air fan problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-9 Balance of Plant: Auxiliary Systems - Service Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Auxiliary Systems	Service Air	3840	Service air compressors
Fossil-Steam	Balance of Plant	Auxiliary Systems	Service Air	3841	Service air piping
Fossil-Steam	Balance of Plant	Auxiliary Systems	Service Air	3842	Service air valves
Fossil-Steam	Balance of Plant	Auxiliary Systems	Service Air	3843	Service air dryers
Fossil-Steam	Balance of Plant	Auxiliary Systems	Service Air	3844	Soot blowing air compressor and system
Fossil-Steam	Balance of Plant	Auxiliary Systems	Service Air	3849	Other service air problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-10 Balance of Plant: Auxiliary Systems - Service Water (Open System)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fossil-Steam	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3810	Service water pumps and motors
Fossil-Steam	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3811	Service water piping
Fossil-Steam	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3812	Service water valves
Fossil-Steam	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3813	Service water heat exchangers
Fossil-Steam	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3814	Service water system fouling
Fossil-Steam	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3815	Service water strainer
Fossil-Steam	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3819	Other service water problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-11 Balance of Plant: Circulating Water Systems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fossil-Steam	Balance of Plant	Circulating Water Systems		3210	Circulating water pumps
Fossil-Steam	Balance of Plant	Circulating Water Systems		3211	Circulating water pump motors
Fossil-Steam	Balance of Plant	Circulating Water Systems		3220	Circulating water piping
Fossil-Steam	Balance of Plant	Circulating Water Systems		3221	Circulating water piping fouling
Fossil-Steam	Balance of Plant	Circulating Water Systems		3230	Circulating water valves
Fossil-Steam	Balance of Plant	Circulating Water Systems		3231	Waterbox
Fossil-Steam	Balance of Plant	Circulating Water Systems		3232	Condenser tube cleaning system including debris filter
Fossil-Steam	Balance of Plant	Circulating Water Systems		3233	Circulating water priming system

Fossil-Steam	Balance of Plant	Circulating Water Systems		3235	Cooling tower booster pump
Fossil-Steam	Balance of Plant	Circulating Water Systems		3236	Cooling tower booster motor
Fossil-Steam	Balance of Plant	Circulating Water Systems		3238	Cooling tower fan motors
Fossil-Steam	Balance of Plant	Circulating Water Systems		3239	Cooling tower fan motors - variable speed
Fossil-Steam	Balance of Plant	Circulating Water Systems		3240	Cooling tower fans
Fossil-Steam	Balance of Plant	Circulating Water Systems		3241	Cooling tower efficiency below design
Fossil-Steam	Balance of Plant	Circulating Water Systems		3242	Cooling tower fill damage
Fossil-Steam	Balance of Plant	Circulating Water Systems		3243	Cooling tower icing
Fossil-Steam	Balance of Plant	Circulating Water Systems		3244	Cooling tower fires
Fossil-Steam	Balance of Plant	Circulating Water Systems		3245	Other cooling tower problems
Fossil-Steam	Balance of Plant	Circulating Water Systems		3246	Cooling tower fouling
Fossil-Steam	Balance of Plant	Circulating Water Systems		3247	Cooling tower instrumentation
Fossil-Steam	Balance of Plant	Circulating Water Systems		3248	Cooling Tower Overhaul
Fossil-Steam	Balance of Plant	Circulating Water Systems		3250	Circulating water system instruments and controls
Fossil-Steam	Balance of Plant	Circulating Water Systems		3260	Traveling screens
Fossil-Steam	Balance of Plant	Circulating Water Systems		3261	Traveling screen fouling
Fossil-Steam	Balance of Plant	Circulating Water Systems		3269	Circulating water biological conditions (ie, zebra mussels)
Fossil-Steam	Balance of Plant	Circulating Water Systems		3270	Intake system problems other than traveling screens
Fossil-Steam	Balance of Plant	Circulating Water Systems		3271	Intake grating fouling

Fossil-Steam	Balance of Plant	Circulating Water Systems		3272	Circulating water screenwash system
Fossil-Steam	Balance of Plant	Circulating Water Systems		3273	Debris in circulating water from outside sources (leaves, mud, etc.)
Fossil-Steam	Balance of Plant	Circulating Water Systems		3274	Ice blockages at intake structures including frazil ice, sheets, blocks of ice, etc.
Fossil-Steam	Balance of Plant	Circulating Water Systems		3280	High circulating water temperature (not due to season, tower efficiency below design, or other listed equipment problem)
Fossil-Steam	Balance of Plant	Circulating Water Systems		3281	Circulating water tempering system
Fossil-Steam	Balance of Plant	Circulating Water Systems		3282	Circulating water cooling ponds
Fossil-Steam	Balance of Plant	Circulating Water Systems		3285	Circulating water chemistry
Fossil-Steam	Balance of Plant	Circulating Water Systems		3299	Other circulating water system problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-12 Balance of Plant: Condensate System - Low/Intermediate Pressure Heater and Deaerators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3339	LP heater head leaks
Fossil-Steam	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3340	LP heater tube leaks
Fossil-Steam	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3341	Other LP heater - general
Fossil-Steam	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3342	IP heater tube leaks
Fossil-Steam	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3343	Other IP heater - general
Fossil-Steam	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3344	Deaerator (including level control)
Fossil-Steam	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3345	IP heater head leaks
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-13 Balance of Plant: Condensate System - Miscellaneous (Condensate System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3360	Condensate makeup and return (including storage tanks)
Fossil-Steam	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3370	Condensate system controls and instrumentation (not hotwell level, heater level, or deaerator level controls; see codes 3150-3159, 3344, 3502).
Fossil-Steam	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3380	Condensate coolers
Fossil-Steam	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3399	Other miscellaneous condensate system problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-14 Balance of Plant: Condensate System - Polishers/Chemical Addition

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Condensate System	Polishers/Chemical Addition	3350	Condensate polishing and filtering systems
Fossil-Steam	Balance of Plant	Condensate System	Polishers/Chemical Addition	3351	Chemical addition systems
Fossil-Steam	Balance of Plant	Condensate System	Polishers/Chemical Addition	3352	Feedwater chemistry (not specific to condenser, polishers, or chemical addition)
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-15 Balance of Plant: Condensate System - Pumps, Piping, and Valves

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3300	Condensate water pre-treatment
Fossil-Steam	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3310	Condensate/hotwell pumps
Fossil-Steam	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3311	Condensate/hotwell pump motor
Fossil-Steam	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3312	Condensate booster pump
Fossil-Steam	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3313	Condensate booster pump motor

Fossil-Steam	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3314	Condensate booster pump motor - variable speed
Fossil-Steam	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3315	Condensate booster pump drive (other than 3313 and 3314)
Fossil-Steam	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3320	Condensate piping
Fossil-Steam	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3330	Condensate valves
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-16 Balance of Plant: Condensing System - Condenser Casing or Shell and Internals

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3120	Tube sheets
Fossil-Steam	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3121	Expansion joint
Fossil-Steam	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3122	Gaskets and seals
Fossil-Steam	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3123	Hot well
Fossil-Steam	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3124	Tube sheet fouling
Fossil-Steam	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3129	Other condenser casing or shell and internal problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-17 Balance of Plant: Condensing System - Condenser Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Condensing System	Condenser Controls	3150	Hot well level controls
Fossil-Steam	Balance of Plant	Condensing System	Condenser Controls	3151	Vacuum pump and air ejector controls
Fossil-Steam	Balance of Plant	Condensing System	Condenser Controls	3152	Air-cooled condenser controls
Fossil-Steam	Balance of Plant	Condensing System	Condenser Controls	3159	Other condensing system controls and instruments
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-18 Balance of Plant: Condensing System - Condenser Tubes and Support Equipment					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fossil-Steam	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3110	Condenser tube leaks
Fossil-Steam	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3111	Condenser tube fouling shell side
Fossil-Steam	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3112	Condenser tube fouling tube side
Fossil-Steam	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3113	Condenser tube and water box cleaning (including circulating water flow reversal)
Fossil-Steam	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3114	Air-cooled condenser tubes
Fossil-Steam	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3115	Air-cooled condenser pumps
Fossil-Steam	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3116	Air-cooled condenser fans
Fossil-Steam	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3117	Air-cooled condenser fan motors
Fossil-Steam	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3118	Other Air-cooled condenser problems
Fossil-Steam	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3119	Other condenser tube casing or shell and internal problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-19 Balance of Plant: Condensing System - Miscellaneous (Condensing System)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fossil-Steam	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3170	Condenser inspection (use code 3110 to report looking for tube leaks)
Fossil-Steam	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3171	Air-cooled condenser inspections
Fossil-Steam	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3180	Major condenser overhaul
Fossil-Steam	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3185	Water side cathodic protection
Fossil-Steam	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3186	Auxiliary condenser and associated equipment

Fossil-Steam	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3190	Air leakage (for losses not attributable to previously noted equipment related codes)
Fossil-Steam	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3199	Other miscellaneous condensing system problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-20 Balance of Plant: Condensing System - Vacuum Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Condensing System	Vacuum Equipment	3130	Air ejectors
Fossil-Steam	Balance of Plant	Condensing System	Vacuum Equipment	3131	Air ejector piping and valves
Fossil-Steam	Balance of Plant	Condensing System	Vacuum Equipment	3132	Inter and after condensers
Fossil-Steam	Balance of Plant	Condensing System	Vacuum Equipment	3133	Vacuum pumps
Fossil-Steam	Balance of Plant	Condensing System	Vacuum Equipment	3134	Vacuum pump piping and valves
Fossil-Steam	Balance of Plant	Condensing System	Vacuum Equipment	3135	Vacuum pump motor and auxiliaries
Fossil-Steam	Balance of Plant	Condensing System	Vacuum Equipment	3139	Other air extraction system problems - general
Fossil-Steam	Balance of Plant	Condensing System	Vacuum Equipment	3149	Loss of vacuum not attributable to a particular component such as air ejectors or valves, or high back pressure not attributable to high circulating water temperature, or vacuum losses from a known cause.
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-21 Balance of Plant: Electrical

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Electrical		3600	Switchyard transformers and associated cooling systems - external (OMC)
Fossil-Steam	Balance of Plant	Electrical		3601	Switchyard transformers and associated cooling systems - external (not OMC)
Fossil-Steam	Balance of Plant	Electrical		3610	Switchyard circuit breakers - external (not OMC)

Fossil-Steam	Balance of Plant	Electrical		3611	Switchyard circuit breakers - external (OMC)
Fossil-Steam	Balance of Plant	Electrical		3612	Switchyard system protection devices - external (OMC)
Fossil-Steam	Balance of Plant	Electrical		3613	Switchyard system protection devices - external (not OMC)
Fossil-Steam	Balance of Plant	Electrical		3618	Other switchyard equipment - external (not OMC)
Fossil-Steam	Balance of Plant	Electrical		3619	Other switchyard equipment - external (OMC)
Fossil-Steam	Balance of Plant	Electrical		3620	Main transformer
Fossil-Steam	Balance of Plant	Electrical		3621	Unit auxiliaries transformer
Fossil-Steam	Balance of Plant	Electrical		3622	Station service startup transformer
Fossil-Steam	Balance of Plant	Electrical		3623	Auxiliary generators
Fossil-Steam	Balance of Plant	Electrical		3624	Auxiliary generator voltage supply system
Fossil-Steam	Balance of Plant	Electrical		3629	Other switchyard or high voltage system problems - external
Fossil-Steam	Balance of Plant	Electrical		3630	400-700 volt transformers
Fossil-Steam	Balance of Plant	Electrical		3631	400-700 volt circuit breakers
Fossil-Steam	Balance of Plant	Electrical		3632	400-700 volt conductors and buses
Fossil-Steam	Balance of Plant	Electrical		3633	400-700 volt insulators
Fossil-Steam	Balance of Plant	Electrical		3634	400-700 volt protection devices
Fossil-Steam	Balance of Plant	Electrical		3639	Other 400-700 volt problems
Fossil-Steam	Balance of Plant	Electrical		3640	AC instrument power transformers
Fossil-Steam	Balance of Plant	Electrical		3641	AC Circuit breakers

Fossil-Steam	Balance of Plant	Electrical		3642	AC Conductors and buses
Fossil-Steam	Balance of Plant	Electrical		3643	AC Inverters
Fossil-Steam	Balance of Plant	Electrical		3644	AC Protection devices
Fossil-Steam	Balance of Plant	Electrical		3649	Other AC instrument power problems
Fossil-Steam	Balance of Plant	Electrical		3650	DC instrument power battery chargers
Fossil-Steam	Balance of Plant	Electrical		3651	DC circuit breakers
Fossil-Steam	Balance of Plant	Electrical		3652	DC conductors and buses
Fossil-Steam	Balance of Plant	Electrical		3653	DC protection devices
Fossil-Steam	Balance of Plant	Electrical		3659	Other DC power problems
Fossil-Steam	Balance of Plant	Electrical		3660	4000-7000 volt transformers
Fossil-Steam	Balance of Plant	Electrical		3661	4000-7000 volt circuit breakers
Fossil-Steam	Balance of Plant	Electrical		3662	4000-7000 volt conductors and buses
Fossil-Steam	Balance of Plant	Electrical		3663	4000-7000 volt insulators
Fossil-Steam	Balance of Plant	Electrical		3664	4000-7000 volt protection devices
Fossil-Steam	Balance of Plant	Electrical		3669	Other 4000-7000 volt problems
Fossil-Steam	Balance of Plant	Electrical		3670	12-15kV transformers
Fossil-Steam	Balance of Plant	Electrical		3671	12-15kV circuit breakers
Fossil-Steam	Balance of Plant	Electrical		3672	12-15kV conductors and buses
Fossil-Steam	Balance of Plant	Electrical		3673	12-15kV insulators

Fossil-Steam	Balance of Plant	Electrical		3674	12-15kV protection devices
Fossil-Steam	Balance of Plant	Electrical		3679	Other 12-15kV problems
Fossil-Steam	Balance of Plant	Electrical		3680	Other voltage transformers
Fossil-Steam	Balance of Plant	Electrical		3681	Other voltage circuit breakers
Fossil-Steam	Balance of Plant	Electrical		3682	Other voltage conductors and buses
Fossil-Steam	Balance of Plant	Electrical		3683	Other voltage insulators
Fossil-Steam	Balance of Plant	Electrical		3684	Other voltage protection devices
Fossil-Steam	Balance of Plant	Electrical		3689	Other voltage problems
Fossil-Steam	Balance of Plant	Electrical		3690	Station Service Power Distribution System, General
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-22 Balance of Plant: Extraction Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Extraction Steam		3520	HP Extraction steam piping
Fossil-Steam	Balance of Plant	Extraction Steam		3521	HP Extraction steam valves
Fossil-Steam	Balance of Plant	Extraction Steam		3522	HP Extraction steam instruments and controls
Fossil-Steam	Balance of Plant	Extraction Steam		3529	Other HP extraction steam system problems
Fossil-Steam	Balance of Plant	Extraction Steam		3530	IP Extraction steam piping
Fossil-Steam	Balance of Plant	Extraction Steam		3531	IP Extraction steam valves
Fossil-Steam	Balance of Plant	Extraction Steam		3532	IP Extraction steam instruments and controls
Fossil-Steam	Balance of Plant	Extraction Steam		3539	Other IP extraction steam system problems

Fossil-Steam	Balance of Plant	Extraction Steam		3540	LP Extraction steam piping
Fossil-Steam	Balance of Plant	Extraction Steam		3541	LP Extraction steam valves
Fossil-Steam	Balance of Plant	Extraction Steam		3542	LP Extraction steam instruments and controls
Fossil-Steam	Balance of Plant	Extraction Steam		3549	Other LP extraction steam system problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-23 Balance of Plant: Feedwater System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Feedwater System		3401	Startup feedwater pump
Fossil-Steam	Balance of Plant	Feedwater System		3402	Startup feedwater pump drives - all types
Fossil-Steam	Balance of Plant	Feedwater System		3407	Feedwater pump suction screens
Fossil-Steam	Balance of Plant	Feedwater System		3408	Feedwater pump drive - local controls
Fossil-Steam	Balance of Plant	Feedwater System		3409	Feedwater pump drive motor - variable speed
Fossil-Steam	Balance of Plant	Feedwater System		3410	Feedwater pump
Fossil-Steam	Balance of Plant	Feedwater System		3411	Feedwater pump drive - motor
Fossil-Steam	Balance of Plant	Feedwater System		3412	Feedwater pump drive - steam turbine
Fossil-Steam	Balance of Plant	Feedwater System		3413	Feedwater pump coupling and drive shaft
Fossil-Steam	Balance of Plant	Feedwater System		3414	Feedwater pump local controls
Fossil-Steam	Balance of Plant	Feedwater System		3415	Feedwater pump/drive lube oil system
Fossil-Steam	Balance of Plant	Feedwater System		3416	Other feedwater pump problems
Fossil-Steam	Balance of Plant	Feedwater System		3417	Feedwater pump drive - main shaft

Fossil-Steam	Balance of Plant	Feedwater System		3418	Feedwater pump drive - other
Fossil-Steam	Balance of Plant	Feedwater System		3419	Feedwater pump drive - gear
Fossil-Steam	Balance of Plant	Feedwater System		3420	Feedwater piping and supports
Fossil-Steam	Balance of Plant	Feedwater System		3430	Feedwater regulating (boiler level control) valve
Fossil-Steam	Balance of Plant	Feedwater System		3431	Other feedwater valves
Fossil-Steam	Balance of Plant	Feedwater System		3439	HP heater head leaks
Fossil-Steam	Balance of Plant	Feedwater System		3440	High pressure heater tube leaks
Fossil-Steam	Balance of Plant	Feedwater System		3441	Other high pressure heater problems (see condensate system for LP and IP heater codes)
Fossil-Steam	Balance of Plant	Feedwater System		3451	Feedwater booster pump suction screens
Fossil-Steam	Balance of Plant	Feedwater System		3452	Feedwater booster pump drive - local controls
Fossil-Steam	Balance of Plant	Feedwater System		3453	Feedwater booster pump drive motor - variable speed
Fossil-Steam	Balance of Plant	Feedwater System		3454	Feedwater booster pump
Fossil-Steam	Balance of Plant	Feedwater System		3455	Feedwater booster pump drive - motor
Fossil-Steam	Balance of Plant	Feedwater System		3456	Feedwater booster pump drive - steam turbine
Fossil-Steam	Balance of Plant	Feedwater System		3457	Feedwater booster pump coupling and drive shaft
Fossil-Steam	Balance of Plant	Feedwater System		3458	Feedwater booster pump local controls
Fossil-Steam	Balance of Plant	Feedwater System		3459	Feedwater booster pump/drive lube oil system
Fossil-Steam	Balance of Plant	Feedwater System		3460	Other feedwater booster pump problems
Fossil-Steam	Balance of Plant	Feedwater System		3461	Feedwater booster pump drive - main shaft

Fossil-Steam	Balance of Plant	Feedwater System		3462	Feedwater booster pump drive - other
Fossil-Steam	Balance of Plant	Feedwater System		3463	Feedwater booster pump drive - gear
Fossil-Steam	Balance of Plant	Feedwater System		3499	Other feedwater system problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-24 Balance of Plant: Heater Drain Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Heater Drain Systems		3501	Heater drain pumps
Fossil-Steam	Balance of Plant	Heater Drain Systems		3502	Heater level control
Fossil-Steam	Balance of Plant	Heater Drain Systems		3503	Heater drain piping
Fossil-Steam	Balance of Plant	Heater Drain Systems		3504	Heater drain valves
Fossil-Steam	Balance of Plant	Heater Drain Systems		3505	Heater drain pump drive
Fossil-Steam	Balance of Plant	Heater Drain Systems		3509	Other heater drain system problems
Notes: 1) For use with Unit Codes 100-199 and 600-649. 2) Excluding extraction or drain systems.					

TABLE B08-25 Balance of Plant: Miscellaneous (Balance of Plant)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3950	Process computer
Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3960	Thermal derating (thermal efficiency losses in balance of plant when specific cause(s) unknown)
Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3970	Distributive Control System (DCS) - process computer
Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3971	DCS - data highway
Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3972	DCS - hardware problems (including card failure)

Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3973	DCS - internal and termination wiring
Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3974	DCS - logic problems
Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3975	DCS - upgrades
Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3979	Other DCS problems
Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3980	Programmable Logic Controller (PLC)
Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3981	PLC - data highway
Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3982	PLC - hardware problems (including card failure)
Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3983	PLC - internal and termination wiring
Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3984	PLC - logic problems
Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3985	PLC - upgrades
Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3989	Other PLC problems
Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3995	Powerhouse heating and ventilating systems
Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3996	Air conditioning systems - rooms and areas
Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3998	Balance of plant overhaul/outage
Fossil-Steam	Balance of Plant	Miscellaneous (Balance of Plant)		3999	Other miscellaneous balance of plant problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-26 Balance of Plant: Power Station Switchyard

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Power Station Switchyard		3700	Power Station switchyard (non generating unit equipment)
Fossil-Steam	Balance of Plant	Power Station Switchyard		3710	Transmission line (connected to powerhouse switchyard to 1st Substation)

Fossil-Steam	Balance of Plant	Power Station Switchyard		3720	Transmission equipment at the 1st substation (see code 9300 if applicable)
Fossil-Steam	Balance of Plant	Power Station Switchyard		3730	Transmission equipment beyond the 1st substation (see code 9300 if applicable)
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-27 Balance of Plant: Waste Water (zero discharge) Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Balance of Plant	Waste Water (zero discharge) Systems		3290	Waste water (zero discharge) tanks, pumps, and motors
Fossil-Steam	Balance of Plant	Waste Water (zero discharge) Systems		3291	Waste water (zero discharge) system fouling
Fossil-Steam	Balance of Plant	Waste Water (zero discharge) Systems		3292	Waste water (zero discharge) piping
Fossil-Steam	Balance of Plant	Waste Water (zero discharge) Systems		3293	Waste water (zero discharge) valves
Fossil-Steam	Balance of Plant	Waste Water (zero discharge) Systems		3294	Waste water (zero discharge) controls and instrumentation
Fossil-Steam	Balance of Plant	Waste Water (zero discharge) Systems		3295	Other waste water (zero discharge) problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

BOILER

This set of codes contains the following:

- Boiler
- Boiler internals (tubes, refractory, supports, etc.)
- All the fuel handling, storage, preparation, and burning equipment.
- The forced/induced draft air system.
- Slag and ash removal except for particulate and gas cleanup. These latter items are covered under pollution control equipment.
- The main steam and reheat steam systems up to but not including the turbine stop or isolation valves.
- The feedwater system downstream of the final valve prior to entry into the economizer or boiler.
- Boiler blowdown systems.
- The startup bypass system including drains up to the heaters or condenser.

- Boiler water chemistry problems not due to problems in the condensate/feedwater system, the chemical addition system, or the demineralizer/polisher system.
- The instruments and controls associated with the above equipment.

TABLE B08-28 Boiler: Boiler Air and Gas Systems - Air Supply

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Air Supply	1400	Forced draft fans
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Air Supply	1401	Forced draft fan dampers
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Air Supply	1407	Forced draft fan lubrication system
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Air Supply	1410	Forced draft fan motors
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Air Supply	1411	Forced draft fan motors - variable speed
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Air Supply	1412	Forced draft fan drives (other than motor)
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Air Supply	1413	Forced draft fan couplings
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Air Supply	1415	Forced draft fan controls
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Air Supply	1420	Other forced draft fan problems
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Air Supply	1421	Secondary air fans/blowers
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Air Supply	1422	Secondary air fan/blower motors - single speed
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Air Supply	1423	Secondary air fan/blower motors - variable speed
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Air Supply	1424	Secondary air fan/blower controls
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Air Supply	1430	Air supply ducts from FD fan
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Air Supply	1431	Air supply dampers from FD fan
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Air Supply	1432	Air supply duct expansion joints
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Air Supply	1440	Air supply dampers
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Air Supply	1450	Other air supply problems

Notes: 1) For use with Unit Codes 100-199 and 600-649. 2) Excluding burner pipes, wind boxes, primary air, or pulverizer exhausters.

TABLE B08-29 Boiler: Boiler Air and Gas Systems - Flue Gas

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1455	Induced draft fans
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1456	Induced draft fan dampers
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1457	Induced draft fan lubrication systems
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1460	Induced draft fan fouling
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1470	Induced draft fan motors and drives

Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1471	Induced draft fan motors - variable speed
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1472	Inducted draft fan coupling
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1475	Induced draft fan controls
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1476	Induced draft fan speed changer
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1480	Other induced draft fan problems
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1487	Air heater (tubular)
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1488	Air heater (regenerative)
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1489	Air heater (heat pipe, plate-type)
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1492	Air heater fouling (tubular)
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1493	Air heater fouling (regenerative)
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1495	Other air heater fouling (heat pipe, plate-type)
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1500	Air heater soot blowers
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1510	Flue gas ducts (except recirculation)
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1512	Flue gas expansion joints
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1520	Flue gas dampers (except recirculation)
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas	1530	Other flue gas problems
Notes: 1) For use with Unit Codes 100-199 and 600-649. 2) Excluding burner pipes, wind boxes, primary air, or pulverizer exhausters.					

TABLE B08-30 Boiler: Boiler Air and Gas Systems - Flue Gas Recirculation

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1535	Flue gas recirculating fan
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1536	Flue gas recirculating fan dampers
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1537	Flue gas recirculating fan lubrication systems
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1540	Flue gas recirculation fan fouling
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1550	Flue gas recirculation fan motors
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1555	Flue gas recirculation fan controls
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1560	Other flue gas recirculation fan problems
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1570	Flue gas recirculation ducts
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1572	Flue gas recirculation duct expansion joints
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1580	Flue gas recirculation dampers
Notes: 1) For use with Unit Codes 100-199 and 600-649. 2) Excluding burner pipes, wind boxes, primary air, or pulverizer exhausters.					

TABLE B08-31 Boiler: Boiler Air and Gas Systems - Miscellaneous (Boiler Air and Gas Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1590	Stacks (use code 8430 for stack problems due to pollution control equipment)
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1591	Stack damper and linkage
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1592	Stack damper linkage motors
Fossil-Steam	Boiler	Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1599	Other miscellaneous boiler air and gas system problems
Notes: 1) For use with Unit Codes 100-199 and 600-649. 2) Excluding burner pipes, wind boxes, primary air, or pulverizer exhausters.					

TABLE B08-32 Boiler: Boiler Control Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Boiler	Boiler Control Systems		1700	Feedwater controls (report local controls - feedwater pump, feedwater regulator valve, etc., - with component or system)
Fossil-Steam	Boiler	Boiler Control Systems		1710	Combustion/steam condition controls (report local controls - burners, pulverizers, etc., - with component or system)
Fossil-Steam	Boiler	Boiler Control Systems		1720	Desuperheater/attemperator controls
Fossil-Steam	Boiler	Boiler Control Systems		1730	Boiler explosion or implosion
Fossil-Steam	Boiler	Boiler Control Systems		1740	Boiler drum gage glasses / level indicator
Fossil-Steam	Boiler	Boiler Control Systems		1741	Furnace and water gauge television auxiliary system
Fossil-Steam	Boiler	Boiler Control Systems		1750	Burner management system
Fossil-Steam	Boiler	Boiler Control Systems		1760	Feedwater instrumentation (not local controls)
Fossil-Steam	Boiler	Boiler Control Systems		1761	Combustion/Steam condition instrumentation (not local controls)
Fossil-Steam	Boiler	Boiler Control Systems		1762	Desuperheater/attemperator instrumentation (not local controls)
Fossil-Steam	Boiler	Boiler Control Systems		1799	Other boiler instrumentation and control problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-33 Boiler: Boiler Design Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Boiler	Boiler Design Limitations		1900	Improper balance between tube sections not due to fouling or plugging
Fossil-Steam	Boiler	Boiler Design Limitations		1910	Inadequate air not due to equipment problems
Notes: 1) For use with Unit Codes 100-199 and 600-649. 2) Including instruments which input to the controls.					

TABLE B08-34 Boiler: Boiler Fuel Supply from Bunkers to Boiler - Burners

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	358	Oil burner piping and valves
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	359	Gas burner piping and valves
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	360	Burners
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	361	Burner orifices
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	362	Burner tilts
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	370	Burner instruments and controls (except light off)
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	380	Light off (igniter) systems (including fuel supply)
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	385	Igniters
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	390	Burner wind boxes and dampers
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	400	Burner wind box fires
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	410	Other burner problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-35 Boiler: Boiler Fuel Supply from Bunkers to Boiler - Cyclone

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	415	Cyclone feeders
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	420	Cyclone crusher
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	425	Cyclone dampers
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	426	Cyclone air ducts
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	430	Cyclone furnace
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	435	Other cyclone problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-36 Boiler: Boiler Fuel Supply from Bunkers to Boiler - Oil and Gas Systems (except light off)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	440	Fuel oil pumps (general)
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	441	Fuel oil pumps (burner supply)
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	442	Fuel oil pumps (forwarding/transfer)
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	443	Fuel oil (burner supply) pump drives
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	444	Fuel oil (forwarding/transfer) pump drives
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	450	Fuel oil heaters
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	460	Fuel oil atomizers
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	470	Oil and gas fires
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	480	Other oil and gas fuel supply problems (see codes 0360-0410 for burner problems)
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-37 Boiler: Boiler Fuel Supply from Bunkers to Boiler - Pulverizers, Primary Air Fans, and Associated Ducts

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	200	Pulverizer exhauster fan (for indirect firing)
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	205	Pulverizer exhauster fan drive
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	210	Pulverizer heater (for indirect firing)
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	220	Pulverizer system cyclone separator
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	230	Pulverizer bag filter
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	240	Pulverized coal bin
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	250	Pulverizer feeders
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	253	Pulverizer feeder motor
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	255	Pulverizer feeder coal scales
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	256	Seal air system (air to pulverizers)
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	257	Coal Crusher/dryer between feeder and pulverizer
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	260	Primary air fan
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	262	Primary air fan lube oil system
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	263	Primary air fan drives
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	264	Other primary air fan problems
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	265	Primary air heater
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	266	Primary air heater fouling
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	267	Primary air flow instrumentation

Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	270	Primary air duct and dampers
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	280	Pulverizer fires
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	290	Pulverizer reduced capacity due to wear
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	300	Pulverizer motors and drives
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	310	Pulverizer mills
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	312	Pulverizer mill classifiers
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	313	Pulverizer mill trunnion seals
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	314	Pulverizer mill ball charger hopper (ball mills only)
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	315	Pulverizer mill coal level controls
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	320	Foreign object in Pulverizers mill
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	325	Pulverizer skidding
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	330	Pulverizer coal leak (pulverizers only)
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	331	Pulverizer system coal leaks (other than pulverizers, see code 0330)
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	335	Pulverizer lube oil system
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	338	Pulverizer control systems (temperature and pressure)
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	339	Pulverizer System Puff
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	340	Other pulverizer problems
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	341	Pulverizer deluge system
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	342	Pulverizer inert system

Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	344	Pulverizer inspection
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	345	Pulverizer overhaul
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	346	Pulverizer pyrite removal system
Fossil-Steam	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	350	Pulverized fuel and air piping (from pulverizer to wind box) (see code 0898 for pulverizer reject system problems)
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-38 Boiler: Boiler Fuel Supply to Bunker - Coal Handling Equipment up Through Bunkers

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	10	Thaw shed failure or fire
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	20	Coal car dumpers, shakers, and unloaders
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	22	Unloading/receiving hopper (train/truck)
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	24	Rotary plow
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	26	Dust suppression system
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	28	Dust collection system
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	30	Coal conveyors and feeders
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	35	Metal detector/collector (including magnetic separator)
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	40	Coal elevators
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	50	Coal storage fires
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	60	Coal crushers including motors
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	70	Coal samplers

Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	75	Storage silos/hoppers
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	80	Stackers/reclaimers
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	84	Coal conveyor scales storage coal pile
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	85	Bunker feeder coal scales
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	90	Bunker fires
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	95	Bunker flow problems
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	100	Bunker gates
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	105	Bunker structures
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	106	Coal drying system (see additional codes 0125-0127)
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	107	Screen (prior to bunkers)
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	110	Other coal fuel supply problems up through bunkers
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	125	Coal crusher dryer hammers (see code 0106)
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	126	Coal crusher lube oil system (see code 0106)
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	127	Other coal crusher dryer problems (see code 0106)
Fossil-Steam	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	129	Other coal processing system problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-39 Boiler: Boiler Internals and Structures

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Boiler	Boiler Internals and Structures		800	Drums and drum internals (single drum only)
Fossil-Steam	Boiler	Boiler Internals and Structures		810	Boiler supports and structures (use code 1320 for tube supports)

Fossil-Steam	Boiler	Boiler Internals and Structures		820	Casing
Fossil-Steam	Boiler	Boiler Internals and Structures		830	Doors
Fossil-Steam	Boiler	Boiler Internals and Structures		840	Refractory and insulation
Fossil-Steam	Boiler	Boiler Internals and Structures		845	Windbox expansion joints
Fossil-Steam	Boiler	Boiler Internals and Structures		847	Other expansion joints
Fossil-Steam	Boiler	Boiler Internals and Structures		850	Other internal or structural problems
Fossil-Steam	Boiler	Boiler Internals and Structures		855	Drum relief/safety valves (single drum only)
Fossil-Steam	Boiler	Boiler Internals and Structures		859	Tube external fins/membranes
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-40 Boiler: Boiler Overhaul and Inspections

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Boiler	Boiler Overhaul and Inspections		1800	Major boiler overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Fossil-Steam	Boiler	Boiler Overhaul and Inspections		1801	Minor boiler overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Fossil-Steam	Boiler	Boiler Overhaul and Inspections		1810	Other boiler inspections
Fossil-Steam	Boiler	Boiler Overhaul and Inspections		1811	Boiler Inspections - problem identification / investigation
Fossil-Steam	Boiler	Boiler Overhaul and Inspections		1812	Boiler Inspections - scheduled or routine
Fossil-Steam	Boiler	Boiler Overhaul and Inspections		1820	Chemical cleaning/steam blows
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-41 Boiler: Boiler Piping System - Boiler Recirculation

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Boiler	Boiler Piping System	Boiler Recirculation	740	Boiler recirculation pumps
Fossil-Steam	Boiler	Boiler Piping System	Boiler Recirculation	741	Boiler recirculation pumps - motors
Fossil-Steam	Boiler	Boiler Piping System	Boiler Recirculation	742	Boiler recirculation pumps - motors - cooling system
Fossil-Steam	Boiler	Boiler Piping System	Boiler Recirculation	750	Boiler recirculation piping including downcomers
Fossil-Steam	Boiler	Boiler Piping System	Boiler Recirculation	760	Boiler recirculation valves
Fossil-Steam	Boiler	Boiler Piping System	Boiler Recirculation	770	Other boiler recirculation problems

Notes: 1) For use with Unit Codes 100-199 and 600-649.

TABLE B08-42 Boiler: Boiler Piping System - Cold and Hot Reheat Steam					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fossil-Steam	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	540	Hot reheat steam piping up to turbine stop valves
Fossil-Steam	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	541	Cold reheat steam piping up to boiler
Fossil-Steam	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	550	Reheat steam relief/safety valves
Fossil-Steam	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	560	Other hot reheat steam valves (not including turbine stop or intercept valves)
Fossil-Steam	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	561	Other cold reheat steam valves (not including turbine stop or intercept valves)
Fossil-Steam	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	570	Other reheat steam problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-43 Boiler: Boiler Piping System - Desuperheaters/Attemperators					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fossil-Steam	Boiler	Boiler Piping System	Desuperheaters/Attemperators	580	Desuperheater/attemperator piping
Fossil-Steam	Boiler	Boiler Piping System	Desuperheaters/Attemperators	590	Desuperheater/attemperator valves
Fossil-Steam	Boiler	Boiler Piping System	Desuperheaters/Attemperators	600	Desuperheater/attemperator spray nozzles
Fossil-Steam	Boiler	Boiler Piping System	Desuperheaters/Attemperators	610	Desuperheater/attemperator drums
Fossil-Steam	Boiler	Boiler Piping System	Desuperheaters/Attemperators	620	Other desuperheater/attemperator problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-44 Boiler: Boiler Piping System - Feedwater and Blowdown					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fossil-Steam	Boiler	Boiler Piping System	Feedwater and Blowdown	670	Feedwater piping downstream of feedwater regulating valve
Fossil-Steam	Boiler	Boiler Piping System	Feedwater and Blowdown	680	Feedwater valves (not feedwater regulating valve)

Fossil-Steam	Boiler	Boiler Piping System	Feedwater and Blowdown	690	Other feedwater problems downstream of feedwater regulating valve (use codes 3401 to 3499 for remainder of feedwater system)
Fossil-Steam	Boiler	Boiler Piping System	Feedwater and Blowdown	700	Blowdown system valves
Fossil-Steam	Boiler	Boiler Piping System	Feedwater and Blowdown	710	Blowdown system piping
Fossil-Steam	Boiler	Boiler Piping System	Feedwater and Blowdown	720	Blowdown system controls / instrumentation
Fossil-Steam	Boiler	Boiler Piping System	Feedwater and Blowdown	730	Other blowdown system problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-45 Boiler: Boiler Piping System - Main Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Boiler	Boiler Piping System	Main Steam	500	Main steam piping up to turbine stop valves
Fossil-Steam	Boiler	Boiler Piping System	Main Steam	510	Main steam relief/safety valves off superheater
Fossil-Steam	Boiler	Boiler Piping System	Main Steam	520	Other main steam valves (including vent and drain valves but not including the turbine stop valves)
Fossil-Steam	Boiler	Boiler Piping System	Main Steam	530	Other main steam system problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-46 Boiler: Boiler Piping System - Miscellaneous (Piping)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Boiler	Boiler Piping System	Miscellaneous (Piping)	775	Economizer piping
Fossil-Steam	Boiler	Boiler Piping System	Miscellaneous (Piping)	780	Headers between tube bundles
Fossil-Steam	Boiler	Boiler Piping System	Miscellaneous (Piping)	782	Headers and caps
Fossil-Steam	Boiler	Boiler Piping System	Miscellaneous (Piping)	790	Pipe hangers, brackets, supports (general)
Fossil-Steam	Boiler	Boiler Piping System	Miscellaneous (Piping)	799	Other miscellaneous piping system problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-47 Boiler: Boiler Piping System - Startup Bypass

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Fossil-Steam	Boiler	Boiler Piping System	Startup Bypass	630	Startup bypass system piping (including drain lines up to heaters or condenser)
Fossil-Steam	Boiler	Boiler Piping System	Startup Bypass	640	Startup bypass system valves
Fossil-Steam	Boiler	Boiler Piping System	Startup Bypass	650	Startup bypass tanks or flash tanks
Fossil-Steam	Boiler	Boiler Piping System	Startup Bypass	655	Steam by-pass system instrumentation and controls
Fossil-Steam	Boiler	Boiler Piping System	Startup Bypass	660	Other startup bypass system problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-48 Boiler: Boiler Tube Fireside Slagging or Fouling

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Boiler	Boiler Tube Fireside Slagging or Fouling		1100	Waterwall (Furnace wall)
Fossil-Steam	Boiler	Boiler Tube Fireside Slagging or Fouling		1103	Steam generating tubes between steam drum and mud drum
Fossil-Steam	Boiler	Boiler Tube Fireside Slagging or Fouling		1105	Generating tubes
Fossil-Steam	Boiler	Boiler Tube Fireside Slagging or Fouling		1110	Cyclone Furnace (in cyclone area only)
Fossil-Steam	Boiler	Boiler Tube Fireside Slagging or Fouling		1120	Convection Pass Wall
Fossil-Steam	Boiler	Boiler Tube Fireside Slagging or Fouling		1130	Boiler screen, wing wall, or slag screen (water tubes only)
Fossil-Steam	Boiler	Boiler Tube Fireside Slagging or Fouling		1140	First superheater
Fossil-Steam	Boiler	Boiler Tube Fireside Slagging or Fouling		1150	Second superheater
Fossil-Steam	Boiler	Boiler Tube Fireside Slagging or Fouling		1160	First reheater
Fossil-Steam	Boiler	Boiler Tube Fireside Slagging or Fouling		1170	Second reheater
Fossil-Steam	Boiler	Boiler Tube Fireside Slagging or Fouling		1180	Economizer
Fossil-Steam	Boiler	Boiler Tube Fireside Slagging or Fouling		1190	Other tube slagging or fouling
Fossil-Steam	Boiler	Boiler Tube Fireside Slagging or Fouling		1200	Operation at reduced power to avoid slagging or fouling (use codes 1100 to

					1190 to report power reductions for slag accumulation or slag removal)
Fossil-Steam	Boiler	Boiler Tube Fireside Slagging or Fouling		1210	Operation at reduced power to avoid slagging or fouling on waterwalls (Furnace walls) (use codes 1100-1190 to report power reductions for slag accumulation or slag removal)
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-49 Boiler: Boiler Tube Leaks

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Boiler	Boiler Tube Leaks		1000	Waterwall (Furnace wall)
Fossil-Steam	Boiler	Boiler Tube Leaks		1003	Steam generating tubes between steam drum and mud drum
Fossil-Steam	Boiler	Boiler Tube Leaks		1005	Generating tubes
Fossil-Steam	Boiler	Boiler Tube Leaks		1010	Cyclone furnace (in cyclone area only)
Fossil-Steam	Boiler	Boiler Tube Leaks		1020	Convection pass wall (water tubes only)
Fossil-Steam	Boiler	Boiler Tube Leaks		1030	Boiler screen, wing wall, or slag screen (water tubes only)
Fossil-Steam	Boiler	Boiler Tube Leaks		1035	Platen superheater
Fossil-Steam	Boiler	Boiler Tube Leaks		1040	First superheater
Fossil-Steam	Boiler	Boiler Tube Leaks		1050	Second superheater
Fossil-Steam	Boiler	Boiler Tube Leaks		1055	External superheater link tubing
Fossil-Steam	Boiler	Boiler Tube Leaks		1060	First reheater
Fossil-Steam	Boiler	Boiler Tube Leaks		1070	Second reheater
Fossil-Steam	Boiler	Boiler Tube Leaks		1075	External reheater link tubing
Fossil-Steam	Boiler	Boiler Tube Leaks		1080	Economizer
Fossil-Steam	Boiler	Boiler Tube Leaks		1090	Other boiler tube leaks
Notes: 1) For use with Unit Codes 100-199 and 600-649. 2) Use codes 860 and 870 for fouling or slagging due to unavailability of soot blowers or their air or steam supply.					

TABLE B08-50 Boiler: Boiler Water Condition

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Boiler	Boiler Water Condition		1850	Boiler water condition (not feedwater water quality)
Notes: 1) For use with Unit Codes 100-199 and 600-649. 2) Use code 859 for tube/membrane failures.					

TABLE B08-51 Boiler: Miscellaneous (Boiler)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fossil-Steam	Boiler	Miscellaneous (Boiler)		1980	Boiler safety valve test
Fossil-Steam	Boiler	Miscellaneous (Boiler)		1990	Boiler performance testing (use code 9999 for total unit performance testing)
Fossil-Steam	Boiler	Miscellaneous (Boiler)		1999	Boiler, miscellaneous
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-52 Boiler: Miscellaneous Boiler Tube Problems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fossil-Steam	Boiler	Miscellaneous Boiler Tube Problems		1300	Water side fouling
Fossil-Steam	Boiler	Miscellaneous Boiler Tube Problems		1305	Fireside cleaning (which requires a full outage) Use code 1200 for cleanings that cause deratings.
Fossil-Steam	Boiler	Miscellaneous Boiler Tube Problems		1310	Water side cleaning (acid cleaning)
Fossil-Steam	Boiler	Miscellaneous Boiler Tube Problems		1320	Tube supports/attachments
Fossil-Steam	Boiler	Miscellaneous Boiler Tube Problems		1330	Slag fall damage
Fossil-Steam	Boiler	Miscellaneous Boiler Tube Problems		1340	Tube modifications (including addition and removal of tubes)
Fossil-Steam	Boiler	Miscellaneous Boiler Tube Problems		1350	Other miscellaneous boiler tube problems
Fossil-Steam	Boiler	Miscellaneous Boiler Tube Problems		1360	Boiler drains system
Notes: 1) For use with Unit Codes 100-199 and 600-649. 2) Use more specific codes - other slagging and fouling problems, other control problems, etc. - whenever possible. Describe miscellaneous problems in the verbal description.					

TABLE B08-53 Boiler: Slag and Ash Removal					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fossil-Steam	Boiler	Slag and Ash Removal		860	Soot blowers - air (see code 3844 for air delivery system)
Fossil-Steam	Boiler	Slag and Ash Removal		870	Soot blowers - steam
Fossil-Steam	Boiler	Slag and Ash Removal		871	Soot blowers - sonic
Fossil-Steam	Boiler	Slag and Ash Removal		872	Soot blowers - water
Fossil-Steam	Boiler	Slag and Ash Removal		873	Soot blower drives
Fossil-Steam	Boiler	Slag and Ash Removal		876	Soot blower controls

Fossil-Steam	Boiler	Slag and Ash Removal		880	Fly Ash Removal System (not precipitators, scrubbers, mechanical collectors, or baghouses)
Fossil-Steam	Boiler	Slag and Ash Removal		885	Fly ash Removal System - wet transport
Fossil-Steam	Boiler	Slag and Ash Removal		890	Bottom ash systems (wet or dry)
Fossil-Steam	Boiler	Slag and Ash Removal		891	Bottom ash hoppers (including gates)
Fossil-Steam	Boiler	Slag and Ash Removal		892	Bottom ash clinker grinders
Fossil-Steam	Boiler	Slag and Ash Removal		893	Bottom ash water pumps and motors
Fossil-Steam	Boiler	Slag and Ash Removal		894	Bottom ash piping and valves
Fossil-Steam	Boiler	Slag and Ash Removal		895	Ashpit trouble
Fossil-Steam	Boiler	Slag and Ash Removal		896	Bottom ash dewatering bin system, instruments and controls
Fossil-Steam	Boiler	Slag and Ash Removal		897	Bottom ash rotary (drag chain type) conveyor and motor
Fossil-Steam	Boiler	Slag and Ash Removal		898	Bottom ash pyrite hopper (pulverizer reject) system
Fossil-Steam	Boiler	Slag and Ash Removal		899	Bottom ash controls and instrumentation
Fossil-Steam	Boiler	Slag and Ash Removal		900	Slag tap (cyclone furnace)
Fossil-Steam	Boiler	Slag and Ash Removal		910	Slag tap (other than cyclone furnace)
Fossil-Steam	Boiler	Slag and Ash Removal		920	Other slag and ash removal problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

EXTERNAL

Use this set of codes to report events caused by external factors (flood, lightning, etc.); economic factors (lack of fuel, labor strikes, etc.); operator training; and transmission system problems external to the plant.

TABLE B08-54 External: Catastrophe

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	External	Catastrophe		9000	Flood
Fossil-Steam	External	Catastrophe		9001	Drought
Fossil-Steam	External	Catastrophe		9010	Fire including wildfires, not related to a specific component
Fossil-Steam	External	Catastrophe		9020	Lightning
Fossil-Steam	External	Catastrophe		9025	Geomagnetic disturbance
Fossil-Steam	External	Catastrophe		9030	Earthquake
Fossil-Steam	External	Catastrophe		9031	Tornado
Fossil-Steam	External	Catastrophe		9035	Hurricane

Fossil-Steam	External	Catastrophe		9036	Storms (ice, snow, etc)
Fossil-Steam	External	Catastrophe		9040	Other catastrophe
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-55 External: Economic

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	External	Economic		0	Reserve shutdown
Fossil-Steam	External	Economic		9130	Failure of fuel supplier to fulfill contractual obligations or a pre-arranged deal due to physical fuel disruptions or operational impairments (e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)
Fossil-Steam	External	Economic		9131	Lack of fuel – due to contractual or tariff provisions that allow for service interruption or price fluctuations during peak demand periods.
Fossil-Steam	External	Economic		9132	Wet Fuel - Biomass
Fossil-Steam	External	Economic		9134	Fuel conservation
Fossil-Steam	External	Economic		9136	Problems with Primary Fuel for Units with Secondary Fuel Operation
Fossil-Steam	External	Economic		9137	Ground water or other water supply problems
Fossil-Steam	External	Economic		9140	Plant modifications to burn different fuel that are not regulatory mandated
Fossil-Steam	External	Economic		9150	Labor strikes company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.
Fossil-Steam	External	Economic		9151	Labor strikes direct plant management grievances that result in a walkout or strike are under plant management control.
Fossil-Steam	External	Economic		9160	Other economic problems
Fossil-Steam	External	Economic		9180	Economic (for internal use at plants only)
Fossil-Steam	External	Economic		9181	Economic (for internal use at plants only)
Fossil-Steam	External	Economic		9182	Economic (for internal use at plants only)
Fossil-Steam	External	Economic		9183	Economic (for internal use at plants only)

Fossil-Steam	External	Economic		9184	Economic (for internal use at plants only)
Fossil-Steam	External	Economic		9185	Economic (for internal use at plants only)
Fossil-Steam	External	Economic		9186	Economic (for internal use at plants only)
Fossil-Steam	External	Economic		9187	Economic (for internal use at plants only)
Fossil-Steam	External	Economic		9188	Economic (for internal use at plants only)
Fossil-Steam	External	Economic		9189	Economic (for internal use at plants only)
Fossil-Steam	External	Economic		9190	Economic (for internal use at plants only)
Fossil-Steam	External	Economic		9191	Economic (for internal use at plants only)
Fossil-Steam	External	Economic		9192	Economic (for internal use at plants only)
Fossil-Steam	External	Economic		9193	Economic (for internal use at plants only)
Fossil-Steam	External	Economic		9194	Economic (for internal use at plants only)
Fossil-Steam	External	Economic		9195	Economic (for internal use at plants only)
Fossil-Steam	External	Economic		9196	Economic (for internal use at plants only)
Fossil-Steam	External	Economic		9197	Economic (for internal use at plants only)
Fossil-Steam	External	Economic		9198	Economic (for internal use at plants only)
Fossil-Steam	External	Economic		9199	Economic (for internal use at plants only)
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-56 External: Fuel Quality

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	External	Fuel Quality		9200	High ash content (OMC)
Fossil-Steam	External	Fuel Quality		9201	High ash content (not OMC)
Fossil-Steam	External	Fuel Quality		9205	Poor quality natural gas fuel, low heat content
Fossil-Steam	External	Fuel Quality		9210	Low grindability (OMC)
Fossil-Steam	External	Fuel Quality		9211	Low grindability (not OMC)
Fossil-Steam	External	Fuel Quality		9220	High sulfur content (OMC)
Fossil-Steam	External	Fuel Quality		9221	High sulfur content (not OMC)
Fossil-Steam	External	Fuel Quality		9230	High vanadium content (OMC)
Fossil-Steam	External	Fuel Quality		9231	High vanadium content (not OMC)
Fossil-Steam	External	Fuel Quality		9240	High sodium content (OMC)
Fossil-Steam	External	Fuel Quality		9241	High sodium content (not OMC)
Fossil-Steam	External	Fuel Quality		9250	Low BTU coal (OMC)
Fossil-Steam	External	Fuel Quality		9251	Low BTU coal (not OMC)
Fossil-Steam	External	Fuel Quality		9260	Low BTU oil (OMC)
Fossil-Steam	External	Fuel Quality		9261	Low BTU oil (not OMC)
Fossil-Steam	External	Fuel Quality		9270	Wet coal (OMC)

Fossil-Steam	External	Fuel Quality		9271	Wet coal (not OMC)
Fossil-Steam	External	Fuel Quality		9280	Frozen coal (OMC)
Fossil-Steam	External	Fuel Quality		9281	Frozen coal (not OMC)
Fossil-Steam	External	Fuel Quality		9290	Other fuel quality problems (OMC)
Fossil-Steam	External	Fuel Quality		9291	Other fuel quality problems (not OMC)
Notes: 1) For use with Unit Codes 100-199 and 600-649. 2) Use code 9600 to 9650 if the fuel quality results in excess stack emissions through no fault in the pollution control equipment. Use the appropriate equipment code to report fouling and slagging.					

TABLE B08-57 External: Miscellaneous (External)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	External	Miscellaneous (External)		9300	Transmission system problems other than catastrophes (do not include switchyard problems in this category; see codes 3600 to 3629, 3720 to 3730)
Fossil-Steam	External	Miscellaneous (External)		9305	Ash disposal problem
Fossil-Steam	External	Miscellaneous (External)		9310	Operator training
Fossil-Steam	External	Miscellaneous (External)		9320	Other miscellaneous external problems
Fossil-Steam	External	Miscellaneous (External)		9340	Synchronous Condenser Operation
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

GENERATOR

This set of codes contains the generator, exciter, generator cooling systems, and generator controls. Note the main leads up to and includes the generator output breaker in this set of codes.

TABLE B08-58 Generator: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Generator	Controls		4700	Generator voltage control
Fossil-Steam	Generator	Controls		4710	Generator metering devices
Fossil-Steam	Generator	Controls		4720	Generator synchronization equipment
Fossil-Steam	Generator	Controls		4730	Generator current and potential transformers
Fossil-Steam	Generator	Controls		4740	Emergency generator trip devices
Fossil-Steam	Generator	Controls		4750	Other generator controls and metering problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-59 Generator: Cooling System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Fossil-Steam	Generator	Cooling System		4610	Hydrogen cooling system piping and valves
Fossil-Steam	Generator	Cooling System		4611	Hydrogen coolers
Fossil-Steam	Generator	Cooling System		4612	Hydrogen storage system
Fossil-Steam	Generator	Cooling System		4613	Hydrogen seals
Fossil-Steam	Generator	Cooling System		4619	Other hydrogen system problems
Fossil-Steam	Generator	Cooling System		4620	Air cooling system
Fossil-Steam	Generator	Cooling System		4630	Liquid cooling system
Fossil-Steam	Generator	Cooling System		4640	Seal oil system and seals
Fossil-Steam	Generator	Cooling System		4650	Other cooling system problems
Notes: 1) For use with Unit Codes 100-199 and 600-649. 2) Report failures caused by water leaks into generator as codes 4500, 4510, etc.					

TABLE B08-60 Generator: Exciter

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Generator	Exciter		4600	Exciter drive - motor
Fossil-Steam	Generator	Exciter		4601	Exciter field rheostat
Fossil-Steam	Generator	Exciter		4602	Exciter commutator and brushes
Fossil-Steam	Generator	Exciter		4603	Solid state exciter element
Fossil-Steam	Generator	Exciter		4604	Exciter drive - shaft
Fossil-Steam	Generator	Exciter		4605	Exciter transformer
Fossil-Steam	Generator	Exciter		4609	Other exciter problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-61 Generator: Generator

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Generator	Generator		4500	Rotor windings (including damper windings and fan blades on hydro units)
Fossil-Steam	Generator	Generator		4510	Rotor collector rings
Fossil-Steam	Generator	Generator		4511	Rotor, General
Fossil-Steam	Generator	Generator		4512	Retaining Rings
Fossil-Steam	Generator	Generator		4520	Stator windings, bushings, and terminals
Fossil-Steam	Generator	Generator		4530	Stator core iron
Fossil-Steam	Generator	Generator		4535	Stator, General
Fossil-Steam	Generator	Generator		4536	Generator Heaters
Fossil-Steam	Generator	Generator		4540	Brushes and brush rigging
Fossil-Steam	Generator	Generator		4550	Generator bearings and lube oil system (including thrust bearings on hydro units)
Fossil-Steam	Generator	Generator		4551	Generator bearings
Fossil-Steam	Generator	Generator		4552	Generator lube oil system
Fossil-Steam	Generator	Generator		4555	Bearing cooling system
Fossil-Steam	Generator	Generator		4560	Generator vibration (excluding vibration due to failed bearing and other components)

Fossil-Steam	Generator	Generator		4570	Generator casing
Fossil-Steam	Generator	Generator		4580	Generator end bells and bolting
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-62 Generator: Miscellaneous (Generator)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Generator	Miscellaneous (Generator)		4800	Generator main leads
Fossil-Steam	Generator	Miscellaneous (Generator)		4805	Generator Bus Duct Cooling System
Fossil-Steam	Generator	Miscellaneous (Generator)		4810	Generator output breaker
Fossil-Steam	Generator	Miscellaneous (Generator)		4830	Major generator overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Fossil-Steam	Generator	Miscellaneous (Generator)		4831	Minor generator overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Fossil-Steam	Generator	Miscellaneous (Generator)		4840	Inspection
Fossil-Steam	Generator	Miscellaneous (Generator)		4841	Generator doble testing
Fossil-Steam	Generator	Miscellaneous (Generator)		4842	Reactive and capability testing
Fossil-Steam	Generator	Miscellaneous (Generator)		4850	Core monitor alarm
Fossil-Steam	Generator	Miscellaneous (Generator)		4860	Generator neutral grounding equipment
Fossil-Steam	Generator	Miscellaneous (Generator)		4899	Other miscellaneous generator problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

INACTIVE STATES

TABLE B08-63 Inactive States: Inactive States

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Inactive States	Inactive States		2	Inactive Reserve Shutdown
Fossil-Steam	Inactive States	Inactive States		9990	Retired unit
Fossil-Steam	Inactive States	Inactive States		9991	Mothballed unit
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

PERFORMANCE

TABLE B08-64 Performance: Performance

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Performance	Performance		9997	NERC Reliability Standard Requirement
Fossil-Steam	Performance	Performance		9998	Black start testing

Fossil-Steam	Performance	Performance		9999	Total unit performance testing (use appropriate codes for individual component testing)
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

PERSONNEL OR PROCEDURAL ERRORS

TABLE B08-65 Personnel or Procedural Errors: Personnel or Procedural Errors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Personnel or Procedural Errors	Personnel or Procedural Errors		9900	Operator error
Fossil-Steam	Personnel or Procedural Errors	Personnel or Procedural Errors		9910	Maintenance personnel error
Fossil-Steam	Personnel or Procedural Errors	Personnel or Procedural Errors		9920	Contractor error
Fossil-Steam	Personnel or Procedural Errors	Personnel or Procedural Errors		9930	Operating procedure error
Fossil-Steam	Personnel or Procedural Errors	Personnel or Procedural Errors		9940	Maintenance procedure error
Fossil-Steam	Personnel or Procedural Errors	Personnel or Procedural Errors		9950	Contractor procedure error
Fossil-Steam	Personnel or Procedural Errors	Personnel or Procedural Errors		9960	Staff shortage
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

POLLUTION CONTROL EQUIPMENT

Use this set of codes to report problems with flue gas desulphurization equipment and stack gas particulate removal equipment. If outages or deratings occur due to reasons other than equipment problems, use the set of codes for Regulatory, Safety, Environmental stack emission limits.

TABLE B08-66 Pollution Control Equipment: CO Reduction

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Pollution Control Equipment	CO Reduction		8840	CO Active catalyst
Fossil-Steam	Pollution Control Equipment	CO Reduction		8841	CO Support materials
Fossil-Steam	Pollution Control Equipment	CO Reduction		8842	CO Plugging

Fossil-Steam	Pollution Control Equipment	CO Reduction		8845	Other CO reduction problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-67 Pollution Control Equipment: Continuous Emissions Monitoring Systems (CEMS)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fossil-Steam	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8700	CEMS Certification and Recertification
Fossil-Steam	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8710	SO2 analyzer problems
Fossil-Steam	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8720	NOx analyzer problems
Fossil-Steam	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8730	CO analyzer problems
Fossil-Steam	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8740	CO2 analyzer problems
Fossil-Steam	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8750	O2 analyzer problems
Fossil-Steam	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8760	Opacity monitor problems
Fossil-Steam	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8770	Flow monitor problems
Fossil-Steam	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8780	Data acquisition system problems
Fossil-Steam	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8790	Miscellaneous CEMS problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-68 Pollution Control Equipment: Dry Scrubbers - Dry Scrubber					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8528	Dry scrubber instruments and controls
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8529	Gas dispersers
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8530	Spray towers

Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8531	Spray machine/atomizer
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8532	Spray machine/atomizer motors
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8533	Spray machine/atomizer lubrication systems
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8534	Spray machine/atomizer vibration problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-69 Pollution Control Equipment: Dry Scrubbers - Miscellaneous (Dry Scrubber)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8544	Mechanical failures
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8545	Electrical failures
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8546	Major overhaul
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8547	Inspection
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8548	Testing
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8549	Other dry scrubber problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-70 Pollution Control Equipment: Dry Scrubbers - Piping, Ducting, and Dampers

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8522	Piping
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8523	Valves
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8524	Strainers or filters
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8525	Ducting

Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8526	Dampers
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8527	Other piping, ducting, and damper problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-71 Pollution Control Equipment: Dry Scrubbers - Reagent\Slurry Supply

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8500	Slurry storage and feed tanks
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8501	Reagent storage, feed bins, and conveyors
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8502	Weigh feeders
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8503	Screw conveyors
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8504	Mills/slakers
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8505	Scalping screens
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8506	Slurry pipelines
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8507	Reagent uploading and transfer systems
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8508	Reagent unavailability
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8510	Slurry mixers and agitators
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8520	Slurry transfer pumps and motors
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8521	Reagent/slurry problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-72 Pollution Control Equipment: Dry Scrubbers - Waste Disposal and Recovery

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8535	Fly ash conveyors
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8536	Bucket elevators
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8537	Weigh hoppers
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8538	Recycle storage and feed tanks including agitators
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8539	Recycle slurry transfer pumps
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8540	Waste disposal
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8541	Recycle feed bins
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8542	Recycle feed bins aeration systems
Fossil-Steam	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8543	Powder coolers
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-73 Pollution Control Equipment: Miscellaneous (Pollution Control Equipment)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fossil-Steam	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8565	Electrostatic Precipitator rebuild/overhaul
Fossil-Steam	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8600	Flue gas additives (furnace injection)
Fossil-Steam	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8601	SO3 mitigation
Fossil-Steam	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8620	Mercury Abatement Equipment
Fossil-Steam	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8650	Baghouse systems, general
Fossil-Steam	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8651	Bag failures and rebagging
Fossil-Steam	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8652	Shakers and rappers
Fossil-Steam	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8653	Inflation and deflation fans and motors

Fossil-Steam	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8654	Baghouse booster fans and motors
Fossil-Steam	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8655	Structural duct work and dampers
Fossil-Steam	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8656	Controls and instrumentation
Fossil-Steam	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8657	Ash handling system and hoppers
Fossil-Steam	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8658	Slurry system from precipitators
Fossil-Steam	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8670	Emission monitors (other than CEMS)
Fossil-Steam	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8699	Other miscellaneous pollution control equipment problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-74 Pollution Control Equipment: NOx Reduction Systems - Catalytic Air Heaters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8830	CAH NOx Active catalyst
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8831	CAH NOx Support materials
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8832	CAH NOx Plugging
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8835	Other CAH problems
Notes: 1) For use with Unit Codes 100-199 and 600-649. 2) Use code 360 for Low NOx Burners.					

TABLE B08-75 Pollution Control Equipment: NOx Reduction Systems - Selective Catalytic Reduction Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8810	SCR NOx Reactor
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8811	SCR NOx Reagent
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8812	SCR NOx Catalyst

Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8813	SCR NOx Injection grid piping/valves
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8814	SCR NOx Catalyst support material
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8815	SCR NOx Soot blowers
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8816	SCR NOx Plugging
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8817	SCR NOx Control system
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8820	SCR NOx Ammonia injection grid piping/valves
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8821	SCR NOx Ammonia tanks, piping and valves (not injection)
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8822	SCR NOx Ammonia air blowers
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8823	SCR NOx Other ammonia system problems
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8825	Other SCR NOx problems
Notes: 1) For use with Unit Codes 100-199 and 600-649. 2) Use code 360 for Low NOx Burners.					

TABLE B08-76 Pollution Control Equipment: NOx Reduction Systems - Selective Non-Catalytic Reduction Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8800	SNCR NOx Reagent
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8801	SNCR NOx Carrier gas
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8802	SNCR NOx Control system
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8803	SNCR Performance Testing
Fossil-Steam	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8809	Other SNCR NOx problems
Notes: 1) For use with Unit Codes 100-199 and 600-649. 2) Use code 360 for Low NOx Burners.					

TABLE B08-77 Pollution Control Equipment: Precipitators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Pollution Control Equipment	Precipitators		8550	Electrostatic precipitator fouling
Fossil-Steam	Pollution Control Equipment	Precipitators		8551	Electrostatic precipitator field out of service
Fossil-Steam	Pollution Control Equipment	Precipitators		8560	Electrostatic precipitator problems
Fossil-Steam	Pollution Control Equipment	Precipitators		8570	Mechanical precipitator fouling
Fossil-Steam	Pollution Control Equipment	Precipitators		8580	Mechanical precipitator problems
Fossil-Steam	Pollution Control Equipment	Precipitators		8590	Other precipitator problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-78 Pollution Control Equipment: Wet Scrubbers - Chemical Supply

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8000	Chemical feed storage, mill feeders, and conveyors
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8002	Screw conveyors
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8003	Bucket elevators
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8006	Weigh feeders
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8010	Crushers/mills
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8020	Mill slurry tanks supply problems
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8030	Classifiers
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8040	Slurry transfer pumps and motors
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8050	Chemical unavailability
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8099	Other chemical supply problems

Notes: 1) For use with Unit Codes 100-199 and 600-649.

TABLE B08-79 Pollution Control Equipment: Wet Scrubbers - Miscellaneous (Wet Scrubber)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8400	Scrubber gas discharge reheaters - general
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8402	Scrubber gas discharge reheaters - vibration
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8404	Scrubber gas discharge reheaters - tube leaks
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8406	Scrubber gas discharge reheaters - ducts
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8410	Scrubber instruments and controls
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8415	Liquid level controls
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8420	Heat tracer
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8425	Miscellaneous mechanical failures
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8426	Miscellaneous electrical failures
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8430	Stack damage related to scrubber system
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8440	Major overhaul
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8450	Inspection
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8460	Testing
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8470	SO2 monitor
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8499	Other miscellaneous wet scrubber problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-80 Pollution Control Equipment: Wet Scrubbers - Piping, Ducting, Dampers, and Fans

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8200	Piping
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8210	Valves
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8220	Strainers or filters
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8225	Drain pots
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8230	Ducting
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8235	Demister
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8240	Bypass dampers
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8250	Dampers other than bypass
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8260	Scrubber booster I.D. fan (fan specific to the scrubber)
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8261	Scrubber booster I.D. fan drive
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8262	Scrubber booster I.D. fan vibration (fan specific to the scrubber)
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8264	Scrubber booster I.D. fan blades (fan specific to the scrubber)
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8265	Scrubber booster I.D. fan dampers
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8270	Scrubber booster F.D. fan (fan specific to the scrubber)
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8271	Scrubber booster F.D. fan drive
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8272	Scrubber booster F.D. fan vibration (fan specific to the scrubber)
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8274	Scrubber booster F.D. fan blades (fan specific to the scrubber)
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8275	Scrubber booster F.D. fan dampers

Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8280	Reagent feed piping
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8290	Demister wash piping assembly
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8299	Other piping, ducting, damper, and fan problems
Notes: 1) For use with Unit Codes 100-199 and 600-649. 2) Use code 9510 for outages or deratings required to install pollution control equipment. Use codes 9600 to 9650 only when the pollution control equipment problems are not responsible for exceeding emission limits.					

TABLE B08-81 Pollution Control Equipment: Wet Scrubbers - Waste Disposal and Recovery

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8300	Waste disposal/recovery tanks
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8310	Waste disposal/recovery pumps
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8320	Waste disposal ponds
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8325	Ash disposal problems
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8330	Dewatering equipment (thickener, centrifuge, etc.)
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8335	Dryers
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8340	Centrifuge/vacuum filter
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8345	Calciners
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8349	Other waste disposal and recovery problems
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8399	Solids conveying and mixing system problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-82 Pollution Control Equipment: Wet Scrubbers - Wet Scrubber

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8100	Scrubber/absorber tower or module

Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8110	Spray nozzles
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8115	Disc scrubber throats
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8120	Spray pumps and motors
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8125	Scrubber recycle (liquid) pumps
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8127	Scrubber recycle (liquid) pump motors
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8130	Recirculation tanks including agitators
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8140	Reaction tanks including agitators
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8150	Tubes
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8160	Mist eliminators/demisters and washdown
Fossil-Steam	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8199	Other scrubber problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

REGULATORY, SAFETY, ENVIRONMENTAL

Use these codes only for events not directly attributable to equipment failures. Inspections or testing of certain equipment due to regulation are reported using the appropriate equipment cause codes, and the fact that it was a regulatory requirement noted in the verbal description section.

TABLE B08-83 Regulatory, Safety, Environmental: Other Operating Environmental Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9660	Thermal discharge limits - fossil and nuclear
Fossil-Steam	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9670	Noise limits (not for personnel safety) – fossil and nuclear
Fossil-Steam	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9677	Noise limits testing - fossil
Fossil-Steam	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9680	Fish kill - fossil and nuclear

Fossil-Steam	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9690	Other miscellaneous operational environmental limits - fossil and nuclear
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-84 Regulatory, Safety, Environmental: Regulatory

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Regulatory, Safety, Environmental	Regulatory		9504	Regulatory (environmental) proceedings and hearings - regulatory agency initiated
Fossil-Steam	Regulatory, Safety, Environmental	Regulatory		9506	Regulatory (environmental) proceedings and hearings - intervenor initiated
Fossil-Steam	Regulatory, Safety, Environmental	Regulatory		9510	Plant modifications strictly for compliance with new or changed regulatory requirements (scrubbers, cooling towers, etc.)
Fossil-Steam	Regulatory, Safety, Environmental	Regulatory		9520	Oil spill in Gulf of Mexico (OMC)
Fossil-Steam	Regulatory, Safety, Environmental	Regulatory		9590	Miscellaneous regulatory (this code is primarily intended for use with event contribution code 2 to indicate that a regulatory-related factor contributed to the primary cause of the event)
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-85 Regulatory, Safety, Environmental: Safety

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Regulatory, Safety, Environmental	Safety		9700	OSHA-related retrofit or inspection
Fossil-Steam	Regulatory, Safety, Environmental	Safety		9720	Other safety problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-86 Regulatory, Safety, Environmental: Stack Emission

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Regulatory, Safety, Environmental	Stack Emission		9600	SO2 stack emissions - fossil
Fossil-Steam	Regulatory, Safety, Environmental	Stack Emission		9610	NOx stack emissions - fossil
Fossil-Steam	Regulatory, Safety, Environmental	Stack Emission		9616	CO stack emissions - fossil
Fossil-Steam	Regulatory, Safety, Environmental	Stack Emission		9620	Particulate stack emissions - fossil
Fossil-Steam	Regulatory, Safety, Environmental	Stack Emission		9630	Opacity - fossil
Fossil-Steam	Regulatory, Safety, Environmental	Stack Emission		9650	Other stack/exhaust emissions - fossil (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
Fossil-Steam	Regulatory, Safety, Environmental	Stack Emission		9656	Other stack or exhaust emissions testing - fossil
Notes: 1) For use with Unit Codes 100-199 and 600-649. 2) Include exhaust emissions.					

STEAM TURBINE

Besides the turbine, this set includes the steam stop/control valves, turbine control system, and the turbine auxiliaries. The extraction steam codes are contained in the Balance of Plant set.

TABLE B08-87 Steam Turbine: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Steam Turbine	Controls		4290	Hydraulic system pumps
Fossil-Steam	Steam Turbine	Controls		4291	Hydraulic system coolers
Fossil-Steam	Steam Turbine	Controls		4292	Hydraulic system filters
Fossil-Steam	Steam Turbine	Controls		4293	Hydraulic system pipes and valves
Fossil-Steam	Steam Turbine	Controls		4299	Other hydraulic system problems
Fossil-Steam	Steam Turbine	Controls		4300	Turbine supervisory system (use codes 4290 to 4299 for hydraulic oil)
Fossil-Steam	Steam Turbine	Controls		4301	Turbine governing system
Fossil-Steam	Steam Turbine	Controls		4302	Turbine trip devices (including instruments)

Fossil-Steam	Steam Turbine	Controls		4303	Exhaust hood and spray controls
Fossil-Steam	Steam Turbine	Controls		4304	Automatic turbine control systems - mechanical
Fossil-Steam	Steam Turbine	Controls		4305	Automatic turbine control systems - mechanical - hydraulic
Fossil-Steam	Steam Turbine	Controls		4306	Automatic turbine control systems - electro-hydraulic - analog
Fossil-Steam	Steam Turbine	Controls		4307	Automatic turbine control systems - electro- hydraulic - digital
Fossil-Steam	Steam Turbine	Controls		4308	Automatic turbine control systems - digital control and monitoring
Fossil-Steam	Steam Turbine	Controls		4309	Other turbine instrument and control problems
Fossil-Steam	Steam Turbine	Controls		4310	Steam Turbine Control System - data highway
Fossil-Steam	Steam Turbine	Controls		4311	Steam Turbine Control System - hardware problems (including card failure)
Fossil-Steam	Steam Turbine	Controls		4312	Steam Turbine Control System - internal and termination wiring
Fossil-Steam	Steam Turbine	Controls		4313	Steam Turbine Control System - logic problems
Fossil-Steam	Steam Turbine	Controls		4314	Steam Turbine Control System - upgrades
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-88 Steam Turbine: High Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Steam Turbine	High Pressure Turbine		4000	Outer casing
Fossil-Steam	Steam Turbine	High Pressure Turbine		4001	Inner casing
Fossil-Steam	Steam Turbine	High Pressure Turbine		4009	Nozzle bolting
Fossil-Steam	Steam Turbine	High Pressure Turbine		4010	Nozzles and nozzle blocks
Fossil-Steam	Steam Turbine	High Pressure Turbine		4011	Diaphragms
Fossil-Steam	Steam Turbine	High Pressure Turbine		4012	Buckets or blades
Fossil-Steam	Steam Turbine	High Pressure Turbine		4013	Diaphragms unit and shroud type
Fossil-Steam	Steam Turbine	High Pressure Turbine		4014	Bucket or blade fouling
Fossil-Steam	Steam Turbine	High Pressure Turbine		4015	Wheels or spindles
Fossil-Steam	Steam Turbine	High Pressure Turbine		4020	Shaft seals

Fossil-Steam	Steam Turbine	High Pressure Turbine		4021	Dummy rings
Fossil-Steam	Steam Turbine	High Pressure Turbine		4022	Gland rings
Fossil-Steam	Steam Turbine	High Pressure Turbine		4030	Rotor shaft
Fossil-Steam	Steam Turbine	High Pressure Turbine		4040	Bearings
Fossil-Steam	Steam Turbine	High Pressure Turbine		4041	Thrust bearings
Fossil-Steam	Steam Turbine	High Pressure Turbine		4099	Other high pressure turbine problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-89 Steam Turbine: Intermediate Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Steam Turbine	Intermediate Pressure Turbine		4100	Outer casing
Fossil-Steam	Steam Turbine	Intermediate Pressure Turbine		4101	Inner casing
Fossil-Steam	Steam Turbine	Intermediate Pressure Turbine		4109	Nozzle bolting
Fossil-Steam	Steam Turbine	Intermediate Pressure Turbine		4110	Nozzles and nozzle blocks
Fossil-Steam	Steam Turbine	Intermediate Pressure Turbine		4111	Diaphragms
Fossil-Steam	Steam Turbine	Intermediate Pressure Turbine		4112	Buckets or blades
Fossil-Steam	Steam Turbine	Intermediate Pressure Turbine		4113	Bucket or blade fouling
Fossil-Steam	Steam Turbine	Intermediate Pressure Turbine		4115	Wheels or spindles
Fossil-Steam	Steam Turbine	Intermediate Pressure Turbine		4120	Shaft seals
Fossil-Steam	Steam Turbine	Intermediate Pressure Turbine		4121	Dummy rings
Fossil-Steam	Steam Turbine	Intermediate Pressure Turbine		4122	Gland rings
Fossil-Steam	Steam Turbine	Intermediate Pressure Turbine		4130	Rotor shaft
Fossil-Steam	Steam Turbine	Intermediate Pressure Turbine		4140	Bearings
Fossil-Steam	Steam Turbine	Intermediate Pressure Turbine		4141	Thrust bearings
Fossil-Steam	Steam Turbine	Intermediate Pressure Turbine		4199	Other intermediate pressure turbine problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-90 Steam Turbine: Low Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Steam Turbine	Low Pressure Turbine		4200	Outer casing
Fossil-Steam	Steam Turbine	Low Pressure Turbine		4201	Inner casing
Fossil-Steam	Steam Turbine	Low Pressure Turbine		4209	Nozzle bolting
Fossil-Steam	Steam Turbine	Low Pressure Turbine		4210	Nozzles and nozzle blocks
Fossil-Steam	Steam Turbine	Low Pressure Turbine		4211	Diaphragms
Fossil-Steam	Steam Turbine	Low Pressure Turbine		4212	Buckets or blades

Fossil-Steam	Steam Turbine	Low Pressure Turbine		4213	Bucket or blade fouling
Fossil-Steam	Steam Turbine	Low Pressure Turbine		4215	Wheels or spindles
Fossil-Steam	Steam Turbine	Low Pressure Turbine		4220	Shaft seals
Fossil-Steam	Steam Turbine	Low Pressure Turbine		4221	Dummy rings
Fossil-Steam	Steam Turbine	Low Pressure Turbine		4222	Gland rings
Fossil-Steam	Steam Turbine	Low Pressure Turbine		4230	Rotor shaft
Fossil-Steam	Steam Turbine	Low Pressure Turbine		4240	Bearings
Fossil-Steam	Steam Turbine	Low Pressure Turbine		4241	Thrust bearings
Fossil-Steam	Steam Turbine	Low Pressure Turbine		4250	Other low pressure turbine problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-91 Steam Turbine: Lube Oil

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Steam Turbine	Lube Oil		4280	Lube oil pumps
Fossil-Steam	Steam Turbine	Lube Oil		4281	Lube oil coolers
Fossil-Steam	Steam Turbine	Lube Oil		4282	Lube oil conditioners
Fossil-Steam	Steam Turbine	Lube Oil		4283	Lube oil system valves and piping
Fossil-Steam	Steam Turbine	Lube Oil		4284	Lube oil pump drive
Fossil-Steam	Steam Turbine	Lube Oil		4289	Other lube oil system problems
Notes: 1) For use with Unit Codes 100-199 and 600-649. 2) Do not include bearing failures due to lube oil.					

TABLE B08-92 Steam Turbine: Miscellaneous (Steam Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Steam Turbine	Miscellaneous (Steam Turbine)		4400	Major turbine overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Fossil-Steam	Steam Turbine	Miscellaneous (Steam Turbine)		4401	Inspection
Fossil-Steam	Steam Turbine	Miscellaneous (Steam Turbine)		4402	Minor turbine overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Fossil-Steam	Steam Turbine	Miscellaneous (Steam Turbine)		4410	Turning gear and motor
Fossil-Steam	Steam Turbine	Miscellaneous (Steam Turbine)		4411	Steam turbine gear box (single shaft configuration)
Fossil-Steam	Steam Turbine	Miscellaneous (Steam Turbine)		4412	Steam turbine clutch (single shaft configuration)
Fossil-Steam	Steam Turbine	Miscellaneous (Steam Turbine)		4415	Shaft coupling mechanism

Fossil-Steam	Steam Turbine	Miscellaneous (Steam Turbine)		4420	Vibration of the turbine generator unit that cannot be attributed to a specific cause such as bearings or blades (use this code for balance moves)
Fossil-Steam	Steam Turbine	Miscellaneous (Steam Turbine)		4430	Gland seal system
Fossil-Steam	Steam Turbine	Miscellaneous (Steam Turbine)		4450	Water induction
Fossil-Steam	Steam Turbine	Miscellaneous (Steam Turbine)		4460	Turbine overspeed trip test
Fossil-Steam	Steam Turbine	Miscellaneous (Steam Turbine)		4470	Differential expansion
Fossil-Steam	Steam Turbine	Miscellaneous (Steam Turbine)		4490	Turbine performance testing (use code 9999 for total unit performance testing)
Fossil-Steam	Steam Turbine	Miscellaneous (Steam Turbine)		4499	Other miscellaneous steam turbine problems
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-93 Steam Turbine: Piping

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Steam Turbine	Piping		4270	Crossover or under piping
Fossil-Steam	Steam Turbine	Piping		4279	Miscellaneous turbine piping
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

TABLE B08-94 Steam Turbine: Valves

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Fossil-Steam	Steam Turbine	Valves		4260	Main stop valves
Fossil-Steam	Steam Turbine	Valves		4261	Control valves
Fossil-Steam	Steam Turbine	Valves		4262	Intercept valves
Fossil-Steam	Steam Turbine	Valves		4263	Reheat stop valves
Fossil-Steam	Steam Turbine	Valves		4264	Combined intercept valves
Fossil-Steam	Steam Turbine	Valves		4265	Miscellaneous drain and vent valves
Fossil-Steam	Steam Turbine	Valves		4266	Main stop valve testing
Fossil-Steam	Steam Turbine	Valves		4267	Control valve testing
Fossil-Steam	Steam Turbine	Valves		4268	Reheat/intercept valve testing
Fossil-Steam	Steam Turbine	Valves		4269	Other turbine valves (including LP steam admission valves)
Notes: 1) For use with Unit Codes 100-199 and 600-649.					

Appendix B09: Index To Gas Turbine/Jet Engine Unit Cause Codes

GAS TURBINE/JET ENGINE UNITS

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B09-1	Balance of Plant	Auxiliary Systems	Auxiliary Steam
B09-2	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems
B09-3	Balance of Plant	Auxiliary Systems	Fire Protection System
B09-4	Balance of Plant	Auxiliary Systems	Instrument Air
B09-5	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System
B09-6	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)
B09-7	Balance of Plant	Auxiliary Systems	Service Air
B09-8	Balance of Plant	Auxiliary Systems	Service Water (Open System)
B09-9	Balance of Plant	Electrical	
B09-10	Balance of Plant	Miscellaneous (Balance of Plant)	
B09-11	Balance of Plant	Power Station Switchyard	
B09-12	Expander Turbine	Expander Turbine	
B09-13	External	Catastrophe	
B09-14	External	Economic	
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B09-16	External	Miscellaneous (External)	
B09-17	Gas Turbine	Auxiliary Systems	
B09-18	Gas Turbine	Exhaust Systems	
B09-19	Gas Turbine	Fuel, Ignition, and Combustion Systems	
B09-20	Gas Turbine	Inlet Air System and Compressors	Compressors
B09-21	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters
B09-22	Gas Turbine	Miscellaneous (Gas Turbine)	
B09-23	Gas Turbine	Turbine	
B09-24	Generator	Controls	
B09-25	Generator	Cooling System	
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B09-28	Generator	Miscellaneous (Generator)	
B09-29	Inactive States	Inactive States	
B09-30	Jet Engine	Auxiliary Systems	
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B09-32	Jet Engine	Fuel, Ignition, and Combustion Systems	

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B09-33	Jet Engine	Inlet Air System and Compressors	Compressors
B09-34	Jet Engine	Inlet Air System and Compressors	Ducts and Filters
B09-35	Jet Engine	Miscellaneous (Jet Engine)	
B09-36	Jet Engine	Turbine	
B09-37	Performance	Performance	
B09-38	Personnel or Procedural Errors	Personnel or Procedural Errors	
B09-39	Pollution Control Equipment	CO Reduction	
B09-40	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)	
B09-41	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)	
B09-42	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters
B09-43	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems
B09-44	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems
B09-45	Regulatory, Safety, Environmental	Other Operating Environmental Limitations	
B09-46	Regulatory, Safety, Environmental	Regulatory	
B09-47	Regulatory, Safety, Environmental	Safety	
B09-48	Regulatory, Safety, Environmental	Stack Emission	

BALANCE OF PLANT

TABLE B09-1 Balance of Plant: Auxiliary Systems - Auxiliary Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3830	Auxiliary boiler
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3831	Auxiliary steam piping
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3832	Auxiliary steam valves
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3833	Auxiliary steam controls and instruments
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3834	Auxiliary boiler tube leaks
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3839	Other auxiliary steam problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-2 Balance of Plant: Auxiliary Systems - Closed Cooling Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3820	Closed cooling water pumps and motors
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3821	Closed cooling water piping
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3822	Closed cooling water valves
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3823	Closed cooling water heat exchangers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3824	Closed cooling water system fouling
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3829	Other closed cooling water system problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-3 Balance of Plant: Auxiliary Systems - Fire Protection System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Fire Protection System	3860	Fire protection system pumps
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Fire Protection System	3861	Fire protection system piping
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Fire Protection System	3862	Fire protection system valves
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Fire Protection System	3863	Fire protection system fouling
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Fire Protection System	3864	Fire protection system instrumentation and controls
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Fire Protection System	3869	Other fire protection system problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-4 Balance of Plant: Auxiliary Systems - Instrument Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Instrument Air	3850	Instrument air compressors

Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Instrument Air	3851	Instrument air piping
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Instrument Air	3852	Instrument air valves
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Instrument Air	3853	Instrument air dryers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Instrument Air	3854	N2 backup to instrument air
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Instrument Air	3859	Other instrument air problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-5 Balance of Plant: Auxiliary Systems - Low-pressure Gas Compression System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3870	Fuel Gas Compressor and Motors
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3871	Fuel Gas Compressor Piping
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3872	Fuel Gas Compressor Valves
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3873	Fuel Gas Compressor Heat Exchangers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3874	Fuel Gas Compressor Controls and Instrumentation
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3875	Fuel Gas Compressor Filters
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3876	Fuel Gas Compressor Fire System
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3879	Fuel Gas Compressor - other
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-6 Balance of Plant: Auxiliary Systems - Miscellaneous (Auxiliary Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3898	Miscellaneous plant auxiliary process and services instrumentation and controls

Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3899	Other miscellaneous auxiliary system problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-7 Balance of Plant: Auxiliary Systems - Service Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Service Air	3840	Service air compressors
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Service Air	3841	Service air piping
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Service Air	3842	Service air valves
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Service Air	3843	Service air dryers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Service Air	3849	Other service air problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-8 Balance of Plant: Auxiliary Systems - Service Water (Open System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3810	Service water pumps and motors
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3811	Service water piping
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3812	Service water valves
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3813	Service water heat exchangers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3814	Service water system fouling
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3819	Other service water problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-9 Balance of Plant: Electrical

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3600	Switchyard transformers and associated cooling systems - external (OMC)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3601	Switchyard transformers and associated cooling systems - external (not OMC)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3610	Switchyard circuit breakers - external (not OMC)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3611	Switchyard circuit breakers - external (OMC)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3612	Switchyard system protection devices - external (OMC)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3613	Switchyard system protection devices - external (not OMC)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3618	Other switchyard equipment - external (not OMC)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3619	Other switchyard equipment - external (OMC)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3620	Main transformer
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3621	Unit auxiliaries transformer
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3622	Station service startup transformer
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3623	Auxiliary generators
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3624	Auxiliary generator voltage supply system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3629	Other switchyard or high voltage system problems - external
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3630	400-700 volt transformers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3631	400-700 volt circuit breakers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3632	400-700 volt conductors and buses
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3633	400-700 volt insulators

Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3634	400-700 volt protection devices
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3639	Other 400-700 volt problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3640	AC instrument power transformers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3641	AC Circuit breakers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3642	AC Conductors and buses
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3643	AC Inverters
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3644	AC Protection devices
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3649	Other AC instrument power problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3650	DC instrument power battery chargers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3651	DC circuit breakers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3652	DC conductors and buses
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3653	DC protection devices
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3659	Other DC power problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3660	4000-7000 volt transformers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3661	4000-7000 volt circuit breakers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3662	4000-7000 volt conductors and buses
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3663	4000-7000 volt insulators
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3664	4000-7000 volt protection devices
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3669	Other 4000-7000 volt problems

Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3670	12-15kV transformers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3671	12-15kV circuit breakers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3672	12-15kV conductors and buses
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3673	12-15kV insulators
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3674	12-15kV protection devices
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3679	Other 12-15kV problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3680	Other voltage transformers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3681	Other voltage circuit breakers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3682	Other voltage conductors and buses
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3683	Other voltage insulators
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3684	Other voltage protection devices
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3689	Other voltage problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Electrical		3690	Station Service Power Distribution System, General
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-10 Balance of Plant: Miscellaneous (Balance of Plant)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3950	Process computer
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3960	Thermal derating (thermal efficiency losses in balance of plant when specific cause(s) unknown)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3970	Distributive Control System (DCS) - process computer

Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3971	DCS - data highway
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3972	DCS - hardware problems (including card failure)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3973	DCS - internal and termination wiring
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3974	DCS - logic problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3975	DCS - upgrades
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3979	Other DCS problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3980	Programmable Logic Controller (PLC)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3981	PLC - data highway
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3982	PLC - hardware problems (including card failure)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3983	PLC - internal and termination wiring
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3984	PLC - logic problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3985	PLC - upgrades
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3989	Other PLC problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3995	Powerhouse heating and ventilating systems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3996	Air conditioning systems - rooms and areas
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3998	Balance of plant overhaul/outage
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Miscellaneous (Balance of Plant)		3999	Other miscellaneous balance of plant problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-11 Balance of Plant: Power Station Switchyard					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**

Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Power Station Switchyard		3700	Power Station switchyard (non generating unit equipment)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Power Station Switchyard		3710	Transmission line (connected to powerhouse switchyard to 1st Substation)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Power Station Switchyard		3720	Transmission equipment at the 1st substation (see code 9300 if applicable)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Balance of Plant	Power Station Switchyard		3730	Transmission equipment beyond the 1st substation (see code 9300 if applicable)
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

EXPANDER TURBINE

TABLE B09-12 Expander Turbine: Expander Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Expander Turbine	Expander Turbine		7800	Couplings
Gas Turbine/Jet Engine (Simple Cycle Operation)	Expander Turbine	Expander Turbine		7810	Shaft
Gas Turbine/Jet Engine (Simple Cycle Operation)	Expander Turbine	Expander Turbine		7820	Bearings
Gas Turbine/Jet Engine (Simple Cycle Operation)	Expander Turbine	Expander Turbine		7830	Blades
Gas Turbine/Jet Engine (Simple Cycle Operation)	Expander Turbine	Expander Turbine		7840	Discs
Gas Turbine/Jet Engine (Simple Cycle Operation)	Expander Turbine	Expander Turbine		7850	Spacers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Expander Turbine	Expander Turbine		7860	Nozzles/vanes
Gas Turbine/Jet Engine (Simple Cycle Operation)	Expander Turbine	Expander Turbine		7870	Heat shields
Gas Turbine/Jet Engine (Simple Cycle Operation)	Expander Turbine	Expander Turbine		7880	Exhaust diffusers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Expander Turbine	Expander Turbine		7890	Seal oil system and seals
Gas Turbine/Jet Engine (Simple Cycle Operation)	Expander Turbine	Expander Turbine		7900	Inner casing

Gas Turbine/Jet Engine (Simple Cycle Operation)	Expander Turbine	Expander Turbine		7910	Outer exhaust casing
Gas Turbine/Jet Engine (Simple Cycle Operation)	Expander Turbine	Expander Turbine		7920	Lube oil system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Expander Turbine	Expander Turbine		7930	Controls and instrumentation
Gas Turbine/Jet Engine (Simple Cycle Operation)	Expander Turbine	Expander Turbine		7940	Evactor
Gas Turbine/Jet Engine (Simple Cycle Operation)	Expander Turbine	Expander Turbine		7950	Major overhaul
Gas Turbine/Jet Engine (Simple Cycle Operation)	Expander Turbine	Expander Turbine		7960	Other expander turbine problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

EXTERNAL

Use this set of codes to report events caused by external factors (flood, lightning, etc.); economic factors (lack of fuel, labor strikes, etc.); operator training; and transmission system problems external to the plant.

TABLE B09-13 External: Catastrophe

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Catastrophe		9000	Flood
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Catastrophe		9001	Drought
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Catastrophe		9010	Fire including wildfires, not related to a specific component
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Catastrophe		9020	Lightning
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Catastrophe		9025	Geomagnetic disturbance
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Catastrophe		9030	Earthquake
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Catastrophe		9031	Tornado
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Catastrophe		9035	Hurricane

Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Catastrophe		9036	Storms (ice, snow, etc)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Catastrophe		9040	Other catastrophe
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-14 External: Economic

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		0	Reserve shutdown
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9130	Failure of fuel supplier to fulfill contractual obligations or a pre-arranged deal due to physical fuel disruptions or operational impairments (e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9131	Lack of fuel – due to contractual or tariff provisions that allow for service interruption or price fluctuations during peak demand periods.
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9134	Fuel conservation
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9136	Problems with Primary Fuel for Units with Secondary Fuel Operation
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9137	Ground water or other water supply problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9140	Plant modifications to burn different fuel that are not regulatory mandated
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9150	Labor strikes company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs)

					or transportation (fuel supply) problems.
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9151	Labor strikes direct plant management grievances that result in a walkout or strike are under plant management control.
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9160	Other economic problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9180	Economic (for internal use at plants only)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9181	Economic (for internal use at plants only)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9182	Economic (for internal use at plants only)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9183	Economic (for internal use at plants only)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9184	Economic (for internal use at plants only)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9185	Economic (for internal use at plants only)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9186	Economic (for internal use at plants only)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9187	Economic (for internal use at plants only)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9188	Economic (for internal use at plants only)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9189	Economic (for internal use at plants only)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9190	Economic (for internal use at plants only)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9191	Economic (for internal use at plants only)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9192	Economic (for internal use at plants only)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9193	Economic (for internal use at plants only)

Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9194	Economic (for internal use at plants only)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9195	Economic (for internal use at plants only)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9196	Economic (for internal use at plants only)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9197	Economic (for internal use at plants only)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9198	Economic (for internal use at plants only)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Economic		9199	Economic (for internal use at plants only)
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-15 External: Fuel Quality

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Fuel Quality		9200	High ash content (OMC)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Fuel Quality		9201	High ash content (not OMC)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Fuel Quality		9205	Poor quality natural gas fuel, low heat content
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Fuel Quality		9220	High sulfur content (OMC)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Fuel Quality		9221	High sulfur content (not OMC)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Fuel Quality		9230	High vanadium content (OMC)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Fuel Quality		9231	High vanadium content (not OMC)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Fuel Quality		9240	High sodium content (OMC)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Fuel Quality		9241	High sodium content (not OMC)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Fuel Quality		9260	Low BTU oil (OMC)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Fuel Quality		9261	Low BTU oil (not OMC)

Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Fuel Quality		9290	Other fuel quality problems (OMC)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Fuel Quality		9291	Other fuel quality problems (not OMC)
Notes: 1) For use with Unit Codes 300–399 and 700–799. 2) Use code 9603 to 9653 (Gas Turbine) or 9604 to 9654 (Jet Engine) if the fuel quality results in excess stack emissions through no fault in the pollution control equipment. Use the appropriate equipment code to report fouling and slagging.					

TABLE B09-16 External: Miscellaneous (External)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Miscellaneous (External)		9300	Transmission system problems other than catastrophes (do not include switchyard problems in this category; see codes 3600 to 3629, 3720 to 3730)
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Miscellaneous (External)		9310	Operator training
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Miscellaneous (External)		9320	Other miscellaneous external problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	External	Miscellaneous (External)		9340	Synchronous Condenser Operation
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

GAS TURBINE

TABLE B09-17 Gas Turbine: Auxiliary Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5110	Lube oil system - general
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5111	Lube oil pumps
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5112	Lube oil coolers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5113	Lube oil valves/piping
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5114	Lube oil filters

Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5115	Oil vapor extractor
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5116	Power Augmentation System Equipment
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5117	Power augmentation piping
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5118	Power augmentation valves
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5119	Power augmentation controls
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5120	Hydraulic oil system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5121	Hydraulic oil system pumps
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5122	Hydraulic oil system piping/valves
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5130	Starting system (including motor)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5140	Battery and charger system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5150	Turning gear and motor
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5151	Load gear compartment
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5160	Cooling and seal air system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5170	Cooling water system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5180	Anti-icing system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Auxiliary Systems		5190	Other auxiliary system problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-18 Gas Turbine: Exhaust Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Exhaust Systems		5100	Chamber

Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Exhaust Systems		5101	Hoods
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Exhaust Systems		5102	Vanes/nozzles
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Exhaust Systems		5103	Silencer
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Exhaust Systems		5104	Cones
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Exhaust Systems		5105	Diverter Dampers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Exhaust Systems		5106	Exhaust Stack
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Exhaust Systems		5108	High engine exhaust temperature
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Exhaust Systems		5109	Other exhaust problems (including high exhaust system temperature not attributable to a specific problem)
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-19 Gas Turbine: Fuel, Ignition, and Combustion Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5040	Fuel tanks
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5041	Fuel piping and valves
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5042	Fuel nozzles/vanes
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5043	Fuel filters
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5044	Liquid fuel oil pump
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5046	Liquid fuel oil transfer/forwarding pump
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5047	Liquid fuel purge system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5048	Gas fuel system including controls and instrumentation

Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5049	Other fuel system problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5050	Ignition system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5051	Pilot fuel piping and valves
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5052	Pilot fuel nozzles/vanes
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5053	Pilot fuel filters
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5054	Water injection system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5060	Atomizing air system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5065	NOx water injection system including pump
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5066	NOx steam injection system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5070	Combustor casing
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5071	Combustor liner
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5072	Combustor caps
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5073	Flame scanners
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5074	Flashback including instrumentation
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5075	Blade path temperature spread
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Fuel, Ignition, and Combustion Systems		5079	Other combustor problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-20 Gas Turbine: Inlet Air System and Compressors - Compressors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Compressors	5010	High pressure shaft

Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Compressors	5011	High pressure bearings
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Compressors	5012	High pressure blades/buckets
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Compressors	5013	Compressor casing and bolts
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Compressors	5014	Compressor diaphragms
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Compressors	5015	Compressor seals
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Compressors	5016	High pressure compressor bleed valves
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Compressors	5017	Low pressure compressor bleed valves
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Compressors	5019	Other high pressure problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Compressors	5020	Low pressure shaft
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Compressors	5021	Low pressure bearings
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Compressors	5022	Low pressure blades/buckets
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Compressors	5029	Other low pressure problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Compressors	5030	Supercharging fans
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Compressors	5035	Compressor washing
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Compressors	5036	Compressor shaft and bearings for two-shaft machines
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Compressors	5037	Inlet bleed heat valve
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Compressors	5039	Other compressor problems
Notes: 1) For use with Unit Codes 300–399 and 700–799. 2) Use HP compressor if only one.					

TABLE B09-21 Gas Turbine: Inlet Air System and Compressors - Ducts and Filters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5000	Inlet air ducts
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5001	Inlet air vanes/nozzles
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5002	Inlet air filters
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5003	Inlet cone
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5004	Inlet air chillers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5005	Inlet air evaporative coolers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5006	Inlet air foggers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5009	Other inlet air problems
Notes: 1) For use with Unit Codes 300–399 and 700–799. 2) Use HP compressor if only one.					

TABLE B09-22 Gas Turbine: Miscellaneous (Gas Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5200	Reduction gear
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5201	Load shaft and bearings
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5205	Main coupling between the turbine and generator
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5206	Clutch
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5210	Intercoolers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5220	Regenerators
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5230	Heat shields
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5240	Fire detection and extinguishing system (including hazardous gas detection system)

Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5241	Fire in unit
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5245	Gas Turbine Control System - data highway
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5246	Gas Turbine Control System - hardware problems (including card failure)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5247	Gas Turbine Control System - internal and termination wiring
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5248	Gas Turbine Control System - logic problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5249	Gas Turbine Control System - upgrades
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5250	Other controls and instrumentation problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5255	Computer
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5260	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5261	Gas turbine/compressor washing
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5262	Gas turbine exchange
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5269	Combustion Inspection (CI)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5270	Hot end inspection
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5272	Boroscope inspection
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5274	General unit inspection
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5280	Vibration (not engine) in unit not attributable to bearings or other components
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5285	Gas turbine vibration
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5286	Gas turbine lockout

Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5290	Gas turbine performance testing - individual engines (use code 9999 for total unit performance testing)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5292	Turbine Overspeed Trip Test - Gas Turbine
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5295	Synchronous condenser equipment
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5298	Main gas filter
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Miscellaneous (Gas Turbine)		5299	Other miscellaneous gas turbine problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-23 Gas Turbine: Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5080	High pressure shaft
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5081	High pressure bearings
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5082	High pressure blades/buckets
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5083	High pressure nozzles/vanes
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5084	High pressure casing/expansion joints
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5085	Interstage gas passages - HP
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5086	High pressure shaft seals
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5087	Thrust bearing
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5088	Gas turbine cooling system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5089	Other high pressure problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5090	Low pressure shaft

Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5091	Low pressure bearings
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5092	Low pressure blades/buckets
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5093	Low pressure nozzles/vanes
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5094	Low pressure casing/expansion joints
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5095	Interstage gas passages - LP
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5096	Low pressure shaft seals
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5097	Other low pressure problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5098	Expansion joints
Gas Turbine/Jet Engine (Simple Cycle Operation)	Gas Turbine	Turbine		5099	HP to LP coupling
Notes: 1) For use with Unit Codes 300–399 and 700–799. 2) Use HP if only one.					

GENERATOR

This set of codes contains the generator, exciter, generator cooling systems, and generator controls. Note the main leads up to and includes the generator output breaker in this set of codes.

TABLE B09-24 Generator: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Controls		4700	Generator voltage control
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Controls		4710	Generator metering devices
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Controls		4720	Generator synchronization equipment
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Controls		4730	Generator current and potential transformers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Controls		4740	Emergency generator trip devices

Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Controls		4750	Other generator controls and metering problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-25 Generator: Cooling System					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Cooling System		4610	Hydrogen cooling system piping and valves
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Cooling System		4611	Hydrogen coolers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Cooling System		4612	Hydrogen storage system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Cooling System		4613	Hydrogen seals
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Cooling System		4619	Other hydrogen system problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Cooling System		4620	Air cooling system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Cooling System		4630	Liquid cooling system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Cooling System		4640	Seal oil system and seals
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Cooling System		4650	Other cooling system problems
Notes: 1) For use with Unit Codes 300–399 and 700–799. 2) Report failures caused by water leaks into generator as codes 4500, 4510, etc.					

TABLE B09-26 Generator: Exciter					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Exciter		4600	Exciter drive - motor
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Exciter		4601	Exciter field rheostat
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Exciter		4602	Exciter commutator and brushes
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Exciter		4603	Solid state exciter element

Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Exciter		4604	Exciter drive - shaft
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Exciter		4605	Exciter transformer
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Exciter		4609	Other exciter problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-27 Generator: Generator

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Generator		4500	Rotor windings (including damper windings and fan blades on hydro units)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Generator		4510	Rotor collector rings
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Generator		4511	Rotor, General
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Generator		4512	Retaining Rings
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Generator		4520	Stator windings, bushings, and terminals
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Generator		4530	Stator core iron
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Generator		4535	Stator, General
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Generator		4536	Generator Heaters
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Generator		4540	Brushes and brush rigging
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Generator		4550	Generator bearings and lube oil system (including thrust bearings on hydro units)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Generator		4551	Generator bearings
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Generator		4552	Generator lube oil system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Generator		4555	Bearing cooling system

Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Generator		4560	Generator vibration (excluding vibration due to failed bearing and other components)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Generator		4570	Generator casing
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Generator		4580	Generator end bells and bolting
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Generator		4590	Generator brakes
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-28 Generator: Miscellaneous (Generator)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Miscellaneous (Generator)		4800	Generator main leads
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Miscellaneous (Generator)		4805	Generator Bus Duct Cooling System
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Miscellaneous (Generator)		4810	Generator output breaker
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Miscellaneous (Generator)		4830	Major generator overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Miscellaneous (Generator)		4831	Minor generator overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Miscellaneous (Generator)		4840	Inspection
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Miscellaneous (Generator)		4841	Generator doble testing
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Miscellaneous (Generator)		4842	Reactive and capability testing
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Miscellaneous (Generator)		4850	Core monitor alarm
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Miscellaneous (Generator)		4860	Generator neutral grounding equipment
Gas Turbine/Jet Engine (Simple Cycle Operation)	Generator	Miscellaneous (Generator)		4899	Other miscellaneous generator problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

INACTIVE STATES

TABLE B09-29 Inactive States: Inactive States					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Gas Turbine/Jet Engine (Simple Cycle Operation)	Inactive States	Inactive States		2	Inactive Reserve Shutdown
Gas Turbine/Jet Engine (Simple Cycle Operation)	Inactive States	Inactive States		9990	Retired unit
Gas Turbine/Jet Engine (Simple Cycle Operation)	Inactive States	Inactive States		9991	Mothballed unit
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

JET ENGINE

TABLE B09-30 Jet Engine: Auxiliary Systems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Auxiliary Systems		5510	Lube oil system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Auxiliary Systems		5516	Power Augmentation System Equipment
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Auxiliary Systems		5520	Hydraulic oil system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Auxiliary Systems		5530	Starting system (including motor)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Auxiliary Systems		5540	Battery and charger system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Auxiliary Systems		5550	Turning gear and motor
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Auxiliary Systems		5551	Load gear compartment
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Auxiliary Systems		5560	Cooling and seal air system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Auxiliary Systems		5570	Cooling water system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Auxiliary Systems		5580	Anti-icing system

Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Auxiliary Systems		5590	Other auxiliary system problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-31 Jet Engine: Exhaust Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Exhaust Systems		5500	Chamber
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Exhaust Systems		5501	Hoods
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Exhaust Systems		5502	Vanes/nozzles
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Exhaust Systems		5503	Silencer
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Exhaust Systems		5504	Cones
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Exhaust Systems		5505	Diverter Dampers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Exhaust Systems		5508	High engine exhaust temperature
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Exhaust Systems		5509	Other exhaust problems (including high exhaust temperature not attributable to a specific problem)
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-32 Jet Engine: Fuel, Ignition, and Combustion Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5440	Fuel tanks
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5441	Fuel piping and valves
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5442	Fuel nozzles/vanes
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5443	Fuel filters

Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5444	Liquid fuel oil pump
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5445	Liquid fuel oil transfer/forwarding pump
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5446	Liquid fuel purge system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5447	Gas fuel system including controls and instrumentation
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5449	Other fuel system problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5450	Ignition system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5451	Pilot fuel piping and valves
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5452	Pilot fuel nozzles/vanes
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5453	Pilot fuel filters
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5454	Water injection system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5455	Fuel nozzle/vane cooling air system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5460	Atomizing air system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5470	Combustor casing
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5471	Combustor liner
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5472	Combustor caps
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5473	Flame scanners
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5474	Flashback (including instrumentation)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5475	Blade path temperature spread
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Fuel, Ignition, and Combustion Systems		5479	Other combustor problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-33 Jet Engine: Inlet Air System and Compressors - Compressors					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Compressors	5410	High pressure shaft
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Compressors	5411	High pressure bearings
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Compressors	5412	High pressure blades/buckets
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Compressors	5413	Other high pressure problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Compressors	5414	Compressor diaphragms/vanes
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Compressors	5420	Low pressure shaft
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Compressors	5421	Low pressure bearings
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Compressors	5422	Low pressure blades/buckets
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Compressors	5429	Other low pressure problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Compressors	5430	Supercharging fans
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Compressors	5435	Compressor washing
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Compressors	5436	Compressor shaft and bearings for two-shaft machines
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Compressors	5439	Other compressor problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-34 Jet Engine: Inlet Air System and Compressors - Ducts and Filters					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5400	Inlet air ducts
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5401	Inlet air vanes/nozzles

Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5402	Inlet air filters
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5403	Inlet and exhaust cones
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5404	Inlet air chillers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5405	Inlet air evaporative coolers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5406	Inlet air foggers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5409	Other inlet air problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-35 Jet Engine: Miscellaneous (Jet Engine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5600	Reduction gear
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5601	Load shaft and bearings
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5605	Main coupling between the turbine and generator
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5606	Clutch
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5610	Intercoolers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5620	Regenerators
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5630	Heat shields
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5640	Fire detection and extinguishing system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5641	Fire in unit
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5645	Jet Engine Control System - data highway

Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5646	Jet Engine Control System - hardware problems (including card failure)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5647	Jet Engine Control System - internal and termination wiring
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5648	Jet Engine Control System - logic problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5649	Jet Engine Control System - upgrades
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5650	Other controls and instrumentation problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5660	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5661	Engine/compressor washing
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5662	Engine exchange
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5665	Engine shafts and bearings
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5670	Hot end inspection
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5672	Boroscope inspection
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5674	General unit inspection
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5680	Vibration (not engine) in unit not attributable to bearings or other components
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5685	Engine vibration
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5686	Jet engine lockout
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5690	Engine performance testing - individual engines (use code 9999 for total unit performance testing)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5692	Turbine Overspeed Trip Test - Jet Engine

Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5695	Synchronous condenser equipment
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Miscellaneous (Jet Engine)		5699	Other miscellaneous jet engine problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-36 Jet Engine: Turbine					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Turbine		5480	High pressure shaft
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Turbine		5481	High pressure bearings
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Turbine		5482	High pressure blades/buckets
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Turbine		5483	High pressure nozzles/vanes
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Turbine		5484	High pressure casing/expansion joint
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Turbine		5485	Interstage gas passages
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Turbine		5486	High pressure shaft seals
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Turbine		5487	Thrust bearing
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Turbine		5489	Other high pressure problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Turbine		5490	Low pressure shaft
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Turbine		5491	Low pressure bearings
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Turbine		5492	Low pressure blades/buckets
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Turbine		5493	Low pressure nozzles/vanes
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Turbine		5494	Low pressure casing/expansion joints
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Turbine		5497	Other low pressure problems

Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Turbine		5498	Expansion joints
Gas Turbine/Jet Engine (Simple Cycle Operation)	Jet Engine	Turbine		5499	Shaft seals
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

PERFORMANCE

TABLE B09-37 Performance: Performance

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Performance	Performance		9997	NERC Reliability Standard Requirement
Gas Turbine/Jet Engine (Simple Cycle Operation)	Performance	Performance		9998	Black start testing
Gas Turbine/Jet Engine (Simple Cycle Operation)	Performance	Performance		9999	Total unit performance testing (use appropriate codes for individual component testing)
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

PERSONNEL OR PROCEDURAL ERRORS

TABLE B09-38 Personnel or Procedural Errors: Personnel or Procedural Errors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Personnel or Procedural Errors	Personnel or Procedural Errors		9900	Operator error
Gas Turbine/Jet Engine (Simple Cycle Operation)	Personnel or Procedural Errors	Personnel or Procedural Errors		9910	Maintenance personnel error
Gas Turbine/Jet Engine (Simple Cycle Operation)	Personnel or Procedural Errors	Personnel or Procedural Errors		9920	Contractor error
Gas Turbine/Jet Engine (Simple Cycle Operation)	Personnel or Procedural Errors	Personnel or Procedural Errors		9930	Operating procedure error
Gas Turbine/Jet Engine (Simple Cycle Operation)	Personnel or Procedural Errors	Personnel or Procedural Errors		9940	Maintenance procedure error
Gas Turbine/Jet Engine (Simple Cycle Operation)	Personnel or Procedural Errors	Personnel or Procedural Errors		9950	Contractor procedure error
Gas Turbine/Jet Engine (Simple Cycle Operation)	Personnel or Procedural Errors	Personnel or Procedural Errors		9960	Staff shortage
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

POLLUTION CONTROL EQUIPMENT

TABLE B09-39 Pollution Control Equipment: CO Reduction					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	CO Reduction		8840	CO Active catalyst
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	CO Reduction		8841	CO Support materials
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	CO Reduction		8842	CO Plugging
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	CO Reduction		8845	Other CO reduction problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-40 Pollution Control Equipment: Continuous Emissions Monitoring Systems (CEMS)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8700	CEMS Certification and Recertification
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8710	SO2 analyzer problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8720	NOx analyzer problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8730	CO analyzer problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8740	CO2 analyzer problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8750	O2 analyzer problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8760	Opacity monitor problems

Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8770	Flow monitor problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8780	Data acquisition system problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8790	Miscellaneous CEMS problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-41 Pollution Control Equipment: Miscellaneous (Pollution Control Equipment)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8656	Controls and instrumentation
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-42 Pollution Control Equipment: NOx Reduction Systems - Catalytic Air Heaters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8830	CAH NOx Active catalyst
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8831	CAH NOx Support materials
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8832	CAH NOx Plugging
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8835	Other CAH problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-43 Pollution Control Equipment: NOx Reduction Systems - Selective Catalytic Reduction Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8810	SCR NOx Reactor
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8811	SCR NOx Reagent

Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8812	SCR NOx Catalyst
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8813	SCR NOx Injection grid piping/valves
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8814	SCR NOx Catalyst support material
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8815	SCR NOx Soot blowers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8816	SCR NOx Plugging
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8817	SCR NOx Control system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8820	SCR NOx Ammonia injection grid piping/valves
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8821	SCR NOx Ammonia tanks, piping and valves (not injection)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8822	SCR NOx Ammonia air blowers
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8823	SCR NOx Other ammonia system problems
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8825	Other SCR NOx problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-44 Pollution Control Equipment: NOx Reduction Systems - Selective Non-Catalytic Reduction Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8800	SNCR NOx Reagent
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8801	SNCR NOx Carrier gas
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8802	SNCR NOx Control system
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8803	SNCR Performance Testing
Gas Turbine/Jet Engine (Simple Cycle Operation)	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8809	Other SNCR NOx problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

REGULATORY, SAFETY, ENVIRONMENTAL

Use these codes only for events not directly attributable to equipment failures. Inspections or testing of certain equipment due to regulation are reported using the appropriate equipment cause codes, and the fact that it was a regulatory requirement noted in the verbal description section.

TABLE B09-45 Regulatory, Safety, Environmental: Other Operating Environmental Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9663	Thermal discharge limits - gas turbines
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9664	Thermal discharge limits - jet engines
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9673	Noise limits (not for personnel safety) - gas turbines
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9674	Noise limits (not for personnel safety) - jet engines
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9678	Noise limits testing - gas turbines
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9679	Noise limits testing - jet engines
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9683	Fish kill - gas turbines
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9684	Fish kill - jet engines
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9693	Other miscellaneous operational environmental limits - gas turbines
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9694	Other miscellaneous operational environmental limits - jet engines

Notes: 1) For use with Unit Codes 300–399 and 700–799.

TABLE B09-46 Regulatory, Safety, Environmental: Regulatory

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Regulatory		9504	Regulatory (environmental) proceedings and hearings - regulatory agency initiated
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Regulatory		9506	Regulatory (environmental) proceedings and hearings - intervenor initiated
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Regulatory		9510	Plant modifications strictly for compliance with new or changed regulatory requirements (scrubbers, cooling towers, etc.)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Regulatory		9520	Oil spill in Gulf of Mexico (OMC)

Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Regulatory		9590	Miscellaneous regulatory (this code is primarily intended for use with event contribution code 2 to indicate that a regulatory-related factor contributed to the primary cause of the event)
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-47 Regulatory, Safety, Environmental: Safety

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Safety		9700	OSHA-related retrofit or inspection
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Safety		9720	Other safety problems
Notes: 1) For use with Unit Codes 300–399 and 700–799.					

TABLE B09-48 Regulatory, Safety, Environmental: Stack Emission

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Stack Emission		9603	SO2 stack emissions - gas turbines
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Stack Emission		9604	SO2 stack emissions - jet engines
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Stack Emission		9613	NOx stack emissions - gas turbines
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Stack Emission		9614	NOx stack emissions - jet engines
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Stack Emission		9616	CO stack emissions - fossil
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Stack Emission		9623	Particulate stack emissions - gas turbines
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Stack Emission		9624	Particulate stack emissions - jet engines
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Stack Emission		9633	Opacity - gas turbines
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Stack Emission		9634	Opacity - jet engines
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Stack Emission		9653	Other stack or exhaust emissions - gas turbines (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Stack Emission		9654	Other stack or exhaust emissions - jet engines (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Stack Emission		9657	Other stack or exhaust emissions testing - gas turbines

Gas Turbine/Jet Engine (Simple Cycle Operation)	Regulatory, Safety, Environmental	Stack Emission		9658	Other stack or exhaust emissions testing - jet engines
Notes: 1) For use with Unit Codes 300–399 and 700–799. 2) Include exhaust emissions.					

Appendix B10: Index To Geothermal Unit Cause Codes

GEOTHERMAL UNITS

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B10-2	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems
B10-3	Balance of Plant	Auxiliary Systems	Fire Protection System
B10-4	Balance of Plant	Auxiliary Systems	Instrument Air
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B10-6	Balance of Plant	Auxiliary Systems	Open Cooling Water System
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B10-39	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans
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BALANCE OF PLANT

TABLE B10-1 Balance of Plant: Auxiliary Systems - Auxiliary Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3830	Auxiliary boiler
Geothermal	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3831	Auxiliary steam piping
Geothermal	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3832	Auxiliary steam valves
Geothermal	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3833	Auxiliary steam controls and instruments
Geothermal	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3834	Auxiliary boiler tube leaks
Geothermal	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3835	Auxiliary boiler burner management system
Geothermal	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3839	Other auxiliary steam problems (also see extraction steam codes 3520 to 3529; startup bypass codes 0630 to 0660; and soot blower steam code 0870)

Notes: 1) For use with Unit Codes 800–899.

TABLE B10-2 Balance of Plant: Auxiliary Systems - Closed Cooling Water Systems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Geothermal	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3820	Closed cooling water pumps and motors
Geothermal	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3821	Closed cooling water piping
Geothermal	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3822	Closed cooling water valves
Geothermal	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3823	Closed cooling water heat exchangers
Geothermal	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3824	Closed cooling water system fouling
Geothermal	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3825	Closed cooling water instrumentation
Geothermal	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3826	Closed cooling water strainer
Geothermal	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3829	Other closed cooling water system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-3 Balance of Plant: Auxiliary Systems - Fire Protection System					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Geothermal	Balance of Plant	Auxiliary Systems	Fire Protection System	3860	Fire protection system pumps
Geothermal	Balance of Plant	Auxiliary Systems	Fire Protection System	3861	Fire protection system piping
Geothermal	Balance of Plant	Auxiliary Systems	Fire Protection System	3862	Fire protection system valves
Geothermal	Balance of Plant	Auxiliary Systems	Fire Protection System	3863	Fire protection system fouling
Geothermal	Balance of Plant	Auxiliary Systems	Fire Protection System	3864	Fire protection system instrumentation and controls
Geothermal	Balance of Plant	Auxiliary Systems	Fire Protection System	3869	Other fire protection system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-4 Balance of Plant: Auxiliary Systems - Instrument Air					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Geothermal	Balance of Plant	Auxiliary Systems	Instrument Air	3850	Instrument air compressors
Geothermal	Balance of Plant	Auxiliary Systems	Instrument Air	3851	Instrument air piping
Geothermal	Balance of Plant	Auxiliary Systems	Instrument Air	3852	Instrument air valves
Geothermal	Balance of Plant	Auxiliary Systems	Instrument Air	3853	Instrument air dryers
Geothermal	Balance of Plant	Auxiliary Systems	Instrument Air	3854	N2 backup to instrument air
Geothermal	Balance of Plant	Auxiliary Systems	Instrument Air	3859	Other instrument air problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-5 Balance of Plant: Auxiliary Systems - Miscellaneous (Auxiliary Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3898	Miscellaneous plant auxiliary process and services instrumentation and controls
Geothermal	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3899	Other miscellaneous auxiliary system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-6 Balance of Plant: Auxiliary Systems - Open Cooling Water System					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Geothermal	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3800	Open cooling water pumps and motors
Geothermal	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3801	Open cooling water piping
Geothermal	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3802	Open cooling water valves
Geothermal	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3803	Open cooling water heat exchangers
Geothermal	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3804	Open cooling water system fouling
Geothermal	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3805	Open cooling water system instrumentation
Geothermal	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3806	Open cooling water strainer
Geothermal	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3809	Other open cooling water problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-7 Balance of Plant: Auxiliary Systems - Seal Air Fans					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Geothermal	Balance of Plant	Auxiliary Systems	Seal Air Fans	3880	Seal air fan
Geothermal	Balance of Plant	Auxiliary Systems	Seal Air Fans	3881	Seal air fan drive - motor
Geothermal	Balance of Plant	Auxiliary Systems	Seal Air Fans	3882	Seal air control dampers and drives
Geothermal	Balance of Plant	Auxiliary Systems	Seal Air Fans	3883	Seal air filters
Geothermal	Balance of Plant	Auxiliary Systems	Seal Air Fans	3889	Other seal air fan problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-8 Balance of Plant: Auxiliary Systems - Service Air					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Geothermal	Balance of Plant	Auxiliary Systems	Service Air	3840	Service air compressors
Geothermal	Balance of Plant	Auxiliary Systems	Service Air	3841	Service air piping

Geothermal	Balance of Plant	Auxiliary Systems	Service Air	3842	Service air valves
Geothermal	Balance of Plant	Auxiliary Systems	Service Air	3843	Service air dryers
Geothermal	Balance of Plant	Auxiliary Systems	Service Air	3844	Soot blowing air compressor and system
Geothermal	Balance of Plant	Auxiliary Systems	Service Air	3849	Other service air problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-9 Balance of Plant: Auxiliary Systems - Service Water (Open System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3810	Service water pumps and motors
Geothermal	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3811	Service water piping
Geothermal	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3812	Service water valves
Geothermal	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3813	Service water heat exchangers
Geothermal	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3814	Service water system fouling
Geothermal	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3815	Service water strainer
Geothermal	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3819	Other service water problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-10 Balance of Plant: Circulating Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Balance of Plant	Circulating Water Systems		3210	Circulating water pumps
Geothermal	Balance of Plant	Circulating Water Systems		3211	Circulating water pump motors
Geothermal	Balance of Plant	Circulating Water Systems		3220	Circulating water piping
Geothermal	Balance of Plant	Circulating Water Systems		3221	Circulating water piping fouling
Geothermal	Balance of Plant	Circulating Water Systems		3230	Circulating water valves
Geothermal	Balance of Plant	Circulating Water Systems		3231	Waterbox
Geothermal	Balance of Plant	Circulating Water Systems		3232	Condenser tube cleaning system including debris filter
Geothermal	Balance of Plant	Circulating Water Systems		3233	Circulating water priming system
Geothermal	Balance of Plant	Circulating Water Systems		3235	Cooling tower booster pump
Geothermal	Balance of Plant	Circulating Water Systems		3236	Cooling tower booster motor
Geothermal	Balance of Plant	Circulating Water Systems		3238	Cooling tower fan motors
Geothermal	Balance of Plant	Circulating Water Systems		3239	Cooling tower fan motors - variable speed
Geothermal	Balance of Plant	Circulating Water Systems		3240	Cooling tower fans
Geothermal	Balance of Plant	Circulating Water Systems		3241	Cooling tower efficiency below design
Geothermal	Balance of Plant	Circulating Water Systems		3242	Cooling tower fill damage

Geothermal	Balance of Plant	Circulating Water Systems		3243	Cooling tower icing
Geothermal	Balance of Plant	Circulating Water Systems		3244	Cooling tower fires
Geothermal	Balance of Plant	Circulating Water Systems		3245	Other cooling tower problems
Geothermal	Balance of Plant	Circulating Water Systems		3246	Cooling tower fouling
Geothermal	Balance of Plant	Circulating Water Systems		3247	Cooling tower instrumentation
Geothermal	Balance of Plant	Circulating Water Systems		3248	Cooling Tower Overhaul
Geothermal	Balance of Plant	Circulating Water Systems		3250	Circulating water system instruments and controls
Geothermal	Balance of Plant	Circulating Water Systems		3260	Traveling screens
Geothermal	Balance of Plant	Circulating Water Systems		3261	Traveling screen fouling
Geothermal	Balance of Plant	Circulating Water Systems		3269	Circulating water biological conditions (ie, zebra mussels)
Geothermal	Balance of Plant	Circulating Water Systems		3270	Intake system problems other than traveling screens
Geothermal	Balance of Plant	Circulating Water Systems		3271	Intake grating fouling
Geothermal	Balance of Plant	Circulating Water Systems		3272	Circulating water screenwash system
Geothermal	Balance of Plant	Circulating Water Systems		3280	High circulating water temperature (not due to season, tower efficiency below design, or other listed equipment problem)
Geothermal	Balance of Plant	Circulating Water Systems		3281	Circulating water tempering system
Geothermal	Balance of Plant	Circulating Water Systems		3282	Circulating water cooling ponds
Geothermal	Balance of Plant	Circulating Water Systems		3285	Circulating water chemistry
Geothermal	Balance of Plant	Circulating Water Systems		3299	Other circulating water system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-11 Balance of Plant: Condensate System - Miscellaneous (Condensate System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3360	Condensate makeup and return (including storage tanks)
Geothermal	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3370	Condensate system controls and instrumentation (not hotwell level, heater level, or deaerator level controls; see codes 3150-3159, 3344, 3502).
Geothermal	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3380	Condensate coolers
Geothermal	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3399	Other miscellaneous condensate system problems

Notes: 1) For use with Unit Codes 800–899.

TABLE B10-12 Balance of Plant: Condensate System - Pumps, Piping, and Valves					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Geothermal	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3300	Condensate water pre-treatment
Geothermal	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3310	Condensate/hotwell pumps
Geothermal	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3311	Condensate/hotwell pump motor
Geothermal	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3312	Condensate booster pump
Geothermal	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3313	Condensate booster pump motor
Geothermal	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3314	Condensate booster pump motor - variable speed
Geothermal	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3315	Condensate booster pump drive (other than 3313 and 3314)
Geothermal	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3320	Condensate piping
Geothermal	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3330	Condensate valves
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-13 Balance of Plant: Condensing System - Condenser Casing or Shell and Internals					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Geothermal	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3120	Tube sheets
Geothermal	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3121	Expansion joint
Geothermal	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3122	Gaskets and seals
Geothermal	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3123	Hot well
Geothermal	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3124	Tube sheet fouling
Geothermal	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3129	Other condenser casing or shell and internal problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-14 Balance of Plant: Condensing System - Condenser Controls					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**

Geothermal	Balance of Plant	Condensing System	Condenser Controls	3150	Hot well level controls
Geothermal	Balance of Plant	Condensing System	Condenser Controls	3151	Vacuum pump and air ejector controls
Geothermal	Balance of Plant	Condensing System	Condenser Controls	3152	Air-cooled condenser controls
Geothermal	Balance of Plant	Condensing System	Condenser Controls	3159	Other condensing system controls and instruments
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-15 Balance of Plant: Condensing System - Condenser Tubes and Support Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3110	Condenser tube leaks
Geothermal	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3111	Condenser tube fouling shell side
Geothermal	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3112	Condenser tube fouling tube side
Geothermal	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3113	Condenser tube and water box cleaning (including circulating water flow reversal)
Geothermal	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3114	Air-cooled condenser tubes
Geothermal	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3115	Air-cooled condenser pumps
Geothermal	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3116	Air-cooled condenser fans
Geothermal	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3117	Air-cooled condenser fan motors
Geothermal	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3118	Other Air-cooled condenser problems
Geothermal	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3119	Other condenser tube casing or shell and internal problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-16 Balance of Plant: Condensing System - Miscellaneous (Condensing System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3170	Condenser inspection (use code 3110 to report looking for tube leaks)
Geothermal	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3171	Air-cooled condenser inspections

Geothermal	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3180	Major condenser overhaul
Geothermal	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3185	Water side cathodic protection
Geothermal	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3190	Air leakage (for losses not attributable to previously noted equipment related codes)
Geothermal	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3199	Other miscellaneous condensing system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-17 Balance of Plant: Condensing System - Vacuum Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Balance of Plant	Condensing System	Vacuum Equipment	3130	Air ejectors
Geothermal	Balance of Plant	Condensing System	Vacuum Equipment	3131	Air ejector piping and valves
Geothermal	Balance of Plant	Condensing System	Vacuum Equipment	3132	Inter and after condensers
Geothermal	Balance of Plant	Condensing System	Vacuum Equipment	3133	Vacuum pumps
Geothermal	Balance of Plant	Condensing System	Vacuum Equipment	3134	Vacuum pump piping and valves
Geothermal	Balance of Plant	Condensing System	Vacuum Equipment	3135	Vacuum pump motor and auxiliaries
Geothermal	Balance of Plant	Condensing System	Vacuum Equipment	3139	Other air extraction system problems - general
Geothermal	Balance of Plant	Condensing System	Vacuum Equipment	3149	Loss of vacuum not attributable to a particular component such as air ejectors or valves, or high back pressure not attributable to high circulating water temperature, or vacuum losses from a known cause.
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-18 Balance of Plant: Electrical

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Balance of Plant	Electrical		3600	Switchyard transformers and associated cooling systems - external (OMC)
Geothermal	Balance of Plant	Electrical		3601	Switchyard transformers and associated cooling systems - external (not OMC)
Geothermal	Balance of Plant	Electrical		3610	Switchyard circuit breakers - external (not OMC)
Geothermal	Balance of Plant	Electrical		3611	Switchyard circuit breakers - external (OMC)

Geothermal	Balance of Plant	Electrical		3612	Switchyard system protection devices - external (OMC)
Geothermal	Balance of Plant	Electrical		3613	Switchyard system protection devices - external (not OMC)
Geothermal	Balance of Plant	Electrical		3618	Other switchyard equipment - external (not OMC)
Geothermal	Balance of Plant	Electrical		3619	Other switchyard equipment - external (OMC)
Geothermal	Balance of Plant	Electrical		3620	Main transformer
Geothermal	Balance of Plant	Electrical		3621	Unit auxiliaries transformer
Geothermal	Balance of Plant	Electrical		3622	Station service startup transformer
Geothermal	Balance of Plant	Electrical		3623	Auxiliary generators
Geothermal	Balance of Plant	Electrical		3629	Other switchyard or high voltage system problems - external
Geothermal	Balance of Plant	Electrical		3630	400-700 volt transformers
Geothermal	Balance of Plant	Electrical		3631	400-700 volt circuit breakers
Geothermal	Balance of Plant	Electrical		3632	400-700 volt conductors and buses
Geothermal	Balance of Plant	Electrical		3633	400-700 volt insulators
Geothermal	Balance of Plant	Electrical		3634	400-700 volt protection devices
Geothermal	Balance of Plant	Electrical		3639	Other 400-700 volt problems
Geothermal	Balance of Plant	Electrical		3640	AC instrument power transformers
Geothermal	Balance of Plant	Electrical		3641	AC Circuit breakers
Geothermal	Balance of Plant	Electrical		3642	AC Conductors and buses
Geothermal	Balance of Plant	Electrical		3643	AC Inverters
Geothermal	Balance of Plant	Electrical		3644	AC Protection devices
Geothermal	Balance of Plant	Electrical		3649	Other AC instrument power problems
Geothermal	Balance of Plant	Electrical		3650	DC instrument power battery chargers
Geothermal	Balance of Plant	Electrical		3651	DC circuit breakers
Geothermal	Balance of Plant	Electrical		3652	DC conductors and buses
Geothermal	Balance of Plant	Electrical		3653	DC protection devices
Geothermal	Balance of Plant	Electrical		3659	Other DC power problems
Geothermal	Balance of Plant	Electrical		3660	4000-7000 volt transformers
Geothermal	Balance of Plant	Electrical		3661	4000-7000 volt circuit breakers
Geothermal	Balance of Plant	Electrical		3662	4000-7000 volt conductors and buses
Geothermal	Balance of Plant	Electrical		3663	4000-7000 volt insulators
Geothermal	Balance of Plant	Electrical		3664	4000-7000 volt protection devices
Geothermal	Balance of Plant	Electrical		3669	Other 4000-7000 volt problems
Geothermal	Balance of Plant	Electrical		3670	12-15kV transformers

Geothermal	Balance of Plant	Electrical		3671	12-15kV circuit breakers
Geothermal	Balance of Plant	Electrical		3672	12-15kV conductors and buses
Geothermal	Balance of Plant	Electrical		3673	12-15kV insulators
Geothermal	Balance of Plant	Electrical		3674	12-15kV protection devices
Geothermal	Balance of Plant	Electrical		3679	Other 12-15kV problems
Geothermal	Balance of Plant	Electrical		3680	Other voltage transformers
Geothermal	Balance of Plant	Electrical		3681	Other voltage circuit breakers
Geothermal	Balance of Plant	Electrical		3682	Other voltage conductors and buses
Geothermal	Balance of Plant	Electrical		3683	Other voltage insulators
Geothermal	Balance of Plant	Electrical		3684	Other voltage protection devices
Geothermal	Balance of Plant	Electrical		3689	Other voltage problems
Geothermal	Balance of Plant	Electrical		3690	Station Service Power Distribution System, General
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-19 Balance of Plant: Miscellaneous (Balance of Plant)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3950	Process computer
Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3960	Thermal derating (thermal efficiency losses in balance of plant when specific cause(s) unknown)
Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3970	Distributive Control System (DCS) - process computer
Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3971	DCS - data highway
Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3972	DCS - hardware problems (including card failure)
Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3973	DCS - internal and termination wiring
Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3974	DCS - logic problems
Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3975	DCS - upgrades
Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3979	Other DCS problems
Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3980	Programmable Logic Controller (PLC)
Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3981	PLC - data highway
Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3982	PLC - hardware problems (including card failure)
Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3983	PLC - internal and termination wiring
Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3984	PLC - logic problems
Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3985	PLC - upgrades

Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3989	Other PLC problems
Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3995	Powerhouse heating and ventilating systems
Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3996	Air conditioning systems - rooms and areas
Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3998	Balance of plant overhaul/outage
Geothermal	Balance of Plant	Miscellaneous (Balance of Plant)		3999	Other miscellaneous balance of plant problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-20 Balance of Plant: Power Station Switchyard

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Balance of Plant	Power Station Switchyard		3700	Power Station switchyard (non generating unit equipment)
Geothermal	Balance of Plant	Power Station Switchyard		3710	Transmission line (connected to powerhouse switchyard to 1st Substation)
Geothermal	Balance of Plant	Power Station Switchyard		3720	Transmission equipment at the 1st substation (see code 9300 if applicable)
Geothermal	Balance of Plant	Power Station Switchyard		3730	Transmission equipment beyond the 1st substation (see code 9300 if applicable)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-21 Balance of Plant: Waste Water (zero discharge) Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Balance of Plant	Waste Water (zero discharge) Systems		3290	Waste water (zero discharge) tanks, pumps, and motors
Geothermal	Balance of Plant	Waste Water (zero discharge) Systems		3291	Waste water (zero discharge) system fouling
Geothermal	Balance of Plant	Waste Water (zero discharge) Systems		3292	Waste water (zero discharge) piping
Geothermal	Balance of Plant	Waste Water (zero discharge) Systems		3293	Waste water (zero discharge) valves
Geothermal	Balance of Plant	Waste Water (zero discharge) Systems		3294	Waste water (zero discharge) controls and instrumentation
Geothermal	Balance of Plant	Waste Water (zero discharge) Systems		3295	Other waste water (zero discharge) problems

Notes: 1) For use with Unit Codes 800–899.

BOILER

TABLE B10-22 Boiler: Boiler Piping System - Desuperheaters/Attemperators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Boiler	Boiler Piping System	Desuperheaters/Attemperators	580	Desuperheater/attemperator piping
Geothermal	Boiler	Boiler Piping System	Desuperheaters/Attemperators	590	Desuperheater/attemperator valves
Geothermal	Boiler	Boiler Piping System	Desuperheaters/Attemperators	600	Desuperheater/attemperator spray nozzles
Geothermal	Boiler	Boiler Piping System	Desuperheaters/Attemperators	610	Desuperheater/attemperator drums
Geothermal	Boiler	Boiler Piping System	Desuperheaters/Attemperators	620	Other desuperheater/attemperator problems

Notes: 1) For use with Unit Codes 800–899.

TABLE B10-23 Boiler: Boiler Piping System - Main Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Boiler	Boiler Piping System	Main Steam	500	Main steam piping up to turbine stop valves
Geothermal	Boiler	Boiler Piping System	Main Steam	510	Main steam relief/safety valves off superheater
Geothermal	Boiler	Boiler Piping System	Main Steam	520	Other main steam valves (including vent and drain valves but not including the turbine stop valves)
Geothermal	Boiler	Boiler Piping System	Main Steam	530	Other main steam system problems

Notes: 1) For use with Unit Codes 800–899.

EXTERNAL

Use this set of codes to report events caused by external factors (flood, lightning, etc.); economic factors (lack of fuel, labor strikes, etc.); operator training; and transmission system problems external to the plant.

TABLE B10-24 External: Catastrophe

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	External	Catastrophe		9000	Flood
Geothermal	External	Catastrophe		9001	Drought

Geothermal	External	Catastrophe		9010	Fire including wildfires, not related to a specific component
Geothermal	External	Catastrophe		9020	Lightning
Geothermal	External	Catastrophe		9025	Geomagnetic disturbance
Geothermal	External	Catastrophe		9030	Earthquake
Geothermal	External	Catastrophe		9031	Tornado
Geothermal	External	Catastrophe		9035	Hurricane
Geothermal	External	Catastrophe		9036	Storms (ice, snow, etc)
Geothermal	External	Catastrophe		9040	Other catastrophe
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-25 External: Economic

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	External	Economic		0	Reserve shutdown
Geothermal	External	Economic		9130	Failure of fuel supplier to fulfill contractual obligations or a pre-arranged deal due to physical fuel disruptions or operational impairments (e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)
Geothermal	External	Economic		9131	Lack of fuel – due to contractual or tariff provisions that allow for service interruption or price fluctuations during peak demand periods.
Geothermal	External	Economic		9134	Fuel conservation
Geothermal	External	Economic		9136	Problems with Primary Fuel for Units with Secondary Fuel Operation
Geothermal	External	Economic		9137	Ground water or other water supply problems
Geothermal	External	Economic		9140	Plant modifications to burn different fuel that are not regulatory mandated
Geothermal	External	Economic		9150	Labor strikes company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.

Geothermal	External	Economic		9151	Labor strikes direct plant management grievances that result in a walkout or strike are under plant management control.
Geothermal	External	Economic		9160	Other economic problems
Geothermal	External	Economic		9180	Economic (for internal use at plants only)
Geothermal	External	Economic		9181	Economic (for internal use at plants only)
Geothermal	External	Economic		9182	Economic (for internal use at plants only)
Geothermal	External	Economic		9183	Economic (for internal use at plants only)
Geothermal	External	Economic		9184	Economic (for internal use at plants only)
Geothermal	External	Economic		9185	Economic (for internal use at plants only)
Geothermal	External	Economic		9186	Economic (for internal use at plants only)
Geothermal	External	Economic		9187	Economic (for internal use at plants only)
Geothermal	External	Economic		9188	Economic (for internal use at plants only)
Geothermal	External	Economic		9189	Economic (for internal use at plants only)
Geothermal	External	Economic		9190	Economic (for internal use at plants only)
Geothermal	External	Economic		9191	Economic (for internal use at plants only)
Geothermal	External	Economic		9192	Economic (for internal use at plants only)
Geothermal	External	Economic		9193	Economic (for internal use at plants only)
Geothermal	External	Economic		9194	Economic (for internal use at plants only)
Geothermal	External	Economic		9195	Economic (for internal use at plants only)
Geothermal	External	Economic		9196	Economic (for internal use at plants only)
Geothermal	External	Economic		9197	Economic (for internal use at plants only)
Geothermal	External	Economic		9198	Economic (for internal use at plants only)
Geothermal	External	Economic		9199	Economic (for internal use at plants only)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-26 External: Miscellaneous (External)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	External	Miscellaneous (External)		9300	Transmission system problems other than catastrophes (do not include switchyard problems in this category; see codes 3600 to 3629, 3720 to 3730)
Geothermal	External	Miscellaneous (External)		9305	Ash disposal problem
Geothermal	External	Miscellaneous (External)		9310	Operator training
Geothermal	External	Miscellaneous (External)		9320	Other miscellaneous external problems
Geothermal	External	Miscellaneous (External)		9340	Synchronous Condenser Operation

Notes: 1) For use with Unit Codes 800–899.

GENERATOR

This set of codes contains the generator, exciter, generator cooling systems, and generator controls. Note the main leads up to and includes the generator output breaker in this set of codes.

TABLE B10-27 Generator: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Generator	Controls		4700	Generator voltage control
Geothermal	Generator	Controls		4710	Generator metering devices
Geothermal	Generator	Controls		4720	Generator synchronization equipment
Geothermal	Generator	Controls		4730	Generator current and potential transformers
Geothermal	Generator	Controls		4740	Emergency generator trip devices
Geothermal	Generator	Controls		4750	Other generator controls and metering problems

Notes: 1) For use with Unit Codes 800–899.

TABLE B10-28 Generator: Cooling System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Generator	Cooling System		4610	Hydrogen cooling system piping and valves
Geothermal	Generator	Cooling System		4611	Hydrogen coolers
Geothermal	Generator	Cooling System		4612	Hydrogen storage system
Geothermal	Generator	Cooling System		4613	Hydrogen seals
Geothermal	Generator	Cooling System		4619	Other hydrogen system problems
Geothermal	Generator	Cooling System		4620	Air cooling system
Geothermal	Generator	Cooling System		4630	Liquid cooling system
Geothermal	Generator	Cooling System		4640	Seal oil system and seals
Geothermal	Generator	Cooling System		4650	Other cooling system problems

Notes: 1) For use with Unit Codes 800–899. 2) Report failures caused by water leaks into generator as codes 4500, 4510, etc.

TABLE B10-29 Generator: Exciter

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Generator	Exciter		4600	Exciter drive - motor

Geothermal	Generator	Exciter		4601	Exciter field rheostat
Geothermal	Generator	Exciter		4602	Exciter commutator and brushes
Geothermal	Generator	Exciter		4603	Solid state exciter element
Geothermal	Generator	Exciter		4604	Exciter drive - shaft
Geothermal	Generator	Exciter		4605	Exciter transformer
Geothermal	Generator	Exciter		4609	Other exciter problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-30 Generator: Generator

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Generator	Generator		4500	Rotor windings (including damper windings and fan blades on hydro units)
Geothermal	Generator	Generator		4510	Rotor collector rings
Geothermal	Generator	Generator		4511	Rotor, General
Geothermal	Generator	Generator		4512	Retaining Rings
Geothermal	Generator	Generator		4520	Stator windings, bushings, and terminals
Geothermal	Generator	Generator		4530	Stator core iron
Geothermal	Generator	Generator		4535	Stator, General
Geothermal	Generator	Generator		4536	Generator Heaters
Geothermal	Generator	Generator		4540	Brushes and brush rigging
Geothermal	Generator	Generator		4550	Generator bearings and lube oil system (including thrust bearings on hydro units)
Geothermal	Generator	Generator		4551	Generator bearings
Geothermal	Generator	Generator		4552	Generator lube oil system
Geothermal	Generator	Generator		4555	Bearing cooling system
Geothermal	Generator	Generator		4560	Generator vibration (excluding vibration due to failed bearing and other components)
Geothermal	Generator	Generator		4570	Generator casing
Geothermal	Generator	Generator		4580	Generator end bells and bolting
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-31 Generator: Miscellaneous (Generator)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Generator	Miscellaneous (Generator)		4800	Generator main leads
Geothermal	Generator	Miscellaneous (Generator)		4805	Generator Bus Duct Cooling System

Geothermal	Generator	Miscellaneous (Generator)		4810	Generator output breaker
Geothermal	Generator	Miscellaneous (Generator)		4830	Major generator overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Geothermal	Generator	Miscellaneous (Generator)		4831	Minor generator overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Geothermal	Generator	Miscellaneous (Generator)		4840	Inspection
Geothermal	Generator	Miscellaneous (Generator)		4841	Generator doble testing
Geothermal	Generator	Miscellaneous (Generator)		4842	Reactive and capability testing
Geothermal	Generator	Miscellaneous (Generator)		4850	Core monitor alarm
Geothermal	Generator	Miscellaneous (Generator)		4860	Generator neutral grounding equipment
Geothermal	Generator	Miscellaneous (Generator)		4899	Other miscellaneous generator problems
Notes: 1) For use with Unit Codes 800–899.					

INACTIVE STATES

TABLE B10-32 Inactive States: Inactive States

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Inactive States	Inactive States		2	Inactive Reserve Shutdown
Geothermal	Inactive States	Inactive States		9990	Retired unit
Geothermal	Inactive States	Inactive States		9991	Mothballed unit
Notes: 1) For use with Unit Codes 800–899.					

MISCELLANEOUS

TABLE B10-33 Miscellaneous: Plant and Auxiliaries

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Miscellaneous	Plant and Auxiliaries		6410	Steam wells/steam field piping problems
Geothermal	Miscellaneous	Plant and Auxiliaries		6415	Low steam pressure
Geothermal	Miscellaneous	Plant and Auxiliaries		6420	Condensate reinjection system
Geothermal	Miscellaneous	Plant and Auxiliaries		6430	Unit H2S emission limitations - regulatory
Geothermal	Miscellaneous	Plant and Auxiliaries		6435	Steam field H2S emission limitations - regulatory
Geothermal	Miscellaneous	Plant and Auxiliaries		6440	H2S abatement system problems - general
Geothermal	Miscellaneous	Plant and Auxiliaries		6450	Heat exchanger problems due to H2S abatement system
Geothermal	Miscellaneous	Plant and Auxiliaries		6460	Condenser problems due to H2S abatement system

Geothermal	Miscellaneous	Plant and Auxiliaries		6470	Cooling tower problems due to H2S abatement system
Geothermal	Miscellaneous	Plant and Auxiliaries		6480	Steam strainer plugging - mineral deposits
Geothermal	Miscellaneous	Plant and Auxiliaries		6490	Turbine plugging - mineral deposits
Geothermal	Miscellaneous	Plant and Auxiliaries		6499	Geothermal
Notes: 1) For use with Unit Codes 800–899.					

PERFORMANCE

TABLE B10-34 Performance: Performance

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Performance	Performance		9997	NERC Reliability Standard Requirement
Geothermal	Performance	Performance		9998	Black start testing
Geothermal	Performance	Performance		9999	Total unit performance testing (use appropriate codes for individual component testing)
Notes: 1) For use with Unit Codes 800–899.					

PERSONNEL OR PROCEDURAL ERRORS

TABLE B10-35 Personnel or Procedural Errors: Personnel or Procedural Errors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Personnel or Procedural Errors	Personnel or Procedural Errors		9900	Operator error
Geothermal	Personnel or Procedural Errors	Personnel or Procedural Errors		9910	Maintenance personnel error
Geothermal	Personnel or Procedural Errors	Personnel or Procedural Errors		9920	Contractor error
Geothermal	Personnel or Procedural Errors	Personnel or Procedural Errors		9930	Operating procedure error
Geothermal	Personnel or Procedural Errors	Personnel or Procedural Errors		9940	Maintenance procedure error
Geothermal	Personnel or Procedural Errors	Personnel or Procedural Errors		9950	Contractor procedure error
Geothermal	Personnel or Procedural Errors	Personnel or Procedural Errors		9960	Staff shortage
Notes: 1) For use with Unit Codes 800–899.					

POLLUTION CONTROL EQUIPMENT

Use this set of codes to report problems with flue gas desulphurization equipment and stack gas particulate removal equipment. If outages or deratings occur due to reasons other than equipment problems, use the set of codes for Regulatory, Safety, Environmental stack emission limits. Use code 9510 for outages or deratings required to install pollution control equipment. Use codes 9600 to 9650 only when the pollution control equipment problems are not responsible for exceeding emission limits

TABLE B10-36 Pollution Control Equipment: Continuous Emissions Monitoring Systems (CEMS)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8700	CEMS Certification and Recertification
Geothermal	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8710	SO2 analyzer problems
Geothermal	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8720	NOx analyzer problems
Geothermal	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8730	CO analyzer problems
Geothermal	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8740	CO2 analyzer problems
Geothermal	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8750	O2 analyzer problems
Geothermal	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8760	Opacity monitor problems
Geothermal	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8770	Flow monitor problems
Geothermal	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8780	Data acquisition system problems
Geothermal	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8790	Miscellaneous CEMS problems

Notes: 1) For use with Unit Codes 800–899.

TABLE B10-37 Pollution Control Equipment: Wet Scrubbers - Chemical Supply

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8000	Chemical feed storage, mill feeders, and conveyors
Geothermal	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8002	Screw conveyors
Geothermal	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8003	Bucket elevators

Geothermal	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8006	Weigh feeders
Geothermal	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8010	Crushers/mills
Geothermal	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8020	Mill slurry tanks supply problems
Geothermal	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8030	Classifiers
Geothermal	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8040	Slurry transfer pumps and motors
Geothermal	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8050	Chemical unavailability
Geothermal	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8099	Other chemical supply problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-38 Pollution Control Equipment: Wet Scrubbers - Miscellaneous (Wet Scrubber)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8400	Scrubber gas discharge reheaters - general
Geothermal	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8402	Scrubber gas discharge reheaters - vibration
Geothermal	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8404	Scrubber gas discharge reheaters - tube leaks
Geothermal	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8406	Scrubber gas discharge reheaters - ducts
Geothermal	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8410	Scrubber instruments and controls
Geothermal	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8415	Liquid level controls
Geothermal	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8420	Heat tracer
Geothermal	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8425	Miscellaneous mechanical failures
Geothermal	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8426	Miscellaneous electrical failures
Geothermal	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8430	Stack damage related to scrubber system

Geothermal	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8440	Major overhaul
Geothermal	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8450	Inspection
Geothermal	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8460	Testing
Geothermal	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8470	SO2 monitor
Geothermal	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8499	Other miscellaneous wet scrubber problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-39 Pollution Control Equipment: Wet Scrubbers - Piping, Ducting, Dampers, and Fans

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8200	Piping
Geothermal	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8210	Valves
Geothermal	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8220	Strainers or filters
Geothermal	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8225	Drain pots
Geothermal	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8230	Ducting
Geothermal	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8235	Demister
Geothermal	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8240	Bypass dampers
Geothermal	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8250	Dampers other than bypass
Geothermal	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8260	Scrubber booster I.D. fan (fan specific to the scrubber)
Geothermal	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8261	Scrubber booster I.D. fan drive
Geothermal	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8262	Scrubber booster I.D. fan vibration (fan specific to the scrubber)
Geothermal	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8264	Scrubber booster I.D. fan blades (fan specific to the scrubber)

Geothermal	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8270	Scrubber booster F.D. fan (fan specific to the scrubber)
Geothermal	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8271	Scrubber booster F.D. fan drive
Geothermal	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8272	Scrubber booster F.D. fan vibration (fan specific to the scrubber)
Geothermal	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8274	Scrubber booster F.D. fan blades (fan specific to the scrubber)
Geothermal	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8280	Reagent feed piping
Geothermal	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8290	Demister wash piping assembly
Geothermal	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8299	Other piping, ducting, damper, and fan problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-40 Pollution Control Equipment: Wet Scrubbers - Wet Scrubber

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8100	Scrubber/absorber tower or module
Geothermal	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8110	Spray nozzles
Geothermal	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8115	Disc scrubber throats
Geothermal	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8120	Spray pumps and motors
Geothermal	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8125	Scrubber recycle (liquid) pumps
Geothermal	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8127	Scrubber recycle (liquid) pump motors
Geothermal	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8130	Recirculation tanks including agitators
Geothermal	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8140	Reaction tanks including agitators
Geothermal	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8150	Tubes
Geothermal	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8160	Mist eliminators/demisters and washdown

Geothermal	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8199	Other scrubber problems
Notes: 1) For use with Unit Codes 800–899.					

REGULATORY, SAFETY, ENVIRONMENTAL

Use these codes only for events not directly attributable to equipment failures. Inspections or testing of certain equipment due to regulation are reported using the appropriate equipment cause codes, and the fact that it was a regulatory requirement noted in the verbal description section.

TABLE B10-41 Regulatory, Safety, Environmental: Regulatory

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Regulatory, Safety, Environmental	Regulatory		9504	Regulatory (environmental) proceedings and hearings - regulatory agency initiated
Geothermal	Regulatory, Safety, Environmental	Regulatory		9506	Regulatory (environmental) proceedings and hearings - intervenor initiated
Geothermal	Regulatory, Safety, Environmental	Regulatory		9510	Plant modifications strictly for compliance with new or changed regulatory requirements (scrubbers, cooling towers, etc.)
Geothermal	Regulatory, Safety, Environmental	Regulatory		9520	Oil spill in Gulf of Mexico (OMC)
Geothermal	Regulatory, Safety, Environmental	Regulatory		9590	Miscellaneous regulatory (this code is primarily intended for use with event contribution code 2 to indicate that a regulatory-related factor contributed to the primary cause of the event)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-42 Regulatory, Safety, Environmental: Safety

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Regulatory, Safety, Environmental	Safety		9700	OSHA-related retrofit or inspection
Geothermal	Regulatory, Safety, Environmental	Safety		9720	Other safety problems
Notes: 1) For use with Unit Codes 800–899.					

STEAM TURBINE

Besides the turbine, this set includes the steam stop/control valves, turbine control system, and the turbine auxiliaries. The extraction steam codes are contained in the Balance of Plant set.

TABLE B10-43 Steam Turbine: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Steam Turbine	Controls		4290	Hydraulic system pumps
Geothermal	Steam Turbine	Controls		4291	Hydraulic system coolers
Geothermal	Steam Turbine	Controls		4292	Hydraulic system filters
Geothermal	Steam Turbine	Controls		4293	Hydraulic system pipes and valves
Geothermal	Steam Turbine	Controls		4299	Other hydraulic system problems
Geothermal	Steam Turbine	Controls		4300	Turbine supervisory system (use codes 4290 to 4299 for hydraulic oil)
Geothermal	Steam Turbine	Controls		4301	Turbine governing system
Geothermal	Steam Turbine	Controls		4302	Turbine trip devices (including instruments)
Geothermal	Steam Turbine	Controls		4303	Exhaust hood and spray controls
Geothermal	Steam Turbine	Controls		4304	Automatic turbine control systems - mechanical
Geothermal	Steam Turbine	Controls		4305	Automatic turbine control systems - mechanical - hydraulic
Geothermal	Steam Turbine	Controls		4306	Automatic turbine control systems - electro-hydraulic - analog
Geothermal	Steam Turbine	Controls		4307	Automatic turbine control systems - electro-hydraulic - digital
Geothermal	Steam Turbine	Controls		4308	Automatic turbine control systems - digital control and monitoring
Geothermal	Steam Turbine	Controls		4309	Other turbine instrument and control problems
Geothermal	Steam Turbine	Controls		4310	Steam Turbine Control System - data highway
Geothermal	Steam Turbine	Controls		4311	Steam Turbine Control System - hardware problems (including card failure)
Geothermal	Steam Turbine	Controls		4312	Steam Turbine Control System - internal and termination wiring

Geothermal	Steam Turbine	Controls		4313	Steam Turbine Control System - logic problems
Geothermal	Steam Turbine	Controls		4314	Steam Turbine Control System - upgrades
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-44 Steam Turbine: Low Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Steam Turbine	Low Pressure Turbine		4200	Outer casing
Geothermal	Steam Turbine	Low Pressure Turbine		4201	Inner casing
Geothermal	Steam Turbine	Low Pressure Turbine		4209	Nozzle bolting
Geothermal	Steam Turbine	Low Pressure Turbine		4210	Nozzles and nozzle blocks
Geothermal	Steam Turbine	Low Pressure Turbine		4211	Diaphragms
Geothermal	Steam Turbine	Low Pressure Turbine		4212	Buckets or blades
Geothermal	Steam Turbine	Low Pressure Turbine		4213	Bucket or blade fouling
Geothermal	Steam Turbine	Low Pressure Turbine		4215	Wheels or spindles
Geothermal	Steam Turbine	Low Pressure Turbine		4220	Shaft seals
Geothermal	Steam Turbine	Low Pressure Turbine		4221	Dummy rings
Geothermal	Steam Turbine	Low Pressure Turbine		4222	Gland rings
Geothermal	Steam Turbine	Low Pressure Turbine		4230	Rotor shaft
Geothermal	Steam Turbine	Low Pressure Turbine		4240	Bearings
Geothermal	Steam Turbine	Low Pressure Turbine		4241	Thrust bearings
Geothermal	Steam Turbine	Low Pressure Turbine		4250	Other low pressure turbine problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-45 Steam Turbine: Lube Oil

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Steam Turbine	Lube Oil		4280	Lube oil pumps
Geothermal	Steam Turbine	Lube Oil		4281	Lube oil coolers
Geothermal	Steam Turbine	Lube Oil		4282	Lube oil conditioners
Geothermal	Steam Turbine	Lube Oil		4283	Lube oil system valves and piping
Geothermal	Steam Turbine	Lube Oil		4284	Lube oil pump drive
Geothermal	Steam Turbine	Lube Oil		4289	Other lube oil system problems
Notes: 1) For use with Unit Codes 800–899. 2) Do not include bearing failures due to lube oil.					

TABLE B10-46 Steam Turbine: Miscellaneous (Steam Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Geothermal	Steam Turbine	Miscellaneous (Steam Turbine)		4400	Major turbine overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Geothermal	Steam Turbine	Miscellaneous (Steam Turbine)		4401	Inspection
Geothermal	Steam Turbine	Miscellaneous (Steam Turbine)		4402	Minor turbine overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Geothermal	Steam Turbine	Miscellaneous (Steam Turbine)		4410	Turning gear and motor
Geothermal	Steam Turbine	Miscellaneous (Steam Turbine)		4411	Steam turbine gear box (single shaft configuration)
Geothermal	Steam Turbine	Miscellaneous (Steam Turbine)		4412	Steam turbine clutch (single shaft configuration)
Geothermal	Steam Turbine	Miscellaneous (Steam Turbine)		4415	Shaft coupling mechanism
Geothermal	Steam Turbine	Miscellaneous (Steam Turbine)		4420	Vibration of the turbine generator unit that cannot be attributed to a specific cause such as bearings or blades (use this code for balance moves)
Geothermal	Steam Turbine	Miscellaneous (Steam Turbine)		4430	Gland seal system
Geothermal	Steam Turbine	Miscellaneous (Steam Turbine)		4450	Water induction
Geothermal	Steam Turbine	Miscellaneous (Steam Turbine)		4460	Turbine overspeed trip test
Geothermal	Steam Turbine	Miscellaneous (Steam Turbine)		4470	Differential expansion
Geothermal	Steam Turbine	Miscellaneous (Steam Turbine)		4490	Turbine performance testing (use code 9999 for total unit performance testing)
Geothermal	Steam Turbine	Miscellaneous (Steam Turbine)		4499	Other miscellaneous steam turbine problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-47 Steam Turbine: Piping					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Geothermal	Steam Turbine	Piping		4270	Crossover or under piping
Geothermal	Steam Turbine	Piping		4279	Miscellaneous turbine piping
Notes: 1) For use with Unit Codes 800–899.					

TABLE B10-48 Steam Turbine: Valves					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**

Geothermal	Steam Turbine	Valves		4260	Main stop valves
Geothermal	Steam Turbine	Valves		4261	Control valves
Geothermal	Steam Turbine	Valves		4262	Intercept valves
Geothermal	Steam Turbine	Valves		4263	Reheat stop valves
Geothermal	Steam Turbine	Valves		4264	Combined intercept valves
Geothermal	Steam Turbine	Valves		4265	Miscellaneous drain and vent valves
Geothermal	Steam Turbine	Valves		4266	Main stop valve testing
Geothermal	Steam Turbine	Valves		4267	Control valve testing
Geothermal	Steam Turbine	Valves		4268	Reheat/intercept valve testing
Geothermal	Steam Turbine	Valves		4269	Other turbine valves (including LP steam admission valves)
Notes: 1) For use with Unit Codes 800–899.					

Appendix B11: Index To Internal Combustion/Reciprocating Engine Unit Cause Codes

INTERNAL COMBUSTION/RECIPROCATING ENGINE UNITS

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
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B11-2	Balance of Plant	Electrical	
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B11-4	Balance of Plant	Power Station Switchyard	
B11-5	External	Catastrophe	
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B11-22	Regulatory, Safety, Environmental	Regulatory	
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B11-24	Regulatory, Safety, Environmental	Stack Emission	

BALANCE OF PLANT

TABLE B11-1 Balance of Plant: Auxiliary Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3850	Instrument air compressors
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3851	Instrument air piping
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3852	Instrument air valves
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3853	Instrument air dryers
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3854	N2 backup to instrument air
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3859	Other instrument air problems
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3860	Fire protection system pumps
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3861	Fire protection system piping
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3862	Fire protection system valves
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3863	Fire protection system fouling
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3864	Fire protection system instrumentation and controls

Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3998	Balance of plant overhaul/outage
Notes: 1) For use with Unit Codes 400-499.					

TABLE B11-2 Balance of Plant: Electrical

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3600	Switchyard transformers and associated cooling systems - external (OMC)
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3601	Switchyard transformers and associated cooling systems - external (not OMC)
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3610	Switchyard circuit breakers - external (not OMC)
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3611	Switchyard circuit breakers - external (OMC)
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3612	Switchyard system protection devices - external (OMC)
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3613	Switchyard system protection devices - external (not OMC)
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3618	Other switchyard equipment - external (not OMC)
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3619	Other switchyard equipment - external (OMC)
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3620	Main transformer
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3621	Unit auxiliaries transformer

Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3622	Station service startup transformer
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3623	Auxiliary generators
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3624	Auxiliary generator voltage supply system
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3629	Other switchyard or high voltage system problems - external
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3630	400-700 volt transformers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3631	400-700 volt circuit breakers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3632	400-700 volt conductors and buses
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3633	400-700 volt insulators
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3634	400-700 volt protection devices
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3639	Other 400-700 volt problems
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3640	AC instrument power transformers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3641	AC Circuit breakers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3642	AC Conductors and buses

Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3643	AC Inverters
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3644	AC Protection devices
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3649	Other AC instrument power problems
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3650	DC instrument power battery chargers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3651	DC circuit breakers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3652	DC conductors and buses
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3653	DC protection devices
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3659	Other DC power problems
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3660	4000-7000 volt transformers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3661	4000-7000 volt circuit breakers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3662	4000-7000 volt conductors and buses
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3663	4000-7000 volt insulators
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3664	4000-7000 volt protection devices

Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3669	Other 4000-7000 volt problems
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3670	12-15kV transformers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3671	12-15kV circuit breakers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3672	12-15kV conductors and buses
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3673	12-15kV insulators
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3674	12-15kV protection devices
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3679	Other 12-15kV problems
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3680	Other voltage transformers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3681	Other voltage circuit breakers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3682	Other voltage conductors and buses
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3683	Other voltage insulators
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3684	Other voltage protection devices
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3689	Other voltage problems

Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3690	Station Service Power Distribution System, General
Notes: 1) For use with Unit Codes 400-499.					

TABLE B11-3 Balance of Plant: Miscellaneous (Balance of Plant)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3970	Distributive Control System (DCS) - process computer
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3971	DCS - data highway
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3972	DCS - hardware problems (including card failure)
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3973	DCS - internal and termination wiring
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3974	DCS - logic problems
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3975	DCS - upgrades
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3979	Other DCS problems
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3980	Programmable Logic Controller (PLC)
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3981	PLC - data highway
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3982	PLC - hardware problems (including card failure)

Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3983	PLC - internal and termination wiring
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3984	PLC - logic problems
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3985	PLC - upgrades
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3989	Other PLC problems
Notes: 1) For use with Unit Codes 400-499.					

TABLE B11-4 Balance of Plant: Power Station Switchyard

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Balance of Plant	Power Station Switchyard		3700	Power Station switchyard (non generating unit equipment)
Internal Combustion/Reciprocating Engines	Balance of Plant	Power Station Switchyard		3710	Transmission line (connected to powerhouse switchyard to 1st Substation)
Internal Combustion/Reciprocating Engines	Balance of Plant	Power Station Switchyard		3720	Transmission equipment at the 1st substation (see code 9300 if applicable)
Internal Combustion/Reciprocating Engines	Balance of Plant	Power Station Switchyard		3730	Transmission equipment beyond the 1st substation (see code 9300 if applicable)
Notes: 1) For use with Unit Codes 400-499.					

EXTERNAL

Use this set of codes to report events caused by external factors (flood, lightning, etc.); economic factors (lack of fuel, labor strikes, etc.); operator training; and transmission system problems external to the plant.

TABLE B11-5 External: Catastrophe

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	External	Catastrophe		9000	Flood
Internal Combustion/Reciprocating Engines	External	Catastrophe		9001	Drought
Internal Combustion/Reciprocating Engines	External	Catastrophe		9010	Fire including wildfires, not related to a specific component
Internal Combustion/Reciprocating Engines	External	Catastrophe		9020	Lightning
Internal Combustion/Reciprocating Engines	External	Catastrophe		9025	Geomagnetic disturbance
Internal Combustion/Reciprocating Engines	External	Catastrophe		9030	Earthquake
Internal Combustion/Reciprocating Engines	External	Catastrophe		9031	Tornado
Internal Combustion/Reciprocating Engines	External	Catastrophe		9035	Hurricane
Internal Combustion/Reciprocating Engines	External	Catastrophe		9036	Storms (ice, snow, etc)
Internal Combustion/Reciprocating Engines	External	Catastrophe		9040	Other catastrophe
Notes: 1) For use with Unit Codes 400-499.					

TABLE B11-6 External: Economic					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**

Internal Combustion/Reciprocating Engines	External	Economic		0	Reserve shutdown
Internal Combustion/Reciprocating Engines	External	Economic		9130	Failure of fuel supplier to fulfill contractual obligations or a pre-arranged deal due to physical fuel disruptions or operational impairments (e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)
Internal Combustion/Reciprocating Engines	External	Economic		9131	Lack of fuel – due to contractual or tariff provisions that allow for service interruption or price fluctuations during peak demand periods.
Internal Combustion/Reciprocating Engines	External	Economic		9134	Fuel conservation
Internal Combustion/Reciprocating Engines	External	Economic		9136	Problems with Primary Fuel for Units with Secondary Fuel Operation
Internal Combustion/Reciprocating Engines	External	Economic		9140	Plant modifications to burn different fuel that are not regulatory mandated
Internal Combustion/Reciprocating Engines	External	Economic		9150	Labor strikes company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.
Internal Combustion/Reciprocating Engines	External	Economic		9151	Labor strikes direct plant management grievances that result in a walkout or strike are under plant management control.
Internal Combustion/Reciprocating Engines	External	Economic		9160	Other economic problems
Internal Combustion/Reciprocating Engines	External	Economic		9180	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9181	Economic (for internal use at plants only)

Internal Combustion/Reciprocating Engines	External	Economic		9182	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9183	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9184	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9185	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9186	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9187	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9188	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9189	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9190	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9191	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9192	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9193	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9194	Economic (for internal use at plants only)

Internal Combustion/Reciprocating Engines	External	Economic		9195	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9196	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9197	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9198	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9199	Economic (for internal use at plants only)
Notes: 1) For use with Unit Codes 400-499.					

TABLE B11-7 External: Fuel Quality

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9200	High ash content (OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9201	High ash content (not OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9205	Poor quality natural gas fuel, low heat content
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9220	High sulfur content (OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9221	High sulfur content (not OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9230	High vanadium content (OMC)

Internal Combustion/Reciprocating Engines	External	Fuel Quality		9231	High vanadium content (not OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9240	High sodium content (OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9241	High sodium content (not OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9260	Low BTU oil (OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9261	Low BTU oil (not OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9290	Other fuel quality problems (OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9291	Other fuel quality problems (not OMC)
Notes: 1) For use with Unit Codes 400-499. 2) Use code 9605 to 9655 if the fuel quality results in excess stack emissions through no fault in the pollution control equipment. Use the appropriate equipment code to report fouling and slagging.					

TABLE B11-8 External: Miscellaneous (External)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	External	Miscellaneous (External)		9300	Transmission system problems other than catastrophes (do not include switchyard problems in this category; see codes 3600 to 3629, 3720 to 3730)
Internal Combustion/Reciprocating Engines	External	Miscellaneous (External)		9310	Operator training
Internal Combustion/Reciprocating Engines	External	Miscellaneous (External)		9320	Other miscellaneous external problems

Internal Combustion/Reciprocating Engines	External	Miscellaneous (External)		9340	Synchronous Condenser Operation
Notes: 1) For use with Unit Codes 400-499.					

GENERATOR

This set of codes contains the generator, exciter, generator cooling systems, and generator controls. Note the main leads up to and includes the generator output breaker in this set of codes.

TABLE B11-9 Generator: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Generator	Controls		4700	Generator voltage control
Internal Combustion/Reciprocating Engines	Generator	Controls		4710	Generator metering devices
Internal Combustion/Reciprocating Engines	Generator	Controls		4720	Generator synchronization equipment
Internal Combustion/Reciprocating Engines	Generator	Controls		4730	Generator current and potential transformers
Internal Combustion/Reciprocating Engines	Generator	Controls		4740	Emergency generator trip devices
Internal Combustion/Reciprocating Engines	Generator	Controls		4750	Other generator controls and metering problems
Notes: 1) For use with Unit Codes 400-499.					

TABLE B11-10 Generator: Cooling System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Generator	Cooling System		4610	Hydrogen cooling system piping and valves

Internal Combustion/Reciprocating Engines	Generator	Cooling System		4611	Hydrogen coolers
Internal Combustion/Reciprocating Engines	Generator	Cooling System		4612	Hydrogen storage system
Internal Combustion/Reciprocating Engines	Generator	Cooling System		4613	Hydrogen seals
Internal Combustion/Reciprocating Engines	Generator	Cooling System		4619	Other hydrogen system problems
Internal Combustion/Reciprocating Engines	Generator	Cooling System		4620	Air cooling system
Internal Combustion/Reciprocating Engines	Generator	Cooling System		4630	Liquid cooling system
Internal Combustion/Reciprocating Engines	Generator	Cooling System		4640	Seal oil system and seals
Internal Combustion/Reciprocating Engines	Generator	Cooling System		4650	Other cooling system problems
Notes: 1) For use with Unit Codes 400-499. 2) Report failures caused by water leaks into generator as codes 4500, 4510, etc.					

TABLE B11-11 Generator: Exciter

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Generator	Exciter		4600	Exciter drive - motor
Internal Combustion/Reciprocating Engines	Generator	Exciter		4601	Exciter field rheostat
Internal Combustion/Reciprocating Engines	Generator	Exciter		4602	Exciter commutator and brushes

Internal Combustion/Reciprocating Engines	Generator	Exciter		4603	Solid state exciter element
Internal Combustion/Reciprocating Engines	Generator	Exciter		4604	Exciter drive - shaft
Internal Combustion/Reciprocating Engines	Generator	Exciter		4605	Exciter transformer
Internal Combustion/Reciprocating Engines	Generator	Exciter		4609	Other exciter problems
Notes: 1) For use with Unit Codes 400-499.					

TABLE B11-12 Generator: Generator

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Generator	Generator		4500	Rotor windings (including damper windings and fan blades on hydro units)
Internal Combustion/Reciprocating Engines	Generator	Generator		4510	Rotor collector rings
Internal Combustion/Reciprocating Engines	Generator	Generator		4511	Rotor, General
Internal Combustion/Reciprocating Engines	Generator	Generator		4512	Retaining Rings
Internal Combustion/Reciprocating Engines	Generator	Generator		4520	Stator windings, bushings, and terminals
Internal Combustion/Reciprocating Engines	Generator	Generator		4530	Stator core iron
Internal Combustion/Reciprocating Engines	Generator	Generator		4535	Stator, General

Internal Combustion/Reciprocating Engines	Generator	Generator		4536	Generator Heaters
Internal Combustion/Reciprocating Engines	Generator	Generator		4540	Brushes and brush rigging
Internal Combustion/Reciprocating Engines	Generator	Generator		4550	Generator bearings and lube oil system (including thrust bearings on hydro units)
Internal Combustion/Reciprocating Engines	Generator	Generator		4551	Generator bearings
Internal Combustion/Reciprocating Engines	Generator	Generator		4552	Generator lube oil system
Internal Combustion/Reciprocating Engines	Generator	Generator		4555	Bearing cooling system
Internal Combustion/Reciprocating Engines	Generator	Generator		4560	Generator vibration (excluding vibration due to failed bearing and other components)
Internal Combustion/Reciprocating Engines	Generator	Generator		4570	Generator casing
Internal Combustion/Reciprocating Engines	Generator	Generator		4580	Generator end bells and bolting
Notes: 1) For use with Unit Codes 400-499.					

TABLE B11-13 Generator: Miscellaneous (Generator)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Generator	Miscellaneous (Generator)		4800	Generator main leads
Internal Combustion/Reciprocating Engines	Generator	Miscellaneous (Generator)		4805	Generator Bus Duct Cooling System

Internal Combustion/Reciprocating Engines	Generator	Miscellaneous (Generator)		4810	Generator output breaker
Internal Combustion/Reciprocating Engines	Generator	Miscellaneous (Generator)		4830	Major generator overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Internal Combustion/Reciprocating Engines	Generator	Miscellaneous (Generator)		4831	Minor generator overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Internal Combustion/Reciprocating Engines	Generator	Miscellaneous (Generator)		4840	Inspection
Internal Combustion/Reciprocating Engines	Generator	Miscellaneous (Generator)		4841	Generator doble testing
Internal Combustion/Reciprocating Engines	Generator	Miscellaneous (Generator)		4842	Reactive and capability testing
Internal Combustion/Reciprocating Engines	Generator	Miscellaneous (Generator)		4850	Core monitor alarm
Internal Combustion/Reciprocating Engines	Generator	Miscellaneous (Generator)		4860	Generator neutral grounding equipment
Internal Combustion/Reciprocating Engines	Generator	Miscellaneous (Generator)		4899	Other miscellaneous generator problems
Notes: 1) For use with Unit Codes 400-499.					

INACTIVE STATES

TABLE B11-14 Inactive States: Inactive States

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Inactive States	Inactive States		2	Inactive Reserve Shutdown
Internal Combustion/Reciprocating Engines	Inactive States	Inactive States		9990	Retired unit

Internal Combustion/Reciprocating Engines	Inactive States	Inactive States		9991	Mothballed unit
Notes: 1) For use with Unit Codes 400-499.					

INTERNAL COMBUSTION/RECIPROCATING ENGINES

TABLE B11-15 Internal Combustion/Reciprocating Engines: Engine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5700	Drive shaft and bearings
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5710	Cylinders
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5711	Cylinder heads
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5712	Hydraulic lock (water in cylinders)
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5720	Pistons
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5730	Intake valves
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5731	Exhaust valves
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5734	Exhaust gas bellow
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5735	Main starting air valve
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5740	Turbo charger

Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5756	Starting air distributer
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5758	Charge air cooler
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5759	Wastegate
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5760	Main bearing
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5761	Camshaft
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5762	Crankshaft
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5763	Liner
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5764	Flywheel
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5765	Connecting rod
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5790	Vibration
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5792	Engine Overspeed Trip
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5799	Other engine problems
Notes: 1) For use with Unit Codes 400-499.					

TABLE B11-16 Internal Combustion/Reciprocating Engines: Engine Auxiliaries

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5114	Lube oil filters
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5800	Lube oil system
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5801	Lube oil separator
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5805	Cooling system
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5810	Heater elements
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5811	HT water pre heater
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5812	LT water pre heater
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5815	Fuel system
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5816	CBU fuel pump
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5817	CBU fuel filter
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5818	Pilot filter
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5820	Start system

Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5825	Battery and battery charger system
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5830	Air filter system
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5831	Exhaust gas rapture disc
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5832	Turning gear
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5849	Other engine auxiliaries problems
Notes: 1) For use with Unit Codes 400-499.					

TABLE B11-17 Internal Combustion/Reciprocating Engines: Engine Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5850	Governor
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5855	Engine control system
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5860	Control power transformer
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5865	Synchronization system
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5870	Other engine control problems
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5871	Peak pressure sensor

Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5872	Knock sensor
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5873	Gas admission valve
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5874	Exhaust gas temp sensor
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5880	Internal Combustion/Reciprocating Engines unit overhaul
Notes: 1) For use with Unit Codes 400-499.					

TABLE B11-18 Internal Combustion/Reciprocating Engines: Miscellaneous (Internal Combustion/Reciprocating Engines)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Miscellaneous (Internal Combustion/Reciprocating Engines)		5890	Major overhaul (use for non-specific overhaul only; see Page B-CCGT-2)
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Miscellaneous (Internal Combustion/Reciprocating Engines)		5895	Inspection
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Miscellaneous (Internal Combustion/Reciprocating Engines)		5990	Engine performance testing - individual engines (use code 9999 for total unit performance testing)
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Miscellaneous (Internal Combustion/Reciprocating Engines)		5999	Other miscellaneous Internal Combustion/Reciprocating Engines problems
Notes: 1) For use with Unit Codes 400-499.					

PERFORMANCE

TABLE B11-19 Performance: Performance

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Performance	Performance		9997	NERC Reliability Standard Requirement

Internal Combustion/Reciprocating Engines	Performance	Performance		9998	Black start testing
Internal Combustion/Reciprocating Engines	Performance	Performance		9999	Total unit performance testing (use appropriate codes for individual component testing)
Notes: 1) For use with Unit Codes 400-499.					

PERSONNEL OR PROCEDURAL ERRORS

TABLE B11-20 Personnel or Procedural Errors: Personnel or Procedural Errors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Personnel or Procedural Errors	Personnel or Procedural Errors		9900	Operator error
Internal Combustion/Reciprocating Engines	Personnel or Procedural Errors	Personnel or Procedural Errors		9910	Maintenance personnel error
Internal Combustion/Reciprocating Engines	Personnel or Procedural Errors	Personnel or Procedural Errors		9920	Contractor error
Internal Combustion/Reciprocating Engines	Personnel or Procedural Errors	Personnel or Procedural Errors		9930	Operating procedure error
Internal Combustion/Reciprocating Engines	Personnel or Procedural Errors	Personnel or Procedural Errors		9940	Maintenance procedure error
Internal Combustion/Reciprocating Engines	Personnel or Procedural Errors	Personnel or Procedural Errors		9950	Contractor procedure error
Internal Combustion/Reciprocating Engines	Personnel or Procedural Errors	Personnel or Procedural Errors		9960	Staff shortage
Notes: 1) For use with Unit Codes 400-499.					

REGULATORY, SAFETY, ENVIRONMENTAL

Use these codes only for events not directly attributable to equipment failures. Inspections or testing of certain equipment due to regulation are reported using the appropriate equipment cause codes, and the fact that it was a regulatory requirement noted in the verbal description section.

TABLE B11-21 Regulatory, Safety, Environmental: Other Operating Environmental Limitations					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9665	Thermal discharge limits (Internal Combustion/Reciprocating Engines)
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9675	Noise limits (not for personnel safety) (Internal Combustion/Reciprocating Engines)
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9685	Fish kill (Internal Combustion/Reciprocating Engines)
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9695	Other miscellaneous operational environmental limits (Internal Combustion/Reciprocating Engines)
Notes: 1) For use with Unit Codes 400-499.					

TABLE B11-22 Regulatory, Safety, Environmental: Regulatory					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Regulatory		9504	Regulatory (environmental) proceedings and hearings - regulatory agency initiated
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Regulatory		9506	Regulatory (environmental) proceedings and hearings - intervenor initiated
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Regulatory		9510	Plant modifications strictly for compliance with new or changed regulatory requirements (scrubbers, cooling towers, etc.)
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Regulatory		9520	Oil spill in Gulf of Mexico (OMC)
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Regulatory		9590	Miscellaneous regulatory (this code is primarily intended for use with event contribution code 2 to indicate that a regulatory-related

					factor contributed to the primary cause of the event)
Notes: 1) For use with Unit Codes 400-499.					

TABLE B11-23 Regulatory, Safety, Environmental: Safety					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Safety		9700	OSHA-related retrofit or inspection
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Safety		9720	Other safety problems
Notes: 1) For use with Unit Codes 400-499.					

TABLE B11-24 Regulatory, Safety, Environmental: Stack Emission					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Stack Emission		9605	SO2 stack emissions (Internal Combustion/Reciprocating Engines)
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Stack Emission		9615	NOx stack emissions (Internal Combustion/Reciprocating Engines)
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Stack Emission		9616	CO stack emissions - fossil
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Stack Emission		9625	Particulate stack emissions (Internal Combustion/Reciprocating Engines)
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Stack Emission		9635	Opacity (Internal Combustion/Reciprocating Engines)
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Stack Emission		9655	Other stack or exhaust emissions (Internal Combustion/Reciprocating Engines)
Notes: 1) For use with Unit Codes 400-499. 2) Include exhaust emissions. Use codes 9220 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions.					

Appendix B12: Index To Miscellaneous Unit Cause Codes

MISCELLANEOUS UNITS

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B12-1	Balance of Plant	Auxiliary Systems	Auxiliary Steam
B12-2	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems
B12-3	Balance of Plant	Auxiliary Systems	Fire Protection System
B12-4	Balance of Plant	Auxiliary Systems	Instrument Air
B12-5	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System
B12-6	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)
B12-7	Balance of Plant	Auxiliary Systems	Open Cooling Water System
B12-8	Balance of Plant	Auxiliary Systems	Seal Air Fans
B12-9	Balance of Plant	Auxiliary Systems	Service Air
B12-10	Balance of Plant	Auxiliary Systems	Service Water (Open System)
B12-11	Balance of Plant	Circulating Water Systems	
B12-12	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators
B12-13	Balance of Plant	Condensate System	Miscellaneous (Condensate System)
B12-14	Balance of Plant	Condensate System	Polishers/Chemical Addition
B12-15	Balance of Plant	Condensate System	Pumps, Piping, and Valves
B12-16	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals
B12-17	Balance of Plant	Condensing System	Condenser Controls
B12-18	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment
B12-19	Balance of Plant	Condensing System	Miscellaneous (Condensing System)
B12-20	Balance of Plant	Condensing System	Vacuum Equipment
B12-21	Balance of Plant	Electrical	
B12-22	Balance of Plant	Extraction Steam	
B12-23	Balance of Plant	Feedwater System	
B12-24	Balance of Plant	Heater Drain Systems	
B12-25	Balance of Plant	Miscellaneous (Balance of Plant)	
B12-26	Balance of Plant	Power Station Switchyard	
B12-27	Balance of Plant	Waste Water (zero discharge) Systems	
B12-28	Boiler	Bed Material Preparation System (FBC only)	
B12-29	Boiler	Bed Material Removal System	
B12-30	Boiler	Bed Solids Recirculation	
B12-31	Boiler	Boiler Air and Gas Systems	Air Supply
B12-32	Boiler	Boiler Air and Gas Systems	Flue Gas
B12-33	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation
B12-34	Boiler	Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)
B12-35	Boiler	Boiler Control Systems	
B12-36	Boiler	Boiler Design Limitations	

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B12-37	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners
B12-38	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone
B12-39	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)
B12-40	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts
B12-41	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers
B12-42	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)
B12-43	Boiler	Boiler Internals and Structures	
B12-44	Boiler	Boiler Overhaul and Inspections	
B12-45	Boiler	Boiler Piping System	Boiler Recirculation
B12-46	Boiler	Boiler Piping System	Cold and Hot Reheat Steam
B12-47	Boiler	Boiler Piping System	Desuperheaters/Attemperators
B12-48	Boiler	Boiler Piping System	Feedwater and Blowdown
B12-49	Boiler	Boiler Piping System	Main Steam
B12-50	Boiler	Boiler Piping System	Miscellaneous (Piping)
B12-51	Boiler	Boiler Piping System	Startup Bypass
B12-52	Boiler	Boiler Tube Fireside Slagging or Fouling	
B12-53	Boiler	Boiler Tube Leaks	
B12-54	Boiler	Boiler Water Condition	
B12-55	Boiler	External Fluidized Bed Heat Exchanger	
B12-56	Boiler	Miscellaneous (Boiler)	
B12-57	Boiler	Miscellaneous Boiler Tube Problems	
B12-58	Boiler	Slag and Ash Removal	
B12-59	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)
B12-60	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)
B12-61	Expander Turbine	Expander Turbine	
B12-62	External	Catastrophe	
B12-63	External	Economic	
B12-64	External	Fuel Quality	
B12-65	External	Miscellaneous (External)	
B12-66	Gas Turbine	Auxiliary Systems	
B12-67	Gas Turbine	Exhaust Systems	
B12-68	Gas Turbine	Fuel, Ignition, and Combustion Systems	
B12-69	Gas Turbine	Inlet Air System and Compressors	Compressors
B12-70	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters
B12-71	Gas Turbine	Miscellaneous (Gas Turbine)	
B12-72	Gas Turbine	Turbine	
B12-73	Generator	Controls	
B12-74	Generator	Cooling System	
B12-75	Generator	Exciter	
B12-76	Generator	Generator	
B12-77	Generator	Miscellaneous (Generator)	

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B12-78	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures	
B12-79	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators
B12-80	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam
B12-81	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass
B12-82	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks	
B12-83	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)	
B12-84	Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)	
B12-85	Hydro Turbine/Pump	Turbine	
B12-86	Hydro Turbine/Pump	Water Supply/Discharge	
B12-87	Inactive States	Inactive States	
B12-88	Internal Combustion/Reciprocating Engines	Engine	
B12-89	Internal Combustion/Reciprocating Engines	Engine Auxiliaries	
B12-90	Internal Combustion/Reciprocating Engines	Engine Controls	
B12-91	Internal Combustion/Reciprocating Engines	Miscellaneous (Internal Combustion/Reciprocating Engines)	
B12-92	Jet Engine	Auxiliary Systems	
B12-93	Jet Engine	Exhaust Systems	
B12-94	Jet Engine	Fuel, Ignition, and Combustion Systems	
B12-95	Jet Engine	Inlet Air System and Compressors	Compressors
B12-96	Jet Engine	Inlet Air System and Compressors	Ducts and Filters
B12-97	Jet Engine	Miscellaneous (Jet Engine)	
B12-98	Jet Engine	Turbine	
B12-99	Miscellaneous	Instruments and Controls	
B12-100	Miscellaneous	Plant and Auxiliaries	
B12-101	Performance	Performance	
B12-102	Personnel or Procedural Errors	Personnel or Procedural Errors	
B12-103	Pollution Control Equipment	CO Reduction	
B12-104	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)	
B12-105	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber
B12-106	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)
B12-107	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers
B12-108	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply
B12-109	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery
B12-110	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)	
B12-111	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters
B12-112	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems
B12-113	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems
B12-114	Pollution Control Equipment	Precipitators	
B12-115	Pollution Control Equipment	Wet Scrubbers	Chemical Supply
B12-116	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)
B12-117	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans
B12-118	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B12-119	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber
B12-120	Regulatory, Safety, Environmental	Other Operating Environmental Limitations	
B12-121	Regulatory, Safety, Environmental	Regulatory	
B12-122	Regulatory, Safety, Environmental	Safety	
B12-123	Regulatory, Safety, Environmental	Stack Emission	
B12-124	Steam Turbine	Controls	
B12-125	Steam Turbine	High Pressure Turbine	
B12-126	Steam Turbine	Intermediate Pressure Turbine	
B12-127	Steam Turbine	Low Pressure Turbine	
B12-128	Steam Turbine	Lube Oil	
B12-129	Steam Turbine	Miscellaneous (Steam Turbine)	
B12-130	Steam Turbine	Piping	
B12-131	Steam Turbine	Valves	

BALANCE OF PLANT

TABLE B12-1 Balance of Plant: Auxiliary Systems - Auxiliary Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3830	Auxiliary boiler
Miscellaneous	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3831	Auxiliary steam piping
Miscellaneous	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3832	Auxiliary steam valves
Miscellaneous	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3833	Auxiliary steam controls and instruments
Miscellaneous	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3834	Auxiliary boiler tube leaks
Miscellaneous	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3835	Auxiliary boiler burner management system
Miscellaneous	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3836	Steam transfer to other unit
Miscellaneous	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3839	Other auxiliary steam problems (also see extraction steam codes 3520 to 3529; startup bypass codes 0630 to 0660; and soot blower steam code 0870)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-2 Balance of Plant: Auxiliary Systems - Closed Cooling Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3820	Closed cooling water pumps and motors
Miscellaneous	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3821	Closed cooling water piping
Miscellaneous	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3822	Closed cooling water valves
Miscellaneous	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3823	Closed cooling water heat exchangers
Miscellaneous	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3824	Closed cooling water system fouling
Miscellaneous	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3825	Closed cooling water instrumentation

Miscellaneous	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3826	Closed cooling water strainer
Miscellaneous	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3829	Other closed cooling water system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-3 Balance of Plant: Auxiliary Systems - Fire Protection System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Auxiliary Systems	Fire Protection System	3860	Fire protection system pumps
Miscellaneous	Balance of Plant	Auxiliary Systems	Fire Protection System	3861	Fire protection system piping
Miscellaneous	Balance of Plant	Auxiliary Systems	Fire Protection System	3862	Fire protection system valves
Miscellaneous	Balance of Plant	Auxiliary Systems	Fire Protection System	3863	Fire protection system fouling
Miscellaneous	Balance of Plant	Auxiliary Systems	Fire Protection System	3864	Fire protection system instrumentation and controls
Miscellaneous	Balance of Plant	Auxiliary Systems	Fire Protection System	3869	Other fire protection system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-4 Balance of Plant: Auxiliary Systems - Instrument Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Auxiliary Systems	Instrument Air	3850	Instrument air compressors
Miscellaneous	Balance of Plant	Auxiliary Systems	Instrument Air	3851	Instrument air piping
Miscellaneous	Balance of Plant	Auxiliary Systems	Instrument Air	3852	Instrument air valves
Miscellaneous	Balance of Plant	Auxiliary Systems	Instrument Air	3853	Instrument air dryers
Miscellaneous	Balance of Plant	Auxiliary Systems	Instrument Air	3854	N2 backup to instrument air
Miscellaneous	Balance of Plant	Auxiliary Systems	Instrument Air	3859	Other instrument air problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-5 Balance of Plant: Auxiliary Systems - Low-pressure Gas Compression System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3870	Fuel Gas Compressor and Motors
Miscellaneous	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3871	Fuel Gas Compressor Piping
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-6 Balance of Plant: Auxiliary Systems - Miscellaneous (Auxiliary Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3898	Miscellaneous plant auxiliary process and services instrumentation and controls
Miscellaneous	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3899	Other miscellaneous auxiliary system problems
Miscellaneous	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	6299	Other combined cycle block problems (Use other gas turbine problem codes, other

					steam turbine codes, etc., whenever appropriate.)
Miscellaneous	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	6399	Other coal gasification equipment problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-7 Balance of Plant: Auxiliary Systems - Open Cooling Water System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3800	Open cooling water pumps and motors
Miscellaneous	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3801	Open cooling water piping
Miscellaneous	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3802	Open cooling water valves
Miscellaneous	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3803	Open cooling water heat exchangers
Miscellaneous	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3804	Open cooling water system fouling
Miscellaneous	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3805	Open cooling water system instrumentation
Miscellaneous	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3806	Open cooling water strainer
Miscellaneous	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3809	Other open cooling water problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-8 Balance of Plant: Auxiliary Systems - Seal Air Fans

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Auxiliary Systems	Seal Air Fans	3880	Seal air fan
Miscellaneous	Balance of Plant	Auxiliary Systems	Seal Air Fans	3881	Seal air fan drive - motor
Miscellaneous	Balance of Plant	Auxiliary Systems	Seal Air Fans	3882	Seal air control dampers and drives
Miscellaneous	Balance of Plant	Auxiliary Systems	Seal Air Fans	3883	Seal air filters
Miscellaneous	Balance of Plant	Auxiliary Systems	Seal Air Fans	3889	Other seal air fan problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-9 Balance of Plant: Auxiliary Systems - Service Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Auxiliary Systems	Service Air	3840	Service air compressors
Miscellaneous	Balance of Plant	Auxiliary Systems	Service Air	3841	Service air piping
Miscellaneous	Balance of Plant	Auxiliary Systems	Service Air	3842	Service air valves
Miscellaneous	Balance of Plant	Auxiliary Systems	Service Air	3843	Service air dryers
Miscellaneous	Balance of Plant	Auxiliary Systems	Service Air	3844	Soot blowing air compressor and system
Miscellaneous	Balance of Plant	Auxiliary Systems	Service Air	3849	Other service air problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-10 Balance of Plant: Auxiliary Systems - Service Water (Open System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Miscellaneous	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3810	Service water pumps and motors
Miscellaneous	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3811	Service water piping
Miscellaneous	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3812	Service water valves
Miscellaneous	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3813	Service water heat exchangers
Miscellaneous	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3814	Service water system fouling
Miscellaneous	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3815	Service water strainer
Miscellaneous	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3819	Other service water problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-11 Balance of Plant: Circulating Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Circulating Water Systems		3210	Circulating water pumps
Miscellaneous	Balance of Plant	Circulating Water Systems		3211	Circulating water pump motors
Miscellaneous	Balance of Plant	Circulating Water Systems		3220	Circulating water piping
Miscellaneous	Balance of Plant	Circulating Water Systems		3221	Circulating water piping fouling
Miscellaneous	Balance of Plant	Circulating Water Systems		3230	Circulating water valves
Miscellaneous	Balance of Plant	Circulating Water Systems		3231	Waterbox
Miscellaneous	Balance of Plant	Circulating Water Systems		3232	Condenser tube cleaning system including debris filter
Miscellaneous	Balance of Plant	Circulating Water Systems		3233	Circulating water priming system
Miscellaneous	Balance of Plant	Circulating Water Systems		3235	Cooling tower booster pump
Miscellaneous	Balance of Plant	Circulating Water Systems		3236	Cooling tower booster motor
Miscellaneous	Balance of Plant	Circulating Water Systems		3238	Cooling tower fan motors
Miscellaneous	Balance of Plant	Circulating Water Systems		3239	Cooling tower fan motors - variable speed
Miscellaneous	Balance of Plant	Circulating Water Systems		3240	Cooling tower fans
Miscellaneous	Balance of Plant	Circulating Water Systems		3241	Cooling tower efficiency below design
Miscellaneous	Balance of Plant	Circulating Water Systems		3242	Cooling tower fill damage
Miscellaneous	Balance of Plant	Circulating Water Systems		3243	Cooling tower icing
Miscellaneous	Balance of Plant	Circulating Water Systems		3244	Cooling tower fires
Miscellaneous	Balance of Plant	Circulating Water Systems		3245	Other cooling tower problems
Miscellaneous	Balance of Plant	Circulating Water Systems		3246	Cooling tower fouling
Miscellaneous	Balance of Plant	Circulating Water Systems		3247	Cooling tower instrumentation
Miscellaneous	Balance of Plant	Circulating Water Systems		3248	Cooling Tower Overhaul
Miscellaneous	Balance of Plant	Circulating Water Systems		3250	Circulating water system instruments and controls
Miscellaneous	Balance of Plant	Circulating Water Systems		3260	Traveling screens
Miscellaneous	Balance of Plant	Circulating Water Systems		3261	Traveling screen fouling
Miscellaneous	Balance of Plant	Circulating Water Systems		3269	Circulating water biological conditions (ie, zebra mussels)
Miscellaneous	Balance of Plant	Circulating Water Systems		3270	Intake system problems other than traveling screens
Miscellaneous	Balance of Plant	Circulating Water Systems		3271	Intake grating fouling
Miscellaneous	Balance of Plant	Circulating Water Systems		3272	Circulating water screenwash system

Miscellaneous	Balance of Plant	Circulating Water Systems		3273	Debris in circulating water from outside sources (leaves, mud, etc.)
Miscellaneous	Balance of Plant	Circulating Water Systems		3280	High circulating water temperature (not due to season, tower efficiency below design, or other listed equipment problem)
Miscellaneous	Balance of Plant	Circulating Water Systems		3281	Circulating water tempering system
Miscellaneous	Balance of Plant	Circulating Water Systems		3282	Circulating water cooling ponds
Miscellaneous	Balance of Plant	Circulating Water Systems		3285	Circulating water chemistry
Miscellaneous	Balance of Plant	Circulating Water Systems		3299	Other circulating water system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-12 Balance of Plant: Condensate System - Low/Intermediate Pressure Heater and Deaerators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3339	LP heater head leaks
Miscellaneous	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3340	LP heater tube leaks
Miscellaneous	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3341	Other LP heater - general
Miscellaneous	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3342	IP heater tube leaks
Miscellaneous	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3343	Other IP heater - general
Miscellaneous	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3344	Deaerator (including level control)
Miscellaneous	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3345	IP heater head leaks
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-13 Balance of Plant: Condensate System - Miscellaneous (Condensate System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3360	Condensate makeup and return (including storage tanks)
Miscellaneous	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3370	Condensate system controls and instrumentation (not hotwell level, heater level, or deaerator level controls; see codes 3150-3159, 3344, 3502).
Miscellaneous	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3380	Condensate coolers
Miscellaneous	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3399	Other miscellaneous condensate system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-14 Balance of Plant: Condensate System - Polishers/Chemical Addition

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Condensate System	Polishers/Chemical Addition	3350	Condensate polishing and filtering systems
Miscellaneous	Balance of Plant	Condensate System	Polishers/Chemical Addition	3351	Chemical addition systems
Miscellaneous	Balance of Plant	Condensate System	Polishers/Chemical Addition	3352	Feedwater chemistry (not specific to condenser, polishers, or chemical addition)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-15 Balance of Plant: Condensate System - Pumps, Piping, and Valves

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3300	Condensate water pre-treatment
Miscellaneous	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3310	Condensate/hotwell pumps
Miscellaneous	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3311	Condensate/hotwell pump motor
Miscellaneous	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3312	Condensate booster pump
Miscellaneous	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3313	Condensate booster pump motor
Miscellaneous	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3314	Condensate booster pump motor - variable speed
Miscellaneous	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3315	Condensate booster pump drive (other than 3313 and 3314)
Miscellaneous	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3320	Condensate piping
Miscellaneous	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3330	Condensate valves
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-16 Balance of Plant: Condensing System - Condenser Casing or Shell and Internals

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3120	Tube sheets
Miscellaneous	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3121	Expansion joint
Miscellaneous	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3122	Gaskets and seals
Miscellaneous	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3123	Hot well
Miscellaneous	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3124	Tube sheet fouling
Miscellaneous	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3129	Other condenser casing or shell and internal problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-17 Balance of Plant: Condensing System - Condenser Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Condensing System	Condenser Controls	3150	Hot well level controls
Miscellaneous	Balance of Plant	Condensing System	Condenser Controls	3151	Vacuum pump and air ejector controls
Miscellaneous	Balance of Plant	Condensing System	Condenser Controls	3152	Air-cooled condenser controls
Miscellaneous	Balance of Plant	Condensing System	Condenser Controls	3159	Other condensing system controls and instruments

Notes: 1) For use with Unit Codes 800–899.

TABLE B12-18 Balance of Plant: Condensing System - Condenser Tubes and Support Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3110	Condenser tube leaks
Miscellaneous	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3111	Condenser tube fouling shell side
Miscellaneous	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3112	Condenser tube fouling tube side
Miscellaneous	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3113	Condenser tube and water box cleaning (including circulating water flow reversal)
Miscellaneous	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3114	Air-cooled condenser tubes
Miscellaneous	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3115	Air-cooled condenser pumps
Miscellaneous	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3116	Air-cooled condenser fans
Miscellaneous	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3117	Air-cooled condenser fan motors
Miscellaneous	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3118	Other Air-cooled condenser problems
Miscellaneous	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3119	Other condenser tube casing or shell and internal problems

Notes: 1) For use with Unit Codes 800–899.

TABLE B12-19 Balance of Plant: Condensing System - Miscellaneous (Condensing System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3170	Condenser inspection (use code 3110 to report looking for tube leaks)
Miscellaneous	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3171	Air-cooled condenser inspections
Miscellaneous	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3180	Major condenser overhaul
Miscellaneous	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3185	Water side cathodic protection
Miscellaneous	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3186	Auxiliary condenser and associated equipment
Miscellaneous	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3190	Air leakage (for losses not attributable to previously noted equipment related codes)
Miscellaneous	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3199	Other miscellaneous condensing system problems

Notes: 1) For use with Unit Codes 800–899.

TABLE B12-20 Balance of Plant: Condensing System - Vacuum Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Miscellaneous	Balance of Plant	Condensing System	Vacuum Equipment	3130	Air ejectors
Miscellaneous	Balance of Plant	Condensing System	Vacuum Equipment	3131	Air ejector piping and valves
Miscellaneous	Balance of Plant	Condensing System	Vacuum Equipment	3132	Inter and after condensers
Miscellaneous	Balance of Plant	Condensing System	Vacuum Equipment	3133	Vacuum pumps
Miscellaneous	Balance of Plant	Condensing System	Vacuum Equipment	3134	Vacuum pump piping and valves
Miscellaneous	Balance of Plant	Condensing System	Vacuum Equipment	3135	Vacuum pump motor and auxiliaries
Miscellaneous	Balance of Plant	Condensing System	Vacuum Equipment	3139	Other air extraction system problems - general
Miscellaneous	Balance of Plant	Condensing System	Vacuum Equipment	3149	Loss of vacuum not attributable to a particular component such as air ejectors or valves, or high back pressure not attributable to high circulating water temperature, or vacuum losses from a known cause.
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-21 Balance of Plant: Electrical

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Electrical		3600	Switchyard transformers and associated cooling systems - external (OMC)
Miscellaneous	Balance of Plant	Electrical		3601	Switchyard transformers and associated cooling systems - external (not OMC)
Miscellaneous	Balance of Plant	Electrical		3610	Switchyard circuit breakers – external (not OMC)
Miscellaneous	Balance of Plant	Electrical		3611	Switchyard circuit breakers - external (OMC)
Miscellaneous	Balance of Plant	Electrical		3612	Switchyard system protection devices - external (OMC)
Miscellaneous	Balance of Plant	Electrical		3613	Switchyard system protection devices – external (not OMC)
Miscellaneous	Balance of Plant	Electrical		3618	Other switchyard equipment - external (not OMC)
Miscellaneous	Balance of Plant	Electrical		3619	Other switchyard equipment - external (OMC)
Miscellaneous	Balance of Plant	Electrical		3620	Main transformer
Miscellaneous	Balance of Plant	Electrical		3621	Unit auxiliaries transformer
Miscellaneous	Balance of Plant	Electrical		3622	Station service startup transformer
Miscellaneous	Balance of Plant	Electrical		3623	Auxiliary generators
Miscellaneous	Balance of Plant	Electrical		3624	Auxiliary generator voltage supply system
Miscellaneous	Balance of Plant	Electrical		3629	Other switchyard or high voltage system problems - external
Miscellaneous	Balance of Plant	Electrical		3630	400-700 volt transformers
Miscellaneous	Balance of Plant	Electrical		3631	400-700 volt circuit breakers
Miscellaneous	Balance of Plant	Electrical		3632	400-700 volt conductors and buses
Miscellaneous	Balance of Plant	Electrical		3633	400-700 volt insulators
Miscellaneous	Balance of Plant	Electrical		3634	400-700 volt protection devices

Miscellaneous	Balance of Plant	Electrical		3639	Other 400-700 volt problems
Miscellaneous	Balance of Plant	Electrical		3640	AC instrument power transformers
Miscellaneous	Balance of Plant	Electrical		3641	AC Circuit breakers
Miscellaneous	Balance of Plant	Electrical		3642	AC Conductors and buses
Miscellaneous	Balance of Plant	Electrical		3643	AC Inverters
Miscellaneous	Balance of Plant	Electrical		3644	AC Protection devices
Miscellaneous	Balance of Plant	Electrical		3649	Other AC instrument power problems
Miscellaneous	Balance of Plant	Electrical		3650	DC instrument power battery chargers
Miscellaneous	Balance of Plant	Electrical		3651	DC circuit breakers
Miscellaneous	Balance of Plant	Electrical		3652	DC conductors and buses
Miscellaneous	Balance of Plant	Electrical		3653	DC protection devices
Miscellaneous	Balance of Plant	Electrical		3659	Other DC power problems
Miscellaneous	Balance of Plant	Electrical		3660	4000-7000 volt transformers
Miscellaneous	Balance of Plant	Electrical		3661	4000-7000 volt circuit breakers
Miscellaneous	Balance of Plant	Electrical		3662	4000-7000 volt conductors and buses
Miscellaneous	Balance of Plant	Electrical		3663	4000-7000 volt insulators
Miscellaneous	Balance of Plant	Electrical		3664	4000-7000 volt protection devices
Miscellaneous	Balance of Plant	Electrical		3669	Other 4000-7000 volt problems
Miscellaneous	Balance of Plant	Electrical		3670	12-15kV transformers
Miscellaneous	Balance of Plant	Electrical		3671	12-15kV circuit breakers
Miscellaneous	Balance of Plant	Electrical		3672	12-15kV conductors and buses
Miscellaneous	Balance of Plant	Electrical		3673	12-15kV insulators
Miscellaneous	Balance of Plant	Electrical		3674	12-15kV protection devices
Miscellaneous	Balance of Plant	Electrical		3679	Other 12-15kV problems
Miscellaneous	Balance of Plant	Electrical		3680	Other voltage transformers
Miscellaneous	Balance of Plant	Electrical		3681	Other voltage circuit breakers
Miscellaneous	Balance of Plant	Electrical		3682	Other voltage conductors and buses
Miscellaneous	Balance of Plant	Electrical		3683	Other voltage insulators
Miscellaneous	Balance of Plant	Electrical		3684	Other voltage protection devices
Miscellaneous	Balance of Plant	Electrical		3689	Other voltage problems
Miscellaneous	Balance of Plant	Electrical		3690	Station Service Power Distribution System, General
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-22 Balance of Plant: Extraction Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Extraction Steam		3520	HP Extraction steam piping
Miscellaneous	Balance of Plant	Extraction Steam		3521	HP Extraction steam valves
Miscellaneous	Balance of Plant	Extraction Steam		3522	HP Extraction steam instruments and controls
Miscellaneous	Balance of Plant	Extraction Steam		3529	Other HP extraction steam system problems
Miscellaneous	Balance of Plant	Extraction Steam		3530	IP Extraction steam piping

Miscellaneous	Balance of Plant	Extraction Steam		3531	IP Extraction steam valves
Miscellaneous	Balance of Plant	Extraction Steam		3532	IP Extraction steam instruments and controls
Miscellaneous	Balance of Plant	Extraction Steam		3539	Other IP extraction steam system problems
Miscellaneous	Balance of Plant	Extraction Steam		3540	LP Extraction steam piping
Miscellaneous	Balance of Plant	Extraction Steam		3541	LP Extraction steam valves
Miscellaneous	Balance of Plant	Extraction Steam		3542	LP Extraction steam instruments and controls
Miscellaneous	Balance of Plant	Extraction Steam		3549	Other LP extraction steam system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-23 Balance of Plant: Feedwater System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Feedwater System		3401	Startup feedwater pump
Miscellaneous	Balance of Plant	Feedwater System		3402	Startup feedwater pump drives - all types
Miscellaneous	Balance of Plant	Feedwater System		3407	Feedwater pump suction screens
Miscellaneous	Balance of Plant	Feedwater System		3408	Feedwater pump drive - local controls
Miscellaneous	Balance of Plant	Feedwater System		3409	Feedwater pump drive motor - variable speed
Miscellaneous	Balance of Plant	Feedwater System		3410	Feedwater pump
Miscellaneous	Balance of Plant	Feedwater System		3411	Feedwater pump drive - motor
Miscellaneous	Balance of Plant	Feedwater System		3412	Feedwater pump drive - steam turbine
Miscellaneous	Balance of Plant	Feedwater System		3413	Feedwater pump coupling and drive shaft
Miscellaneous	Balance of Plant	Feedwater System		3414	Feedwater pump local controls
Miscellaneous	Balance of Plant	Feedwater System		3415	Feedwater pump/drive lube oil system
Miscellaneous	Balance of Plant	Feedwater System		3416	Other feedwater pump problems
Miscellaneous	Balance of Plant	Feedwater System		3417	Feedwater pump drive - main shaft
Miscellaneous	Balance of Plant	Feedwater System		3418	Feedwater pump drive - other
Miscellaneous	Balance of Plant	Feedwater System		3419	Feedwater pump drive - gear
Miscellaneous	Balance of Plant	Feedwater System		3420	Feedwater piping and supports
Miscellaneous	Balance of Plant	Feedwater System		3430	Feedwater regulating (boiler level control) valve
Miscellaneous	Balance of Plant	Feedwater System		3431	Other feedwater valves
Miscellaneous	Balance of Plant	Feedwater System		3439	HP heater head leaks
Miscellaneous	Balance of Plant	Feedwater System		3440	High pressure heater tube leaks
Miscellaneous	Balance of Plant	Feedwater System		3441	Other high pressure heater problems (see condensate system for LP and IP heater codes)
Miscellaneous	Balance of Plant	Feedwater System		3451	Feedwater booster pump suction screens
Miscellaneous	Balance of Plant	Feedwater System		3452	Feedwater booster pump drive - local controls
Miscellaneous	Balance of Plant	Feedwater System		3453	Feedwater booster pump drive motor - variable speed
Miscellaneous	Balance of Plant	Feedwater System		3454	Feedwater booster pump
Miscellaneous	Balance of Plant	Feedwater System		3455	Feedwater booster pump drive - motor

Miscellaneous	Balance of Plant	Feedwater System		3456	Feedwater booster pump drive - steam turbine
Miscellaneous	Balance of Plant	Feedwater System		3457	Feedwater booster pump coupling and drive shaft
Miscellaneous	Balance of Plant	Feedwater System		3458	Feedwater booster pump local controls
Miscellaneous	Balance of Plant	Feedwater System		3459	Feedwater booster pump/drive lube oil system
Miscellaneous	Balance of Plant	Feedwater System		3460	Other feedwater booster pump problems
Miscellaneous	Balance of Plant	Feedwater System		3461	Feedwater booster pump drive - main shaft
Miscellaneous	Balance of Plant	Feedwater System		3462	Feedwater booster pump drive - other
Miscellaneous	Balance of Plant	Feedwater System		3463	Feedwater booster pump drive - gear
Miscellaneous	Balance of Plant	Feedwater System		3499	Other feedwater system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-24 Balance of Plant: Heater Drain Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Heater Drain Systems		3501	Heater drain pumps
Miscellaneous	Balance of Plant	Heater Drain Systems		3502	Heater level control
Miscellaneous	Balance of Plant	Heater Drain Systems		3503	Heater drain piping
Miscellaneous	Balance of Plant	Heater Drain Systems		3504	Heater drain valves
Miscellaneous	Balance of Plant	Heater Drain Systems		3505	Heater drain pump drive
Miscellaneous	Balance of Plant	Heater Drain Systems		3509	Other heater drain system problems
Notes: 1) For use with Unit Codes 800–899. 2) Excluding extraction or drain systems.					

TABLE B12-25 Balance of Plant: Miscellaneous (Balance of Plant)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3950	Process computer
Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3960	Thermal derating (thermal efficiency losses in balance of plant when specific cause(s) unknown)
Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3970	Distributive Control System (DCS) - process computer
Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3971	DCS - data highway
Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3972	DCS - hardware problems (including card failure)
Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3973	DCS - internal and termination wiring
Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3974	DCS - logic problems
Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3975	DCS - upgrades
Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3979	Other DCS problems
Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3980	Programmable Logic Controller (PLC)
Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3981	PLC - data highway
Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3982	PLC - hardware problems (including card failure)

Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3983	PLC - internal and termination wiring
Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3984	PLC - logic problems
Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3985	PLC - upgrades
Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3989	Other PLC problems
Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3995	Powerhouse heating and ventilating systems
Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3996	Air conditioning systems - rooms and areas
Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3998	Balance of plant overhaul/outage
Miscellaneous	Balance of Plant	Miscellaneous (Balance of Plant)		3999	Other miscellaneous balance of plant problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-26 Balance of Plant: Power Station Switchyard

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Power Station Switchyard		3700	Power Station switchyard (non generating unit equipment)
Miscellaneous	Balance of Plant	Power Station Switchyard		3710	Transmission line (connected to powerhouse switchyard to 1st Substation)
Miscellaneous	Balance of Plant	Power Station Switchyard		3720	Transmission equipment at the 1st substation (see code 9300 if applicable)
Miscellaneous	Balance of Plant	Power Station Switchyard		3730	Transmission equipment beyond the 1st substation (see code 9300 if applicable)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-27 Balance of Plant: Waste Water (zero discharge) Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Balance of Plant	Waste Water (zero discharge) Systems		3290	Waste water (zero discharge) tanks, pumps, and motors
Miscellaneous	Balance of Plant	Waste Water (zero discharge) Systems		3291	Waste water (zero discharge) system fouling
Miscellaneous	Balance of Plant	Waste Water (zero discharge) Systems		3292	Waste water (zero discharge) piping
Miscellaneous	Balance of Plant	Waste Water (zero discharge) Systems		3293	Waste water (zero discharge) valves
Miscellaneous	Balance of Plant	Waste Water (zero discharge) Systems		3294	Waste water (zero discharge) controls and instrumentation
Miscellaneous	Balance of Plant	Waste Water (zero discharge) Systems		3295	Other waste water (zero discharge) problems
Notes: 1) For use with Unit Codes 800–899.					

BOILER

This set of codes contains the following:

- Boiler
- Boiler internals (tubes, refractory, supports, etc.)
- All the fuel handling, storage, preparation, and burning equipment.
- The forced/induced draft air system.
- Slag and ash removal except for particulate and gas cleanup. These latter items are covered under pollution control equipment.
- The main steam and reheat steam systems up to but not including the turbine stop or isolation valves.
- The feedwater system downstream of the final valve prior to entry into the economizer or boiler.
- Boiler blowdown systems.
- The startup bypass system including drains up to the heaters or condenser.
- Boiler water chemistry problems not due to problems in the condensate/feedwater system, the chemical addition system, or the demineralizer/polisher system.
- The instruments and controls associated with the above equipment.

TABLE B12-28 Boiler: Bed Material Preparation System (FBC only)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Bed Material Preparation System (FBC only)		160	Bed material tanks/hoppers
Miscellaneous	Boiler	Bed Material Preparation System (FBC only)		162	Bed material conveyors
Miscellaneous	Boiler	Bed Material Preparation System (FBC only)		163	Bed material feeders
Miscellaneous	Boiler	Bed Material Preparation System (FBC only)		164	Bed material feeder motors
Miscellaneous	Boiler	Bed Material Preparation System (FBC only)		165	Bed material crushers
Miscellaneous	Boiler	Bed Material Preparation System (FBC only)		166	Bed material crusher motors
Miscellaneous	Boiler	Bed Material Preparation System (FBC only)		167	Bed material screens
Miscellaneous	Boiler	Bed Material Preparation System (FBC only)		168	Bed material blowers/fans
Miscellaneous	Boiler	Bed Material Preparation System (FBC only)		169	Bed material blower/fan motors
Miscellaneous	Boiler	Bed Material Preparation System (FBC only)		170	Bed material cyclone
Miscellaneous	Boiler	Bed Material Preparation System (FBC only)		171	Bed material baghouse
Miscellaneous	Boiler	Bed Material Preparation System (FBC only)		172	Bed material drying equipment
Miscellaneous	Boiler	Bed Material Preparation System (FBC only)		173	Bed material pneumatic transport system including piping and valves
Miscellaneous	Boiler	Bed Material Preparation System (FBC only)		174	Other bed material handling equipment

Notes: 1) For use with Unit Codes 800–899.

TABLE B12-29 Boiler: Bed Material Removal System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Miscellaneous	Boiler	Bed Material Removal System		930	Bed material coolers
Miscellaneous	Boiler	Bed Material Removal System		931	Bed material transport piping/valves
Miscellaneous	Boiler	Bed Material Removal System		932	Bed material transport tanks/hoppers
Miscellaneous	Boiler	Bed Material Removal System		933	Bed material fans/blowers
Miscellaneous	Boiler	Bed Material Removal System		934	Bed material fan/blower motors
Miscellaneous	Boiler	Bed Material Removal System		935	Bed material disposal conditioner
Miscellaneous	Boiler	Bed Material Removal System		936	Bed material conveyors
Miscellaneous	Boiler	Bed Material Removal System		937	Bed material mechanical separators and baghouse
Miscellaneous	Boiler	Bed Material Removal System		950	Other bed material system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-30 Boiler: Bed Solids Recirculation

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Bed Solids Recirculation		951	Char reinjection feeders
Miscellaneous	Boiler	Bed Solids Recirculation		952	Char reinjection piping/valves
Miscellaneous	Boiler	Bed Solids Recirculation		953	Char reinjection controls
Miscellaneous	Boiler	Bed Solids Recirculation		959	Other char reinjection equipment problems
Miscellaneous	Boiler	Bed Solids Recirculation		960	Char transport piping and valves
Miscellaneous	Boiler	Bed Solids Recirculation		961	Char transfer tanks/hoppers
Miscellaneous	Boiler	Bed Solids Recirculation		962	Char conditioner
Miscellaneous	Boiler	Bed Solids Recirculation		969	Other char equipment problems
Miscellaneous	Boiler	Bed Solids Recirculation		970	Flue gas-solids separator
Miscellaneous	Boiler	Bed Solids Recirculation		971	Flue gas-solids separator piping and valves
Miscellaneous	Boiler	Bed Solids Recirculation		972	Flue gas-solids separator controls
Miscellaneous	Boiler	Bed Solids Recirculation		973	Flue gas-solids separator refractory
Miscellaneous	Boiler	Bed Solids Recirculation		980	High pressure loop seal recirculation fans/blowers
Miscellaneous	Boiler	Bed Solids Recirculation		981	High pressure loop seal recirculation fan/blower motors
Miscellaneous	Boiler	Bed Solids Recirculation		982	High pressure loop seal recirculation fan/blower controls
Miscellaneous	Boiler	Bed Solids Recirculation		989	Other bed solids recirculation problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-31 Boiler: Boiler Air and Gas Systems - Air Supply

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Air and Gas Systems	Air Supply	1400	Forced draft fans
Miscellaneous	Boiler	Boiler Air and Gas Systems	Air Supply	1401	Forced draft fan dampers
Miscellaneous	Boiler	Boiler Air and Gas Systems	Air Supply	1407	Forced draft fan lubrication system
Miscellaneous	Boiler	Boiler Air and Gas Systems	Air Supply	1410	Forced draft fan motors
Miscellaneous	Boiler	Boiler Air and Gas Systems	Air Supply	1411	Forced draft fan motors - variable speed

Miscellaneous	Boiler	Boiler Air and Gas Systems	Air Supply	1412	Forced draft fan drives (other than motor)
Miscellaneous	Boiler	Boiler Air and Gas Systems	Air Supply	1413	Forced draft fan couplings
Miscellaneous	Boiler	Boiler Air and Gas Systems	Air Supply	1415	Forced draft fan controls
Miscellaneous	Boiler	Boiler Air and Gas Systems	Air Supply	1420	Other forced draft fan problems
Miscellaneous	Boiler	Boiler Air and Gas Systems	Air Supply	1421	Secondary air fans/blowers
Miscellaneous	Boiler	Boiler Air and Gas Systems	Air Supply	1422	Secondary air fan/blower motors - single speed
Miscellaneous	Boiler	Boiler Air and Gas Systems	Air Supply	1423	Secondary air fan/blower motors - variable speed
Miscellaneous	Boiler	Boiler Air and Gas Systems	Air Supply	1424	Secondary air fan/blower controls
Miscellaneous	Boiler	Boiler Air and Gas Systems	Air Supply	1430	Air supply ducts from FD fan
Miscellaneous	Boiler	Boiler Air and Gas Systems	Air Supply	1432	Air supply duct expansion joints
Miscellaneous	Boiler	Boiler Air and Gas Systems	Air Supply	1440	Air supply dampers
Miscellaneous	Boiler	Boiler Air and Gas Systems	Air Supply	1450	Other air supply problems
Miscellaneous	Boiler	Boiler Air and Gas Systems	Air Supply	1451	Fluidized Air Fan (FBC Only)
Notes: 1) For use with Unit Codes 800–899. 2) Excluding burner pipes, wind boxes, primary air, or pulverizer exhausters.					

TABLE B12-32 Boiler: Boiler Air and Gas Systems - Flue Gas

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1455	Induced draft fans
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1456	Induced draft fan dampers
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1457	Induced draft fan lubrication systems
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1460	Induced draft fan fouling
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1470	Induced draft fan motors and drives
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1471	Induced draft fan motors - variable speed
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1472	Inducted draft fan coupling
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1475	Induced draft fan controls
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1476	Induced draft fan speed changer
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1480	Other induced draft fan problems
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1487	Air heater (tubular)
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1488	Air heater (regenerative)
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1489	Air heater (heat pipe, plate-type)
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1492	Air heater fouling (tubular)
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1493	Air heater fouling (regenerative)
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1495	Other air heater fouling (heat pipe, plate-type)
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1500	Air heater soot blowers
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1510	Flue gas ducts (except recirculation)
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1512	Flue gas expansion joints
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1520	Flue gas dampers (except recirculation)
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas	1530	Other flue gas problems
Notes: 1) For use with Unit Codes 800–899. 2) Excluding burner pipes, wind boxes, primary air, or pulverizer exhausters.					

TABLE B12-33 Boiler: Boiler Air and Gas Systems - Flue Gas Recirculation					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1535	Flue gas recirculating fan
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1536	Flue gas recirculating fan dampers
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1537	Flue gas recirculating fan lubrication systems
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1540	Flue gas recirculation fan fouling
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1550	Flue gas recirculation fan motors
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1555	Flue gas recirculation fan controls
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1560	Other flue gas recirculation fan problems
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1570	Flue gas recirculation ducts
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1572	Flue gas recirculation duct expansion joints
Miscellaneous	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1580	Flue gas recirculation dampers
Notes: 1) For use with Unit Codes 800–899. 2) Excluding burner pipes, wind boxes, primary air, or pulverizer exhausters.					

TABLE B12-34 Boiler: Boiler Air and Gas Systems - Miscellaneous (Boiler Air and Gas Systems)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Miscellaneous	Boiler	Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1590	Stacks (use code 8430 for stack problems due to pollution control equipment)
Miscellaneous	Boiler	Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1591	Stack damper and linkage
Miscellaneous	Boiler	Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1592	Stack damper linkage motors
Miscellaneous	Boiler	Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1599	Other miscellaneous boiler air and gas system problems
Notes: 1) For use with Unit Codes 800–899. 2) Excluding burner pipes, wind boxes, primary air, or pulverizer exhausters.					

TABLE B12-35 Boiler: Boiler Control Systems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Miscellaneous	Boiler	Boiler Control Systems		1700	Feedwater controls (report local controls - feedwater pump, feedwater regulator valve, etc., - with component or system)
Miscellaneous	Boiler	Boiler Control Systems		1710	Combustion/steam condition controls (report local controls - burners, pulverizers, etc., - with component or system)
Miscellaneous	Boiler	Boiler Control Systems		1720	Desuperheater/attemperator controls
Miscellaneous	Boiler	Boiler Control Systems		1730	Boiler explosion or implosion
Miscellaneous	Boiler	Boiler Control Systems		1740	Boiler drum gage glasses / level indicator
Miscellaneous	Boiler	Boiler Control Systems		1741	Furnace and water gauge television auxiliary system
Miscellaneous	Boiler	Boiler Control Systems		1750	Burner management system
Miscellaneous	Boiler	Boiler Control Systems		1760	Feedwater instrumentation (not local controls)

Miscellaneous	Boiler	Boiler Control Systems		1761	Combustion/Steam condition instrumentation (not local controls)
Miscellaneous	Boiler	Boiler Control Systems		1762	Desuperheater/attemperator instrumentation (not local controls)
Miscellaneous	Boiler	Boiler Control Systems		1799	Other boiler instrumentation and control problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-36 Boiler: Boiler Design Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Design Limitations		1900	Improper balance between tube sections not due to fouling or plugging
Miscellaneous	Boiler	Boiler Design Limitations		1910	Inadequate air not due to equipment problems
Notes: 1) For use with Unit Codes 800–899. 2) Including instruments which input to the controls.					

TABLE B12-37 Boiler: Boiler Fuel Supply from Bunkers to Boiler - Burners

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	358	Oil burner piping and valves
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	359	Gas burner piping and valves
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	360	Burners
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	361	Burner orifices
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	365	Bed warmup burners (FBC only)
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	366	Duct burners (FBC only)
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	370	Burner instruments and controls (except light off)
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	375	Burner instruments and controls (FBC light-off system)
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	380	Light off (igniter) systems (including fuel supply)
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	385	Igniters
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	390	Burner wind boxes and dampers
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	400	Burner wind box fires
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	410	Other burner problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-38 Boiler: Boiler Fuel Supply from Bunkers to Boiler - Cyclone

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	415	Cyclone feeders
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	420	Cyclone crusher
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	425	Cyclone dampers
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	426	Cyclone air ducts

Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	430	Cyclone furnace
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	435	Other cyclone problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-39 Boiler: Boiler Fuel Supply from Bunkers to Boiler - Oil and Gas Systems (except light off)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	440	Fuel oil pumps (general)
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	441	Fuel oil pumps (burner supply)
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	442	Fuel oil pumps (forwarding/transfer)
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	443	Fuel oil (burner supply) pump drives
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	444	Fuel oil (forwarding/transfer) pump drives
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	450	Fuel oil heaters
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	460	Fuel oil atomizers
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	470	Oil and gas fires
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	475	Fuel lance (FBC only)
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	480	Other oil and gas fuel supply problems (see codes 0360-0410 for burner problems)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-40 Boiler: Boiler Fuel Supply from Bunkers to Boiler - Pulverizers, Primary Air Fans, and Associated Ducts

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	200	Pulverizer exhauster fan (for indirect firing)
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	205	Pulverizer exhauster fan drive
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	210	Pulverizer heater (for indirect firing)
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	220	Pulverizer system cyclone separator
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	230	Pulverizer bag filter
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	240	Pulverized coal bin
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	250	Pulverizer feeders
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	253	Pulverizer feeder motor
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	255	Pulverizer feeder coal scales
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	256	Seal air system (air to pulverizers)
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	260	Primary air fan
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	262	Primary air fan lube oil system

Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	263	Primary air fan drives
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	264	Other primary air fan problems
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	265	Primary air heater
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	266	Primary air heater fouling
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	267	Primary air flow instrumentation
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	270	Primary air duct and dampers
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	280	Pulverizer fires
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	290	Pulverizer reduced capacity due to wear
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	300	Pulverizer motors and drives
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	310	Pulverizer mills
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	312	Pulverizer mill classifiers
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	313	Pulverizer mill trunnion seals
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	314	Pulverizer mill ball charger hopper (ball mills only)
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	315	Pulverizer mill coal level controls
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	320	Foreign object in Pulverizers mill
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	325	Pulverizer skidding
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	330	Pulverizer coal leak (pulverizers only)
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	331	Pulverizer system coal leaks (other than pulverizers, see code 0330)
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	335	Pulverizer lube oil system
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	338	Pulverizer control systems (temperature and pressure)
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	340	Other pulverizer problems
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	341	Pulverizer deluge system
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	342	Pulverizer inert system
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	344	Pulverizer inspection
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	345	Pulverizer overhaul

Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	346	Pulverizer pyrite removal system
Miscellaneous	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	350	Pulverized fuel and air piping (from pulverizer to wind box) (see code 0898 for pulverizer reject system problems)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-41 Boiler: Boiler Fuel Supply to Bunker - Coal Handling Equipment up Through Bunkers

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	10	Thaw shed failure or fire
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	20	Coal car dumpers, shakers, and unloaders
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	22	Unloading/receiving hopper (train/truck)
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	24	Rotary plow
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	26	Dust suppression system
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	28	Dust collection system
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	30	Coal conveyors and feeders
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	35	Metal detector/collector (including magnetic separator)
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	40	Coal elevators
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	50	Coal storage fires
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	60	Coal crushers including motors
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	70	Coal samplers
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	75	Storage silos/hoppers
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	80	Stackers/reclaimers
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	84	Coal conveyor scales storage coal pile
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	85	Bunker feeder coal scales
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	90	Bunker fires
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	95	Bunker flow problems
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	100	Bunker gates
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	105	Bunker structures

Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	106	Coal drying system (see additional codes 0125-0127)
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	107	Screen (prior to bunkers)
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	110	Other coal fuel supply problems up through bunkers
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	125	Coal crusher dryer hammers (see code 0106)
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	126	Coal crusher lube oil system (see code 0106)
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	127	Other coal crusher dryer problems (see code 0106)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-42 Boiler: Boiler Fuel Supply to Bunker - Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	111	Solid fuel feeder conveyors
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	112	Solid fuel feed tanks/hoppers
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	113	Solid fuel tank/hopper fires
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	114	Solid fuel volumetric feeder
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	115	Solid fuel gravimetric feeder
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	116	Solid fuel feeder motors
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	117	Solid fuel pneumatic transport system including piping and valves
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	118	Solid fuel drying system including screens
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	119	Solid fuel crushers
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	120	Solid fuel crusher motors
Miscellaneous	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	121	Other solid fuel feed problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-43 Boiler: Boiler Internals and Structures

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Internals and Structures		800	Drums and drum internals (single drum only)

Miscellaneous	Boiler	Boiler Internals and Structures		810	Boiler supports and structures (use code 1320 for tube supports)
Miscellaneous	Boiler	Boiler Internals and Structures		811	Convection pass enclosure (FBC only)
Miscellaneous	Boiler	Boiler Internals and Structures		812	Distribution plate (FBC only)
Miscellaneous	Boiler	Boiler Internals and Structures		813	Lower furnace (in-bed) tube supports (FBC only)
Miscellaneous	Boiler	Boiler Internals and Structures		814	In-bed bubble caps (FBC only)
Miscellaneous	Boiler	Boiler Internals and Structures		820	Casing
Miscellaneous	Boiler	Boiler Internals and Structures		830	Doors
Miscellaneous	Boiler	Boiler Internals and Structures		840	Refractory and insulation
Miscellaneous	Boiler	Boiler Internals and Structures		845	Windbox expansion joints
Miscellaneous	Boiler	Boiler Internals and Structures		846	Convection pass expansion joints (FBC only)
Miscellaneous	Boiler	Boiler Internals and Structures		847	Other expansion joints
Miscellaneous	Boiler	Boiler Internals and Structures		850	Other internal or structural problems
Miscellaneous	Boiler	Boiler Internals and Structures		855	Drum relief/safety valves (single drum only)
Miscellaneous	Boiler	Boiler Internals and Structures		859	Tube external fins/membranes
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-44 Boiler: Boiler Overhaul and Inspections

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Overhaul and Inspections		1800	Major boiler overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Miscellaneous	Boiler	Boiler Overhaul and Inspections		1801	Minor boiler overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Miscellaneous	Boiler	Boiler Overhaul and Inspections		1810	Other boiler inspections
Miscellaneous	Boiler	Boiler Overhaul and Inspections		1811	Boiler Inspections - problem identification / investigation
Miscellaneous	Boiler	Boiler Overhaul and Inspections		1812	Boiler Inspections - scheduled or routine
Miscellaneous	Boiler	Boiler Overhaul and Inspections		1820	Chemical cleaning/steam blows
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-45 Boiler: Boiler Piping System - Boiler Recirculation

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Piping System	Boiler Recirculation	740	Boiler recirculation pumps
Miscellaneous	Boiler	Boiler Piping System	Boiler Recirculation	741	Boiler recirculation pumps - motors
Miscellaneous	Boiler	Boiler Piping System	Boiler Recirculation	742	Boiler recirculation pumps - motors - cooling system
Miscellaneous	Boiler	Boiler Piping System	Boiler Recirculation	750	Boiler recirculation piping including downcomers
Miscellaneous	Boiler	Boiler Piping System	Boiler Recirculation	760	Boiler recirculation valves
Miscellaneous	Boiler	Boiler Piping System	Boiler Recirculation	770	Other boiler recirculation problems

Notes: 1) For use with Unit Codes 800–899.

TABLE B12-46 Boiler: Boiler Piping System - Cold and Hot Reheat Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	540	Hot reheat steam piping up to turbine stop valves
Miscellaneous	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	541	Cold reheat steam piping up to boiler
Miscellaneous	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	550	Reheat steam relief/safety valves
Miscellaneous	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	560	Other hot reheat steam valves (not including turbine stop or intercept valves)
Miscellaneous	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	561	Other cold reheat steam valves (not including turbine stop or intercept valves)
Miscellaneous	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	570	Other reheat steam problems

Notes: 1) For use with Unit Codes 800–899.

TABLE B12-47 Boiler: Boiler Piping System - Desuperheaters/Attemperators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Piping System	Desuperheaters/Attemperators	580	Desuperheater/attemperator piping
Miscellaneous	Boiler	Boiler Piping System	Desuperheaters/Attemperators	590	Desuperheater/attemperator valves
Miscellaneous	Boiler	Boiler Piping System	Desuperheaters/Attemperators	600	Desuperheater/attemperator spray nozzles
Miscellaneous	Boiler	Boiler Piping System	Desuperheaters/Attemperators	610	Desuperheater/attemperator drums
Miscellaneous	Boiler	Boiler Piping System	Desuperheaters/Attemperators	620	Other desuperheater/attemperator problems

Notes: 1) For use with Unit Codes 800–899.

TABLE B12-48 Boiler: Boiler Piping System - Feedwater and Blowdown

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Piping System	Feedwater and Blowdown	670	Feedwater piping downstream of feedwater regulating valve
Miscellaneous	Boiler	Boiler Piping System	Feedwater and Blowdown	680	Feedwater valves (not feedwater regulating valve)
Miscellaneous	Boiler	Boiler Piping System	Feedwater and Blowdown	690	Other feedwater problems downstream of feedwater regulating valve (use codes 3401 to 3499 for remainder of feedwater system)
Miscellaneous	Boiler	Boiler Piping System	Feedwater and Blowdown	700	Blowdown system valves
Miscellaneous	Boiler	Boiler Piping System	Feedwater and Blowdown	710	Blowdown system piping
Miscellaneous	Boiler	Boiler Piping System	Feedwater and Blowdown	720	Blowdown system controls / instrumentation
Miscellaneous	Boiler	Boiler Piping System	Feedwater and Blowdown	730	Other blowdown system problems

Notes: 1) For use with Unit Codes 800–899.

TABLE B12-49 Boiler: Boiler Piping System - Main Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Piping System	Main Steam	500	Main steam piping up to turbine stop valves
Miscellaneous	Boiler	Boiler Piping System	Main Steam	510	Main steam relief/safety valves off superheater
Miscellaneous	Boiler	Boiler Piping System	Main Steam	520	Other main steam valves (including vent and drain valves but not including the turbine stop valves)
Miscellaneous	Boiler	Boiler Piping System	Main Steam	530	Other main steam system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-50 Boiler: Boiler Piping System - Miscellaneous (Piping)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Piping System	Miscellaneous (Piping)	775	Economizer piping
Miscellaneous	Boiler	Boiler Piping System	Miscellaneous (Piping)	780	Headers between tube bundles
Miscellaneous	Boiler	Boiler Piping System	Miscellaneous (Piping)	782	Headers and caps
Miscellaneous	Boiler	Boiler Piping System	Miscellaneous (Piping)	790	Pipe hangers, brackets, supports (general)
Miscellaneous	Boiler	Boiler Piping System	Miscellaneous (Piping)	799	Other miscellaneous piping system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-51 Boiler: Boiler Piping System - Startup Bypass

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Piping System	Startup Bypass	630	Startup bypass system piping (including drain lines up to heaters or condenser)
Miscellaneous	Boiler	Boiler Piping System	Startup Bypass	640	Startup bypass system valves
Miscellaneous	Boiler	Boiler Piping System	Startup Bypass	650	Startup bypass tanks or flash tanks
Miscellaneous	Boiler	Boiler Piping System	Startup Bypass	655	Steam by-pass system instrumentation and controls
Miscellaneous	Boiler	Boiler Piping System	Startup Bypass	660	Other startup bypass system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-52 Boiler: Boiler Tube Fireside Slagging or Fouling

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Tube Fireside Slagging or Fouling		1100	Waterwall (Furnace wall)
Miscellaneous	Boiler	Boiler Tube Fireside Slagging or Fouling		1103	Steam generating tubes between steam drum and mud drum
Miscellaneous	Boiler	Boiler Tube Fireside Slagging or Fouling		1105	Generating tubes
Miscellaneous	Boiler	Boiler Tube Fireside Slagging or Fouling		1110	Cyclone Furnace (in cyclone area only)
Miscellaneous	Boiler	Boiler Tube Fireside Slagging or Fouling		1120	Convection Pass Wall
Miscellaneous	Boiler	Boiler Tube Fireside Slagging or Fouling		1130	Boiler screen, wing wall, or slag screen (water tubes only)
Miscellaneous	Boiler	Boiler Tube Fireside Slagging or Fouling		1140	First superheater

Miscellaneous	Boiler	Boiler Tube Fireside Slagging or Fouling		1150	Second superheater
Miscellaneous	Boiler	Boiler Tube Fireside Slagging or Fouling		1160	First reheater
Miscellaneous	Boiler	Boiler Tube Fireside Slagging or Fouling		1170	Second reheater
Miscellaneous	Boiler	Boiler Tube Fireside Slagging or Fouling		1180	Economizer
Miscellaneous	Boiler	Boiler Tube Fireside Slagging or Fouling		1190	Other tube slagging or fouling
Miscellaneous	Boiler	Boiler Tube Fireside Slagging or Fouling		1191	Bed agglomeration (FBC only)
Miscellaneous	Boiler	Boiler Tube Fireside Slagging or Fouling		1200	Operation at reduced power to avoid slagging or fouling (use codes 1100 to 1190 to report power reductions for slag accumulation or slag removal)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-53 Boiler: Boiler Tube Leaks

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Boiler Tube Leaks		1000	Waterwall (Furnace wall)
Miscellaneous	Boiler	Boiler Tube Leaks		1003	Steam generating tubes between steam drum and mud drum
Miscellaneous	Boiler	Boiler Tube Leaks		1005	Generating tubes
Miscellaneous	Boiler	Boiler Tube Leaks		1006	In-bed reheat tubes (FBC only - includes external heat exchangers)
Miscellaneous	Boiler	Boiler Tube Leaks		1010	Cyclone furnace (in cyclone area only)
Miscellaneous	Boiler	Boiler Tube Leaks		1020	Convection pass wall (water tubes only)
Miscellaneous	Boiler	Boiler Tube Leaks		1030	Boiler screen, wing wall, or slag screen (water tubes only)
Miscellaneous	Boiler	Boiler Tube Leaks		1035	Platen superheater
Miscellaneous	Boiler	Boiler Tube Leaks		1040	First superheater
Miscellaneous	Boiler	Boiler Tube Leaks		1045	In-bed superheater tubes (FBC only - includes external heat exchangers)
Miscellaneous	Boiler	Boiler Tube Leaks		1050	Second superheater
Miscellaneous	Boiler	Boiler Tube Leaks		1055	External superheater link tubing
Miscellaneous	Boiler	Boiler Tube Leaks		1060	First reheater
Miscellaneous	Boiler	Boiler Tube Leaks		1070	Second reheater
Miscellaneous	Boiler	Boiler Tube Leaks		1075	External reheater link tubing
Miscellaneous	Boiler	Boiler Tube Leaks		1080	Economizer
Miscellaneous	Boiler	Boiler Tube Leaks		1085	In-bed evaporative tubes (FBC only - includes external heat exchangers)
Miscellaneous	Boiler	Boiler Tube Leaks		1090	Other boiler tube leaks
Notes: 1) For use with Unit Codes 800–899. 2) Use codes 860 and 870 for fouling or slagging due to unavailability of soot blowers or their air or steam supply.					

TABLE B12-54 Boiler: Boiler Water Condition

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Miscellaneous	Boiler	Boiler Water Condition		1850	Boiler water condition (not feedwater water quality)
Notes: 1) For use with Unit Codes 800–899. 2) Use code 859 for tube/membrane failures.					

TABLE B12-55 Boiler: External Fluidized Bed Heat Exchanger

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	External Fluidized Bed Heat Exchanger		990	Refractory
Miscellaneous	Boiler	External Fluidized Bed Heat Exchanger		991	Tube leaks
Miscellaneous	Boiler	External Fluidized Bed Heat Exchanger		992	Tube supports
Miscellaneous	Boiler	External Fluidized Bed Heat Exchanger		999	Other heat exchanger problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-56 Boiler: Miscellaneous (Boiler)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Miscellaneous (Boiler)		1980	Boiler safety valve test
Miscellaneous	Boiler	Miscellaneous (Boiler)		1990	Boiler performance testing (use code 9999 for total unit performance testing)
Miscellaneous	Boiler	Miscellaneous (Boiler)		1999	Boiler, miscellaneous
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-57 Boiler: Miscellaneous Boiler Tube Problems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Miscellaneous Boiler Tube Problems		1300	Water side fouling
Miscellaneous	Boiler	Miscellaneous Boiler Tube Problems		1305	Fireside cleaning (which requires a full outage) Use code 1200 for cleanings that cause deratings.
Miscellaneous	Boiler	Miscellaneous Boiler Tube Problems		1310	Water side cleaning (acid cleaning)
Miscellaneous	Boiler	Miscellaneous Boiler Tube Problems		1320	Tube supports/attachments
Miscellaneous	Boiler	Miscellaneous Boiler Tube Problems		1330	Slag fall damage
Miscellaneous	Boiler	Miscellaneous Boiler Tube Problems		1340	Tube modifications (including addition and removal of tubes)
Miscellaneous	Boiler	Miscellaneous Boiler Tube Problems		1350	Other miscellaneous boiler tube problems
Miscellaneous	Boiler	Miscellaneous Boiler Tube Problems		1360	Boiler drains system
Notes: 1) For use with Unit Codes 800–899. 2) Use more specific codes - other slagging and fouling problems, other control problems, etc. - whenever possible. Describe miscellaneous problems in the verbal description.					

TABLE B12-58 Boiler: Slag and Ash Removal

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Slag and Ash Removal		860	Soot blowers - air (see code 3844 for air delivery system)
Miscellaneous	Boiler	Slag and Ash Removal		870	Soot blowers - steam

Miscellaneous	Boiler	Slag and Ash Removal		871	Soot blowers - sonic
Miscellaneous	Boiler	Slag and Ash Removal		872	Soot blowers - water
Miscellaneous	Boiler	Slag and Ash Removal		873	Soot blower drives
Miscellaneous	Boiler	Slag and Ash Removal		876	Soot blower controls
Miscellaneous	Boiler	Slag and Ash Removal		880	Fly Ash Removal System (not precipitators, scrubbers, mechanical collectors, or baghouses)
Miscellaneous	Boiler	Slag and Ash Removal		885	Fly ash Removal System - wet transport
Miscellaneous	Boiler	Slag and Ash Removal		890	Bottom ash systems (wet or dry)
Miscellaneous	Boiler	Slag and Ash Removal		891	Bottom ash hoppers (including gates)
Miscellaneous	Boiler	Slag and Ash Removal		892	Bottom ash clinker grinders
Miscellaneous	Boiler	Slag and Ash Removal		893	Bottom ash water pumps and motors
Miscellaneous	Boiler	Slag and Ash Removal		894	Bottom ash piping and valves
Miscellaneous	Boiler	Slag and Ash Removal		895	Ashpit trouble
Miscellaneous	Boiler	Slag and Ash Removal		896	Bottom ash dewatering bin system, instruments and controls
Miscellaneous	Boiler	Slag and Ash Removal		897	Bottom ash rotary (drag chain type) conveyor and motor
Miscellaneous	Boiler	Slag and Ash Removal		898	Bottom ash pyrite hopper (pulverizer reject) system
Miscellaneous	Boiler	Slag and Ash Removal		899	Bottom ash controls and instrumentation
Miscellaneous	Boiler	Slag and Ash Removal		900	Slag tap (cyclone furnace)
Miscellaneous	Boiler	Slag and Ash Removal		910	Slag tap (other than cyclone furnace)
Miscellaneous	Boiler	Slag and Ash Removal		920	Other slag and ash removal problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-59 Boiler: Sorbent Supply (FBC only) - Sorbent Feed Equipment from Bunkers to Boiler (FBC only)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	150	Sorbent feed conveyors
Miscellaneous	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	151	Sorbent feed tanks/hoppers
Miscellaneous	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	152	Sorbent feed volumetric feeder
Miscellaneous	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	153	Sorbent feed gravimetric feeder
Miscellaneous	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	154	Sorbent feed feeder motors
Miscellaneous	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	155	Sorbent feed pneumatic transport system including piping and valves
Miscellaneous	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	156	Other sorbent feed problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-60 Boiler: Sorbent Supply (FBC only) - Sorbent Handling System up Through Bunkers (FBC only)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Miscellaneous	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	130	Sorbent handling tanks/hoppers
Miscellaneous	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	131	Sorbent handling conveyors
Miscellaneous	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	132	Sorbent handling feeders
Miscellaneous	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	133	Sorbent handling feeder motors
Miscellaneous	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	134	Sorbent handling crushers
Miscellaneous	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	135	Sorbent handling crusher motors
Miscellaneous	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	136	Sorbent handling blowers/fans
Miscellaneous	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	137	Sorbent handling blower/fan motors
Miscellaneous	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	138	Sorbent handling baghouse
Miscellaneous	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	139	Sorbent handling drying equipment
Miscellaneous	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	140	Sorbent handling screens
Miscellaneous	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	141	Other sorbent handling equipment problems
Notes: 1) For use with Unit Codes 800–899.					

EXPANDER TURBINE

TABLE B12-61 Expander Turbine: Expander Turbine					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Miscellaneous	Expander Turbine	Expander Turbine		7800	Couplings
Miscellaneous	Expander Turbine	Expander Turbine		7810	Shaft
Miscellaneous	Expander Turbine	Expander Turbine		7820	Bearings
Miscellaneous	Expander Turbine	Expander Turbine		7830	Blades
Miscellaneous	Expander Turbine	Expander Turbine		7840	Discs
Miscellaneous	Expander Turbine	Expander Turbine		7850	Spacers
Miscellaneous	Expander Turbine	Expander Turbine		7860	Nozzles/vanes
Miscellaneous	Expander Turbine	Expander Turbine		7870	Heat shields

Miscellaneous	Expander Turbine	Expander Turbine		7880	Exhaust diffusers
Miscellaneous	Expander Turbine	Expander Turbine		7890	Seal oil system and seals
Miscellaneous	Expander Turbine	Expander Turbine		7900	Inner casing
Miscellaneous	Expander Turbine	Expander Turbine		7910	Outer exhaust casing
Miscellaneous	Expander Turbine	Expander Turbine		7920	Lube oil system
Miscellaneous	Expander Turbine	Expander Turbine		7930	Controls and instrumentation
Miscellaneous	Expander Turbine	Expander Turbine		7940	Evactor
Miscellaneous	Expander Turbine	Expander Turbine		7950	Major overhaul
Miscellaneous	Expander Turbine	Expander Turbine		7960	Other expander turbine problems
Notes: 1) For use with Unit Codes 800–899.					

EXTERNAL

Use this set of codes to report events caused by external factors (flood, lightning, etc.); economic factors (lack of fuel, labor strikes, etc.); operator training; and transmission system problems external to the plant.

TABLE B12-62 External: Catastrophe

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	External	Catastrophe		9000	Flood
Miscellaneous	External	Catastrophe		9001	Drought
Miscellaneous	External	Catastrophe		9010	Fire including wildfires, not related to a specific component
Miscellaneous	External	Catastrophe		9020	Lightning
Miscellaneous	External	Catastrophe		9025	Geomagnetic disturbance
Miscellaneous	External	Catastrophe		9030	Earthquake
Miscellaneous	External	Catastrophe		9031	Tornado
Miscellaneous	External	Catastrophe		9035	Hurricane
Miscellaneous	External	Catastrophe		9036	Storms (ice, snow, etc)
Miscellaneous	External	Catastrophe		9040	Other catastrophe
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-63 External: Economic

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	External	Economic		0	Reserve shutdown
Miscellaneous	External	Economic		9130	Failure of fuel supplier to fulfill contractual obligations or a pre-arranged deal due to physical fuel disruptions or operational impairments (e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)
Miscellaneous	External	Economic		9131	Lack of fuel – due to contractual or tariff provisions that allow for service interruption or

					price fluctuations during peak demand periods.
Miscellaneous	External	Economic		9132	Wet Fuel - Biomass
Miscellaneous	External	Economic		9134	Fuel conservation
Miscellaneous	External	Economic		9135	Lack of water
Miscellaneous	External	Economic		9136	Problems with Primary Fuel for Units with Secondary Fuel Operation
Miscellaneous	External	Economic		9137	Ground water or other water supply problems
Miscellaneous	External	Economic		9138	High Water Level in Tailrace (too much water)
Miscellaneous	External	Economic		9140	Plant modifications to burn different fuel that are not regulatory mandated
Miscellaneous	External	Economic		9150	Labor strikes company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.
Miscellaneous	External	Economic		9151	Labor strikes direct plant management grievances that result in a walkout or strike are under plant management control.
Miscellaneous	External	Economic		9160	Other economic problems
Miscellaneous	External	Economic		9180	Economic (for internal use at plants only)
Miscellaneous	External	Economic		9181	Economic (for internal use at plants only)
Miscellaneous	External	Economic		9182	Economic (for internal use at plants only)
Miscellaneous	External	Economic		9183	Economic (for internal use at plants only)
Miscellaneous	External	Economic		9184	Economic (for internal use at plants only)
Miscellaneous	External	Economic		9185	Economic (for internal use at plants only)
Miscellaneous	External	Economic		9186	Economic (for internal use at plants only)
Miscellaneous	External	Economic		9187	Economic (for internal use at plants only)
Miscellaneous	External	Economic		9188	Economic (for internal use at plants only)
Miscellaneous	External	Economic		9189	Economic (for internal use at plants only)
Miscellaneous	External	Economic		9190	Economic (for internal use at plants only)
Miscellaneous	External	Economic		9191	Economic (for internal use at plants only)
Miscellaneous	External	Economic		9192	Economic (for internal use at plants only)
Miscellaneous	External	Economic		9193	Economic (for internal use at plants only)
Miscellaneous	External	Economic		9194	Economic (for internal use at plants only)
Miscellaneous	External	Economic		9195	Economic (for internal use at plants only)
Miscellaneous	External	Economic		9196	Economic (for internal use at plants only)
Miscellaneous	External	Economic		9197	Economic (for internal use at plants only)
Miscellaneous	External	Economic		9198	Economic (for internal use at plants only)
Miscellaneous	External	Economic		9199	Economic (for internal use at plants only)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-64 External: Fuel Quality

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	External	Fuel Quality		9200	High ash content (OMC)
Miscellaneous	External	Fuel Quality		9205	Poor quality natural gas fuel, low heat content
Miscellaneous	External	Fuel Quality		9210	Low grindability (OMC)
Miscellaneous	External	Fuel Quality		9220	High sulfur content (OMC)
Miscellaneous	External	Fuel Quality		9230	High vanadium content (OMC)
Miscellaneous	External	Fuel Quality		9240	High sodium content (OMC)
Miscellaneous	External	Fuel Quality		9250	Low BTU coal (OMC)
Miscellaneous	External	Fuel Quality		9251	Low BTU coal (not OMC)
Miscellaneous	External	Fuel Quality		9260	Low BTU oil (OMC)
Miscellaneous	External	Fuel Quality		9270	Wet coal (OMC)
Miscellaneous	External	Fuel Quality		9271	Wet coal (not OMC)
Miscellaneous	External	Fuel Quality		9280	Frozen coal (OMC)
Miscellaneous	External	Fuel Quality		9281	Frozen coal (not OMC)
Miscellaneous	External	Fuel Quality		9290	Other fuel quality problems (OMC)
Miscellaneous	External	Fuel Quality		9291	Other fuel quality problems (not OMC)
Notes: 1) For use with Unit Codes 800–899. 2) Use code 9600 to 9650 if the fuel quality results in excess stack emissions through no fault in the pollution control equipment. Use the appropriate equipment code to report fouling and slagging.					

TABLE B12-65 External: Miscellaneous (External)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	External	Miscellaneous (External)		9300	Transmission system problems other than catastrophes (do not include switchyard problems in this category; see codes 3600 to 3629, 3720 to 3730)
Miscellaneous	External	Miscellaneous (External)		9305	Ash disposal problem
Miscellaneous	External	Miscellaneous (External)		9310	Operator training
Miscellaneous	External	Miscellaneous (External)		9320	Other miscellaneous external problems
Miscellaneous	External	Miscellaneous (External)		9340	Synchronous Condenser Operation
Notes: 1) For use with Unit Codes 800–899.					

GAS TURBINE

TABLE B12-66 Gas Turbine: Auxiliary Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Gas Turbine	Auxiliary Systems		5110	Lube oil system - general
Miscellaneous	Gas Turbine	Auxiliary Systems		5111	Lube oil pumps
Miscellaneous	Gas Turbine	Auxiliary Systems		5112	Lube oil coolers
Miscellaneous	Gas Turbine	Auxiliary Systems		5113	Lube oil valves/piping

Miscellaneous	Gas Turbine	Auxiliary Systems		5114	Lube oil filters
Miscellaneous	Gas Turbine	Auxiliary Systems		5115	Oil vapor extractor
Miscellaneous	Gas Turbine	Auxiliary Systems		5119	Power augmentation controls
Miscellaneous	Gas Turbine	Auxiliary Systems		5120	Hydraulic oil system
Miscellaneous	Gas Turbine	Auxiliary Systems		5130	Starting system (including motor)
Miscellaneous	Gas Turbine	Auxiliary Systems		5140	Battery and charger system
Miscellaneous	Gas Turbine	Auxiliary Systems		5150	Turning gear and motor
Miscellaneous	Gas Turbine	Auxiliary Systems		5160	Cooling and seal air system
Miscellaneous	Gas Turbine	Auxiliary Systems		5170	Cooling water system
Miscellaneous	Gas Turbine	Auxiliary Systems		5180	Anti-icing system
Miscellaneous	Gas Turbine	Auxiliary Systems		5190	Other auxiliary system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-67 Gas Turbine: Exhaust Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Gas Turbine	Exhaust Systems		5100	Chamber
Miscellaneous	Gas Turbine	Exhaust Systems		5101	Hoods
Miscellaneous	Gas Turbine	Exhaust Systems		5102	Vanes/nozzles
Miscellaneous	Gas Turbine	Exhaust Systems		5103	Silencer
Miscellaneous	Gas Turbine	Exhaust Systems		5104	Cones
Miscellaneous	Gas Turbine	Exhaust Systems		5108	High engine exhaust temperature
Miscellaneous	Gas Turbine	Exhaust Systems		5109	Other exhaust problems (including high exhaust system temperature not attributable to a specific problem)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-68 Gas Turbine: Fuel, Ignition, and Combustion Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5040	Fuel tanks
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5041	Fuel piping and valves
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5042	Fuel nozzles/vanes
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5043	Fuel filters
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5044	Liquid fuel oil pump
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5046	Liquid fuel oil transfer/forwarding pump
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5047	Liquid fuel purge system
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5048	Gas fuel system including controls and instrumentation
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5049	Other fuel system problems
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5050	Ignition system
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5051	Pilot fuel piping and valves
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5052	Pilot fuel nozzles/vanes
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5053	Pilot fuel filters
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5054	Water injection system

Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5060	Atomizing air system
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5070	Combustor casing
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5071	Combustor liner
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5072	Combustor caps
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5073	Flame scanners
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5074	Flashback including instrumentation
Miscellaneous	Gas Turbine	Fuel, Ignition, and Combustion Systems		5079	Other combustor problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-69 Gas Turbine: Inlet Air System and Compressors - Compressors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Compressors	5010	High pressure shaft
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Compressors	5011	High pressure bearings
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Compressors	5012	High pressure blades/buckets
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Compressors	5013	Compressor casing and bolts
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Compressors	5014	Compressor diaphragms
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Compressors	5015	Compressor seals
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Compressors	5016	High pressure compressor bleed valves
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Compressors	5017	Low pressure compressor bleed valves
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Compressors	5019	Other high pressure problems
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Compressors	5020	Low pressure shaft
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Compressors	5021	Low pressure bearings
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Compressors	5022	Low pressure blades/buckets
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Compressors	5029	Other low pressure problems
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Compressors	5030	Supercharging fans
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Compressors	5035	Compressor washing
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Compressors	5037	Inlet bleed heat valve
Notes: 1) For use with Unit Codes 800–899. 2) Use HP compressor if only one.					

TABLE B12-70 Gas Turbine: Inlet Air System and Compressors - Ducts and Filters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5000	Inlet air ducts
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5001	Inlet air vanes/nozzles
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5002	Inlet air filters
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5003	Inlet cone
Miscellaneous	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5009	Other inlet air problems
Notes: 1) For use with Unit Codes 800–899. 2) Use HP compressor if only one.					

TABLE B12-71 Gas Turbine: Miscellaneous (Gas Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5200	Reduction gear
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5201	Load shaft and bearings
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5205	Main coupling between the turbine and generator
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5206	Clutch
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5210	Intercoolers
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5220	Regenerators
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5230	Heat shields
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5240	Fire detection and extinguishing system (including hazardous gas detection system)
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5241	Fire in unit
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5245	Gas Turbine Control System - data highway
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5246	Gas Turbine Control System - hardware problems (including card failure)
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5247	Gas Turbine Control System - internal and termination wiring
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5248	Gas Turbine Control System - logic problems
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5249	Gas Turbine Control System - upgrades
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5250	Other controls and instrumentation problems
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5255	Computer
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5260	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5261	Gas turbine/compressor washing
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5262	Gas turbine exchange
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5270	Hot end inspection
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5272	Boroscope inspection
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5274	General unit inspection
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5280	Vibration (not engine) in unit not attributable to bearings or other components
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5285	Gas turbine vibration
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5286	Gas turbine lockout
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5290	Gas turbine performance testing - individual engines (use code 9999 for total unit performance testing)
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5292	Turbine Overspeed Trip Test - Gas Turbine
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5295	Synchronous condenser equipment
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5298	Main gas filter
Miscellaneous	Gas Turbine	Miscellaneous (Gas Turbine)		5299	Other miscellaneous gas turbine problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-72 Gas Turbine: Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Gas Turbine	Turbine		5080	High pressure shaft

Miscellaneous	Gas Turbine	Turbine		5081	High pressure bearings
Miscellaneous	Gas Turbine	Turbine		5082	High pressure blades/buckets
Miscellaneous	Gas Turbine	Turbine		5083	High pressure nozzles/vanes
Miscellaneous	Gas Turbine	Turbine		5084	High pressure casing/expansion joints
Miscellaneous	Gas Turbine	Turbine		5085	Interstage gas passages - HP
Miscellaneous	Gas Turbine	Turbine		5086	High pressure shaft seals
Miscellaneous	Gas Turbine	Turbine		5087	Thrust bearing
Miscellaneous	Gas Turbine	Turbine		5089	Other high pressure problems
Miscellaneous	Gas Turbine	Turbine		5090	Low pressure shaft
Miscellaneous	Gas Turbine	Turbine		5091	Low pressure bearings
Miscellaneous	Gas Turbine	Turbine		5092	Low pressure blades/buckets
Miscellaneous	Gas Turbine	Turbine		5093	Low pressure nozzles/vanes
Miscellaneous	Gas Turbine	Turbine		5094	Low pressure casing/expansion joints
Miscellaneous	Gas Turbine	Turbine		5095	Interstage gas passages - LP
Miscellaneous	Gas Turbine	Turbine		5096	Low pressure shaft seals
Miscellaneous	Gas Turbine	Turbine		5097	Other low pressure problems
Miscellaneous	Gas Turbine	Turbine		5098	Expansion joints
Miscellaneous	Gas Turbine	Turbine		5099	HP to LP coupling
Notes: 1) For use with Unit Codes 800–899. 2) Use HP if only one.					

GENERATOR

This set of codes contains the generator, exciter, generator cooling systems, and generator controls. Note the main leads up to and includes the generator output breaker in this set of codes.

TABLE B12-73 Generator: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Generator	Controls		4700	Generator voltage control
Miscellaneous	Generator	Controls		4710	Generator metering devices
Miscellaneous	Generator	Controls		4720	Generator synchronization equipment
Miscellaneous	Generator	Controls		4730	Generator current and potential transformers
Miscellaneous	Generator	Controls		4740	Emergency generator trip devices
Miscellaneous	Generator	Controls		4750	Other generator controls and metering problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-74 Generator: Cooling System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Generator	Cooling System		4610	Hydrogen cooling system piping and valves
Miscellaneous	Generator	Cooling System		4611	Hydrogen coolers
Miscellaneous	Generator	Cooling System		4612	Hydrogen storage system

Miscellaneous	Generator	Cooling System		4613	Hydrogen seals
Miscellaneous	Generator	Cooling System		4619	Other hydrogen system problems
Miscellaneous	Generator	Cooling System		4620	Air cooling system
Miscellaneous	Generator	Cooling System		4630	Liquid cooling system
Miscellaneous	Generator	Cooling System		4640	Seal oil system and seals
Miscellaneous	Generator	Cooling System		4650	Other cooling system problems
Notes: 1) For use with Unit Codes 800–899. 2) Report failures caused by water leaks into generator as codes 4500, 4510, etc.					

TABLE B12-75 Generator: Exciter

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Generator	Exciter		4600	Exciter drive - motor
Miscellaneous	Generator	Exciter		4601	Exciter field rheostat
Miscellaneous	Generator	Exciter		4602	Exciter commutator and brushes
Miscellaneous	Generator	Exciter		4603	Solid state exciter element
Miscellaneous	Generator	Exciter		4604	Exciter drive - shaft
Miscellaneous	Generator	Exciter		4605	Exciter transformer
Miscellaneous	Generator	Exciter		4609	Other exciter problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-76 Generator: Generator

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Generator	Generator		4500	Rotor windings (including damper windings and fan blades on hydro units)
Miscellaneous	Generator	Generator		4510	Rotor collector rings
Miscellaneous	Generator	Generator		4511	Rotor, General
Miscellaneous	Generator	Generator		4512	Retaining Rings
Miscellaneous	Generator	Generator		4520	Stator windings, bushings, and terminals
Miscellaneous	Generator	Generator		4530	Stator core iron
Miscellaneous	Generator	Generator		4535	Stator, General
Miscellaneous	Generator	Generator		4536	Generator Heaters
Miscellaneous	Generator	Generator		4540	Brushes and brush rigging
Miscellaneous	Generator	Generator		4550	Generator bearings and lube oil system (including thrust bearings on hydro units)
Miscellaneous	Generator	Generator		4551	Generator bearings
Miscellaneous	Generator	Generator		4552	Generator lube oil system
Miscellaneous	Generator	Generator		4555	Bearing cooling system
Miscellaneous	Generator	Generator		4560	Generator vibration (excluding vibration due to failed bearing and other components)
Miscellaneous	Generator	Generator		4570	Generator casing
Miscellaneous	Generator	Generator		4580	Generator end bells and bolting
Miscellaneous	Generator	Generator		4590	Generator brakes

Notes: 1) For use with Unit Codes 800–899.

TABLE B12-77 Generator: Miscellaneous (Generator)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Miscellaneous	Generator	Miscellaneous (Generator)		4800	Generator main leads
Miscellaneous	Generator	Miscellaneous (Generator)		4805	Generator Bus Duct Cooling System
Miscellaneous	Generator	Miscellaneous (Generator)		4810	Generator output breaker
Miscellaneous	Generator	Miscellaneous (Generator)		4830	Major generator overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Miscellaneous	Generator	Miscellaneous (Generator)		4831	Minor generator overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Miscellaneous	Generator	Miscellaneous (Generator)		4840	Inspection
Miscellaneous	Generator	Miscellaneous (Generator)		4841	Generator doble testing
Miscellaneous	Generator	Miscellaneous (Generator)		4842	Reactive and capability testing
Miscellaneous	Generator	Miscellaneous (Generator)		4850	Core monitor alarm
Miscellaneous	Generator	Miscellaneous (Generator)		4860	Generator neutral grounding equipment
Miscellaneous	Generator	Miscellaneous (Generator)		4899	Other miscellaneous generator problems
Notes: 1) For use with Unit Codes 800–899.					

HEAT RECOVERY STEAM GENERATOR (HRSG)

TABLE B12-78 Heat Recovery Steam Generator (HRSG): HRSG Boiler Internals and Structures					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		801	HP Drum (including drum level trips not attributable to other causes)
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		802	IP Drum (including drum level trips not attributable to other causes)
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		803	LP Drum (including drum level trips not attributable to other causes)
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		848	Inlet panel
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		856	HP Drum relief/safety valves
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		857	IP Drum relief/safety valves
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		858	LP Drum relief/safety valves
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-79 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Desuperheaters/Attemperators					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6140	HP Desuperheater/attemperator piping - Greater than 600 PSIG.
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6141	HP Desuperheater/attemperator valves
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6142	HP Desuperheater/attemperator spray nozzles
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6143	HP Desuperheater/attemperator drums
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6144	Other HP desuperheater/attemperator problems
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6145	IP Desuperheater/attemperator piping - Between 200-600 PSIG
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6146	IP Desuperheater/attemperator valves
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6147	IP Desuperheater/attemperator spray nozzles
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6148	IP Desuperheater/attemperator drums
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6149	Other IP desuperheater/attemperator problems
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6150	LP Desuperheater/attemperator piping - Less than 200 PSIG
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6151	LP Desuperheater/attemperator valves
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6152	LP Desuperheater/attemperator spray nozzles
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6153	LP Desuperheater/attemperator drums
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6154	Other LP desuperheater/attemperator problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-80 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Main Steam					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6110	HP steam piping up to turbine stop valves - Greater than 600 PSIG (see 0790 for piping supports)
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6111	HP steam relief/safety valves
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6112	Other HP steam valves (including vent and drain valves but not including the turbine stop valves)
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6113	Other HP steam system problems
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6114	HP steam isolation/boundary valves
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6120	IP steam piping up to turbine stop valves - Between 200 & 600 PSIG (see 0790 for piping supports)
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6121	IP steam relief/safety valves

Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6122	Other IP steam valves (including vent and drain valves but not including the turbine stop valves)
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6123	Other IP steam system problems
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6130	LP steam piping up to turbine stop valves - Less than 200 PSIG (see 0790 for piping supports)
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6131	LP steam relief/safety valves
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6132	Other LP steam valves (including vent and drain valves but not including the turbine stop valves)
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6133	Other LP steam system problems
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6134	Other main steam valves (including vent and drain valves but not including the turbine stop valves)
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	6135	LP steam isolation/boundary valves
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-81 Heat Recovery Steam Generator (HRSG): HRSG Boiler Piping System - HRSG Startup Bypass

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6160	HP Startup bypass system piping (including drain lines up to heaters or condenser) - Greater than 600 PSIG
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6161	HP Startup bypass system valves
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6162	HP Startup bypass tanks or flash tanks
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6163	Other HP startup bypass system problems
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6164	HP startup bypass instrumentation and controls
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6170	IP Startup bypass system piping (including drain lines up to heaters or condenser) - Between 200-600 PSIG
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6171	IP Startup bypass system valves
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6172	IP Startup bypass tanks or flash tanks
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6173	Other IP startup bypass system problems
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6174	IP startup bypass instrumentation and controls
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6180	LP Startup bypass system piping (including drain lines up to heaters or condenser) - Less than 200 PSIG
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6181	LP Startup bypass system valves
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6182	LP Startup bypass tanks or flash tanks
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6183	Other LP startup bypass system problems

Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6184	LP startup bypass instrumentation and controls
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-82 Heat Recovery Steam Generator (HRSG): HRSG Boiler Tube Leaks

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6005	HP Evaporator tubes
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6006	IP Evaporator tubes
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6007	LP Evaporator tubes
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6010	HP superheater
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6011	HP reheater
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6012	HP economizer
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6020	IP superheater
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6021	IP reheater
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6022	IP economizer
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6030	LP reheater
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6031	LP superheater
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6032	LP economizer
Miscellaneous	Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6090	Other HRSG tube problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-83 Heat Recovery Steam Generator (HRSG): Miscellaneous (HRSG Boiler)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		6000	Heat recovery steam generator to gas turbine connecting equipment. For additional codes, use Fossil Steam Cause Codes 0010 to 1999.
Miscellaneous	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		6100	Steam turbine to gas turbine coupling. For additional codes, use Fossil Steam Cause Codes 4000 to 4499.
Notes: 1) For use with Unit Codes 800–899.					

HYDRO TURBINE/PUMP

TABLE B12-84 Hydro Turbine/Pump: Miscellaneous (Hydro Turbine/Pump)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)		7200	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
Miscellaneous	Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)		7201	Inspection

Miscellaneous	Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)		7210	Canals (including siphons, radial gates, and spills)
Miscellaneous	Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)		7220	Unit out of service due to common penstock with unit under repair
Miscellaneous	Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)		7230	Pony motor (pumped storage units only)
Miscellaneous	Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)		7240	Powerhouse substructure
Miscellaneous	Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)		7299	Other miscellaneous hydro turbine/pump problems (use generator codes and balance of plant electrical and auxiliary codes as appropriate)
Miscellaneous	Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)		7300	Routine Hydro Planned Outage (reoccurring schedule) (Use 4840 or 7201 for specific inspections.)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-85 Hydro Turbine/Pump: Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Hydro Turbine/Pump	Turbine		7000	Shaft
Miscellaneous	Hydro Turbine/Pump	Turbine		7001	Shaft packing
Miscellaneous	Hydro Turbine/Pump	Turbine		7003	Lube oil system (use code 7007 to report bearing failures due to lube oil problems)
Miscellaneous	Hydro Turbine/Pump	Turbine		7007	Bearings
Miscellaneous	Hydro Turbine/Pump	Turbine		7008	Bearing cooling system
Miscellaneous	Hydro Turbine/Pump	Turbine		7009	Bearing oil system
Miscellaneous	Hydro Turbine/Pump	Turbine		7010	Runner cavitation damage
Miscellaneous	Hydro Turbine/Pump	Turbine		7011	Other runner problems
Miscellaneous	Hydro Turbine/Pump	Turbine		7012	Casing, wear ring, or liner cavitation damage
Miscellaneous	Hydro Turbine/Pump	Turbine		7014	Blade or bucket cracking
Miscellaneous	Hydro Turbine/Pump	Turbine		7020	Nozzle assembly
Miscellaneous	Hydro Turbine/Pump	Turbine		7030	Vibration (Only for unbalance, report bearing failure, etc., in appropriate category)
Miscellaneous	Hydro Turbine/Pump	Turbine		7040	Turbine overhaul
Miscellaneous	Hydro Turbine/Pump	Turbine		7050	Turbine governor
Miscellaneous	Hydro Turbine/Pump	Turbine		7052	Other turbine control problems (Report specific wicket gate controls, etc., using the code for the appropriate equipment item.)
Miscellaneous	Hydro Turbine/Pump	Turbine		7053	Governor oil system
Miscellaneous	Hydro Turbine/Pump	Turbine		7070	Speed Increaser
Miscellaneous	Hydro Turbine/Pump	Turbine		7099	Other turbine problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-86 Hydro Turbine/Pump: Water Supply/Discharge

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7100	Upper reservoir dams and dikes

Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7101	Lower reservoir dams and dikes
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7102	Auxiliary reservoir dams and dikes
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7110	Intake channel or flume (including trash racks)
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7111	Intake tunnel
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7120	Headgates
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7121	Shutoff valves
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7123	Shutoff valve bypass line and valve
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7124	Penstock
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7130	Spiral case
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7140	Wicket gate assembly
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7141	Wicket gate operating mechanism or positioner
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7142	Wicket gate shear pin
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7150	Stay vanes
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7160	Pressure regulating valve
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7161	Pressure regulating valve operator or positioner
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7162	Relief valve and vacuum breakers
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7170	Draft tube
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7180	Tailrace
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7181	Tail water depressing equipment
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7190	Dewatering and rewatering equipment
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7191	Equalizing line
Miscellaneous	Hydro Turbine/Pump	Water Supply/Discharge		7199	Other water supply/discharge problems (use for equipment related problems; use codes 9135 or 9320 for lack of water or discharge limit related problems)
Notes: 1) For use with Unit Codes 800–899.					

INACTIVE STATES

TABLE B12-87 Inactive States: Inactive States

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Inactive States	Inactive States		2	Inactive Reserve Shutdown
Miscellaneous	Inactive States	Inactive States		9990	Retired unit
Miscellaneous	Inactive States	Inactive States		9991	Mothballed unit
Notes: 1) For use with Unit Codes 800–899.					

INTERNAL COMBUSTION/RECIPROCATING ENGINE

TABLE B12-88 Internal Combustion/Reciprocating Engines: Engine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Miscellaneous	Internal Combustion/Reciprocating Engines	Engine		5700	Drive shaft and bearings
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine		5710	Cylinders
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine		5711	Cylinder heads
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine		5712	Hydraulic lock (water in cylinders)
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine		5720	Pistons
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine		5730	Intake valves
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine		5731	Exhaust valves
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine		5740	Turbo charger
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine		5790	Vibration
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine		5799	Other engine problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-89 Internal Combustion/Reciprocating Engines: Engine Auxiliaries

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5800	Lube oil system
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5805	Cooling system
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5810	Heater elements
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5815	Fuel system
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5820	Start system
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5825	Battery and battery charger system
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5830	Air filter system
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5849	Other engine auxiliaries problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-90 Internal Combustion/Reciprocating Engines: Engine Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine Controls		5850	Governor
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine Controls		5855	Engine control system
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine Controls		5860	Control power transformer
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine Controls		5865	Synchronization system
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine Controls		5870	Other engine control problems
Miscellaneous	Internal Combustion/Reciprocating Engines	Engine Controls		5880	Internal Combustion/Reciprocating Engines unit overhaul
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-91 Internal Combustion/Reciprocating Engines: Miscellaneous (Internal Combustion/Reciprocating Engines)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Miscellaneous	Internal Combustion/Reciprocating Engines	Miscellaneous (Internal Combustion/Reciprocating Engines)		5890	Major overhaul (use for non-specific overhaul only; see Page B-CCGT-2)
Miscellaneous	Internal Combustion/Reciprocating Engines	Miscellaneous (Internal Combustion/Reciprocating Engines)		5895	Inspection
Miscellaneous	Internal Combustion/Reciprocating Engines	Miscellaneous (Internal Combustion/Reciprocating Engines)		5990	Engine performance testing - individual engines (use code 9999 for total unit performance testing)
Miscellaneous	Internal Combustion/Reciprocating Engines	Miscellaneous (Internal Combustion/Reciprocating Engines)		5999	Other miscellaneous Internal Combustion/Reciprocating Engines problems
Notes: 1) For use with Unit Codes 800–899.					

JET ENGINE

TABLE B12-92 Jet Engine: Auxiliary Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Jet Engine	Auxiliary Systems		5510	Lube oil system
Miscellaneous	Jet Engine	Auxiliary Systems		5520	Hydraulic oil system
Miscellaneous	Jet Engine	Auxiliary Systems		5530	Starting system (including motor)
Miscellaneous	Jet Engine	Auxiliary Systems		5540	Battery and charger system
Miscellaneous	Jet Engine	Auxiliary Systems		5550	Turning gear and motor
Miscellaneous	Jet Engine	Auxiliary Systems		5560	Cooling and seal air system
Miscellaneous	Jet Engine	Auxiliary Systems		5570	Cooling water system
Miscellaneous	Jet Engine	Auxiliary Systems		5580	Anti-icing system
Miscellaneous	Jet Engine	Auxiliary Systems		5590	Other auxiliary system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-93 Jet Engine: Exhaust Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Jet Engine	Exhaust Systems		5500	Chamber
Miscellaneous	Jet Engine	Exhaust Systems		5501	Hoods
Miscellaneous	Jet Engine	Exhaust Systems		5502	Vanes/nozzles
Miscellaneous	Jet Engine	Exhaust Systems		5503	Silencer
Miscellaneous	Jet Engine	Exhaust Systems		5504	Cones
Miscellaneous	Jet Engine	Exhaust Systems		5508	High engine exhaust temperature
Miscellaneous	Jet Engine	Exhaust Systems		5509	Other exhaust problems (including high exhaust temperature not attributable to a specific problem)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-94 Jet Engine: Fuel, Ignition, and Combustion Systems					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Miscellaneous	Jet Engine	Fuel, Ignition, and Combustion Systems		5440	Fuel tanks
Miscellaneous	Jet Engine	Fuel, Ignition, and Combustion Systems		5441	Fuel piping and valves
Miscellaneous	Jet Engine	Fuel, Ignition, and Combustion Systems		5442	Fuel nozzles/vanes
Miscellaneous	Jet Engine	Fuel, Ignition, and Combustion Systems		5443	Fuel filters
Miscellaneous	Jet Engine	Fuel, Ignition, and Combustion Systems		5449	Other fuel system problems
Miscellaneous	Jet Engine	Fuel, Ignition, and Combustion Systems		5450	Ignition system
Miscellaneous	Jet Engine	Fuel, Ignition, and Combustion Systems		5455	Fuel nozzle/vane cooling air system
Miscellaneous	Jet Engine	Fuel, Ignition, and Combustion Systems		5460	Atomizing air system
Miscellaneous	Jet Engine	Fuel, Ignition, and Combustion Systems		5470	Combustor casing
Miscellaneous	Jet Engine	Fuel, Ignition, and Combustion Systems		5471	Combustor liner
Miscellaneous	Jet Engine	Fuel, Ignition, and Combustion Systems		5472	Combustor caps
Miscellaneous	Jet Engine	Fuel, Ignition, and Combustion Systems		5479	Other combustor problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-95 Jet Engine: Inlet Air System and Compressors - Compressors					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Miscellaneous	Jet Engine	Inlet Air System and Compressors	Compressors	5410	High pressure shaft
Miscellaneous	Jet Engine	Inlet Air System and Compressors	Compressors	5411	High pressure bearings
Miscellaneous	Jet Engine	Inlet Air System and Compressors	Compressors	5412	High pressure blades/buckets
Miscellaneous	Jet Engine	Inlet Air System and Compressors	Compressors	5413	Other high pressure problems
Miscellaneous	Jet Engine	Inlet Air System and Compressors	Compressors	5420	Low pressure shaft
Miscellaneous	Jet Engine	Inlet Air System and Compressors	Compressors	5421	Low pressure bearings
Miscellaneous	Jet Engine	Inlet Air System and Compressors	Compressors	5422	Low pressure blades/buckets
Miscellaneous	Jet Engine	Inlet Air System and Compressors	Compressors	5429	Other low pressure problems
Miscellaneous	Jet Engine	Inlet Air System and Compressors	Compressors	5430	Supercharging fans
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-96 Jet Engine: Inlet Air System and Compressors - Ducts and Filters					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Miscellaneous	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5400	Inlet air ducts
Miscellaneous	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5401	Inlet air vanes/nozzles
Miscellaneous	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5402	Inlet air filters
Miscellaneous	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5403	Inlet and exhaust cones
Miscellaneous	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5409	Other inlet air problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-97 Jet Engine: Miscellaneous (Jet Engine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5600	Reduction gear
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5601	Load shaft and bearings
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5605	Main coupling between the turbine and generator
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5606	Clutch
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5610	Intercoolers
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5620	Regenerators
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5630	Heat shields
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5640	Fire detection and extinguishing system
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5641	Fire in unit
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5645	Jet Engine Control System - data highway
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5646	Jet Engine Control System - hardware problems (including card failure)
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5647	Jet Engine Control System - internal and termination wiring
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5648	Jet Engine Control System - logic problems
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5649	Jet Engine Control System - upgrades
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5650	Other controls and instrumentation problems
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5660	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5661	Engine/compressor washing
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5662	Engine exchange
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5665	Engine shafts and bearings
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5670	Hot end inspection
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5672	Boroscope inspection
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5674	General unit inspection
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5680	Vibration (not engine) in unit not attributable to bearings or other components
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5685	Engine vibration
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5686	Jet engine lockout
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5690	Engine performance testing - individual engines (use code 9999 for total unit performance testing)
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5692	Turbine Overspeed Trip Test - Jet Engine
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5695	Synchronous condenser equipment
Miscellaneous	Jet Engine	Miscellaneous (Jet Engine)		5699	Other miscellaneous jet engine problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-98 Jet Engine: Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Jet Engine	Turbine		5480	High pressure shaft

Miscellaneous	Jet Engine	Turbine		5481	High pressure bearings
Miscellaneous	Jet Engine	Turbine		5482	High pressure blades/buckets
Miscellaneous	Jet Engine	Turbine		5483	High pressure nozzles/vanes
Miscellaneous	Jet Engine	Turbine		5484	High pressure casing/expansion joint
Miscellaneous	Jet Engine	Turbine		5485	Interstage gas passages
Miscellaneous	Jet Engine	Turbine		5486	High pressure shaft seals
Miscellaneous	Jet Engine	Turbine		5487	Thrust bearing
Miscellaneous	Jet Engine	Turbine		5489	Other high pressure problems
Miscellaneous	Jet Engine	Turbine		5490	Low pressure shaft
Miscellaneous	Jet Engine	Turbine		5491	Low pressure bearings
Miscellaneous	Jet Engine	Turbine		5492	Low pressure blades/buckets
Miscellaneous	Jet Engine	Turbine		5493	Low pressure nozzles/vanes
Miscellaneous	Jet Engine	Turbine		5494	Low pressure casing/expansion joints
Miscellaneous	Jet Engine	Turbine		5497	Other low pressure problems
Miscellaneous	Jet Engine	Turbine		5498	Expansion joints
Miscellaneous	Jet Engine	Turbine		5499	Shaft seals
Notes: 1) For use with Unit Codes 800–899.					

MISCELLANEOUS

TABLE B12-99 Miscellaneous: Instruments and Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Miscellaneous	Instruments and Controls		6200	Combined cycle instruments and controls. (Report instruments and controls specific to the gas turbine, steam turbine, boiler, generator, or balance of plant using the codes for the appropriate piece of equipment.)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-100 Miscellaneous: Plant and Auxiliaries

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Miscellaneous	Plant and Auxiliaries		6410	Steam wells/steam field piping problems
Miscellaneous	Miscellaneous	Plant and Auxiliaries		6415	Low steam pressure
Miscellaneous	Miscellaneous	Plant and Auxiliaries		6420	Condensate reinjection system
Miscellaneous	Miscellaneous	Plant and Auxiliaries		6430	Unit H2S emission limitations - regulatory
Miscellaneous	Miscellaneous	Plant and Auxiliaries		6435	Steam field H2S emission limitations - regulatory
Miscellaneous	Miscellaneous	Plant and Auxiliaries		6440	H2S abatement system problems - general
Miscellaneous	Miscellaneous	Plant and Auxiliaries		6450	Heat exchanger problems due to H2S abatement system
Miscellaneous	Miscellaneous	Plant and Auxiliaries		6460	Condenser problems due to H2S abatement system

Miscellaneous	Miscellaneous	Plant and Auxiliaries		6470	Cooling tower problems due to H2S abatement system
Miscellaneous	Miscellaneous	Plant and Auxiliaries		6480	Steam strainer plugging - mineral deposits
Miscellaneous	Miscellaneous	Plant and Auxiliaries		6490	Turbine plugging - mineral deposits
Miscellaneous	Miscellaneous	Plant and Auxiliaries		6499	Geothermal
Notes: 1) For use with Unit Codes 800–899.					

PERFORMANCE

TABLE B12-101 Performance: Performance

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Performance	Performance		9998	Black start testing
Miscellaneous	Performance	Performance		9999	Total unit performance testing (use appropriate codes for individual component testing)
Notes: 1) For use with Unit Codes 800–899.					

PERSONNEL OR PROCEDURAL ERRORS

TABLE B12-102 Personnel or Procedural Errors: Personnel or Procedural Errors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Personnel or Procedural Errors	Personnel or Procedural Errors		9900	Operator error
Miscellaneous	Personnel or Procedural Errors	Personnel or Procedural Errors		9910	Maintenance personnel error
Miscellaneous	Personnel or Procedural Errors	Personnel or Procedural Errors		9920	Contractor error
Miscellaneous	Personnel or Procedural Errors	Personnel or Procedural Errors		9930	Operating procedure error
Miscellaneous	Personnel or Procedural Errors	Personnel or Procedural Errors		9940	Maintenance procedure error
Miscellaneous	Personnel or Procedural Errors	Personnel or Procedural Errors		9950	Contractor procedure error
Miscellaneous	Personnel or Procedural Errors	Personnel or Procedural Errors		9960	Staff shortage
Notes: 1) For use with Unit Codes 800–899.					

POLLUTION CONTROL EQUIPMENT

Use this set of codes to report problems with flue gas desulphurization equipment and stack gas particulate removal equipment. If outages or deratings occur due to reasons other than equipment problems, use the set of codes for Regulatory, Safety, Environmental stack emission limits.

TABLE B12-103 Pollution Control Equipment: CO Reduction

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Pollution Control Equipment	CO Reduction		8840	CO Active catalyst
Miscellaneous	Pollution Control Equipment	CO Reduction		8841	CO Support materials
Miscellaneous	Pollution Control Equipment	CO Reduction		8842	CO Plugging
Miscellaneous	Pollution Control Equipment	CO Reduction		8845	Other CO reduction problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-104 Pollution Control Equipment: Continuous Emissions Monitoring Systems (CEMS)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8700	CEMS Certification and Recertification
Miscellaneous	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8710	SO2 analyzer problems
Miscellaneous	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8720	NOx analyzer problems
Miscellaneous	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8730	CO analyzer problems
Miscellaneous	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8740	CO2 analyzer problems
Miscellaneous	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8750	O2 analyzer problems
Miscellaneous	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8760	Opacity monitor problems
Miscellaneous	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8770	Flow monitor problems
Miscellaneous	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8780	Data acquisition system problems

Miscellaneous	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8790	Miscellaneous CEMS problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-105 Pollution Control Equipment: Dry Scrubbers - Dry Scrubber

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8528	Dry scrubber instruments and controls
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8529	Gas dispersers
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8530	Spray towers
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8531	Spray machine/atomizer
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8532	Spray machine/atomizer motors
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8533	Spray machine/atomizer lubrication systems
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8534	Spray machine/atomizer vibration problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-106 Pollution Control Equipment: Dry Scrubbers - Miscellaneous (Dry Scrubber)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8544	Mechanical failures
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8545	Electrical failures
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8546	Major overhaul
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8547	Inspection
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8548	Testing
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8549	Other dry scrubber problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-107 Pollution Control Equipment: Dry Scrubbers - Piping, Ducting, and Dampers					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8522	Piping
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8523	Valves
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8524	Strainers or filters
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8525	Ducting
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8526	Dampers
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8527	Other piping, ducting, and damper problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-108 Pollution Control Equipment: Dry Scrubbers - Reagent\Slurry Supply					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8500	Slurry storage and feed tanks
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8501	Reagent storage, feed bins, and conveyors
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8502	Weigh feeders
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8503	Screw conveyors
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8504	Mills/slakers
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8505	Scalping screens
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8506	Slurry pipelines
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8507	Reagent uploading and transfer systems
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8508	Reagent unavailability

Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8510	Slurry mixers and agitators
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8520	Slurry transfer pumps and motors
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8521	Reagent/slurry problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-109 Pollution Control Equipment: Dry Scrubbers - Waste Disposal and Recovery

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8535	Fly ash conveyors
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8536	Bucket elevators
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8537	Weigh hoppers
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8538	Recycle storage and feed tanks including agitators
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8539	Recycle slurry transfer pumps
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8540	Waste disposal
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8541	Recycle feed bins
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8542	Recycle feed bins aeration systems
Miscellaneous	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8543	Powder coolers
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-110 Pollution Control Equipment: Miscellaneous (Pollution Control Equipment)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8565	Electrostatic Precipitator rebuild/overhaul
Miscellaneous	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8600	Flue gas additives (furnace injection)

Miscellaneous	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8601	SO3 mitigation
Miscellaneous	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8620	Mercury Abatement Equipment
Miscellaneous	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8650	Baghouse systems, general
Miscellaneous	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8651	Bag failures and rebagging
Miscellaneous	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8652	Shakers and rappers
Miscellaneous	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8653	Inflation and deflation fans and motors
Miscellaneous	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8654	Baghouse booster fans and motors
Miscellaneous	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8655	Structural duct work and dampers
Miscellaneous	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8656	Controls and instrumentation
Miscellaneous	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8657	Ash handling system and hoppers
Miscellaneous	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8658	Slurry system from precipitators
Miscellaneous	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8670	Emission monitors (other than CEMS)
Miscellaneous	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8699	Other miscellaneous pollution control equipment problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-111 Pollution Control Equipment: NOx Reduction Systems - Catalytic Air Heaters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8830	CAH NOx Active catalyst
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8831	CAH NOx Support materials
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8832	CAH NOx Plugging
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8835	Other CAH problems

Notes: 1) For use with Unit Codes 800–899. 2) Use code 360 for Low NOx Burners.

TABLE B12-112 Pollution Control Equipment: NOx Reduction Systems - Selective Catalytic Reduction Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8810	SCR NOx Reactor
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8811	SCR NOx Reagent
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8812	SCR NOx Catalyst
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8813	SCR NOx Injection grid piping/valves
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8814	SCR NOx Catalyst support material
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8815	SCR NOx Soot blowers
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8816	SCR NOx Plugging
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8817	SCR NOx Control system
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8820	SCR NOx Ammonia injection grid piping/valves
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8821	SCR NOx Ammonia tanks, piping and valves (not injection)
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8822	SCR NOx Ammonia air blowers
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8823	SCR NOx Other ammonia system problems
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8825	Other SCR NOx problems

Notes: 1) For use with Unit Codes 800–899. 2) Use code 360 for Low NOx Burners.

TABLE B12-113 Pollution Control Equipment: NOx Reduction Systems - Selective Non-Catalytic Reduction Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8800	SNCR NOx Reagent

Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8801	SNCR NOx Carrier gas
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8802	SNCR NOx Control system
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8803	SNCR Performance Testing
Miscellaneous	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8809	Other SNCR NOx problems
Notes: 1) For use with Unit Codes 800–899. 2) Use code 360 for Low NOx Burners.					

TABLE B12-114 Pollution Control Equipment: Precipitators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Pollution Control Equipment	Precipitators		8550	Electrostatic precipitator fouling
Miscellaneous	Pollution Control Equipment	Precipitators		8551	Electrostatic precipitator field out of service
Miscellaneous	Pollution Control Equipment	Precipitators		8560	Electrostatic precipitator problems
Miscellaneous	Pollution Control Equipment	Precipitators		8570	Mechanical precipitator fouling
Miscellaneous	Pollution Control Equipment	Precipitators		8580	Mechanical precipitator problems
Miscellaneous	Pollution Control Equipment	Precipitators		8590	Other precipitator problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-115 Pollution Control Equipment: Wet Scrubbers - Chemical Supply

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8000	Chemical feed storage, mill feeders, and conveyors
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8002	Screw conveyors
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8003	Bucket elevators
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8006	Weigh feeders

Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8010	Crushers/mills
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8020	Mill slurry tanks supply problems
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8030	Classifiers
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8040	Slurry transfer pumps and motors
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8050	Chemical unavailability
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8099	Other chemical supply problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-116 Pollution Control Equipment: Wet Scrubbers - Miscellaneous (Wet Scrubber)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8400	Scrubber gas discharge reheaters - general
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8402	Scrubber gas discharge reheaters - vibration
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8404	Scrubber gas discharge reheaters - tube leaks
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8406	Scrubber gas discharge reheaters - ducts
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8410	Scrubber instruments and controls
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8415	Liquid level controls
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8420	Heat tracer
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8425	Miscellaneous mechanical failures
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8426	Miscellaneous electrical failures
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8430	Stack damage related to scrubber system
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8440	Major overhaul

Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8450	Inspection
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8460	Testing
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8470	SO2 monitor
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8499	Other miscellaneous wet scrubber problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-117 Pollution Control Equipment: Wet Scrubbers - Piping, Ducting, Dampers, and Fans

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8200	Piping
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8210	Valves
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8220	Strainers or filters
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8225	Drain pots
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8230	Ducting
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8235	Demister
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8240	Bypass dampers
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8250	Dampers other than bypass
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8260	Scrubber booster I.D. fan (fan specific to the scrubber)
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8261	Scrubber booster I.D. fan drive
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8262	Scrubber booster I.D. fan vibration (fan specific to the scrubber)
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8264	Scrubber booster I.D. fan blades (fan specific to the scrubber)
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8265	Scrubber booster I.D. fan dampers

Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8270	Scrubber booster F.D. fan (fan specific to the scrubber)
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8271	Scrubber booster F.D. fan drive
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8272	Scrubber booster F.D. fan vibration (fan specific to the scrubber)
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8274	Scrubber booster F.D. fan blades (fan specific to the scrubber)
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8275	Scrubber booster F.D. fan dampers
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8280	Reagent feed piping
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8290	Demister wash piping assembly
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8299	Other piping, ducting, damper, and fan problems
Notes: 1) For use with Unit Codes 800–899. 2) Use code 9510 for outages or deratings required to install pollution control equipment. Use codes 9600 to 9650 only when the pollution control equipment problems are not responsible for exceeding emission limits.					

TABLE B12-118 Pollution Control Equipment: Wet Scrubbers - Waste Disposal and Recovery

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8300	Waste disposal/recovery tanks
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8310	Waste disposal/recovery pumps
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8320	Waste disposal ponds
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8325	Ash disposal problems
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8330	Dewatering equipment (thickener, centrifuge, etc.)
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8335	Dryers
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8340	Centrifuge/vacuum filter
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8345	Calciners

Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8349	Other waste disposal and recovery problems
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8399	Solids conveying and mixing system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-119 Pollution Control Equipment: Wet Scrubbers - Wet Scrubber

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8100	Scrubber/absorber tower or module
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8110	Spray nozzles
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8115	Disc scrubber throats
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8120	Spray pumps and motors
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8125	Scrubber recycle (liquid) pumps
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8127	Scrubber recycle (liquid) pump motors
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8130	Recirculation tanks including agitators
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8140	Reaction tanks including agitators
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8150	Tubes
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8160	Mist eliminators/demisters and washdown
Miscellaneous	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8199	Other scrubber problems
Notes: 1) For use with Unit Codes 800–899.					

REGULATORY, SAFETY, ENVIRONMENTAL

Use these codes only for events not directly attributable to equipment failures. Inspections or testing of certain equipment due to regulation are reported using the appropriate equipment cause codes, and the fact that it was a regulatory requirement noted in the verbal description section.

TABLE B12-120 Regulatory, Safety, Environmental: Other Operating Environmental Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9660	Thermal discharge limits - fossil and nuclear
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9663	Thermal discharge limits - gas turbines
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9664	Thermal discharge limits - jet engines
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9665	Thermal discharge limits (Internal Combustion/Reciprocating Engines)
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9670	Noise limits (not for personnel safety) - fossil and nuclear
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9673	Noise limits (not for personnel safety) - gas turbines
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9674	Noise limits (not for personnel safety) - jet engines
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9675	Noise limits (not for personnel safety) (Internal Combustion/Reciprocating Engines)
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9676	Noise limits (not for personnel safety) - hydro and pumped storage
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9677	Noise limits testing - fossil
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9678	Noise limits testing - gas turbines
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9679	Noise limits testing - jet engines
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9680	Fish kill - fossil and nuclear
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9683	Fish kill - gas turbines
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9684	Fish kill - jet engines
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9685	Fish kill (Internal Combustion/Reciprocating Engines)
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9686	Fish kill - hydro and pumped storage
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9690	Other miscellaneous operational environmental limits - fossil and nuclear

Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9693	Other miscellaneous operational environmental limits - gas turbines
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9694	Other miscellaneous operational environmental limits - jet engines
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9695	Other miscellaneous operational environmental limits (Internal Combustion/Reciprocating Engines)
Miscellaneous	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9696	Other miscellaneous operational environmental limits - hydro and pumped storage
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-121 Regulatory, Safety, Environmental: Regulatory

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Regulatory, Safety, Environmental	Regulatory		9504	Regulatory (environmental) proceedings and hearings - regulatory agency initiated
Miscellaneous	Regulatory, Safety, Environmental	Regulatory		9506	Regulatory (environmental) proceedings and hearings - intervenor initiated
Miscellaneous	Regulatory, Safety, Environmental	Regulatory		9510	Plant modifications strictly for compliance with new or changed regulatory requirements (scrubbers, cooling towers, etc.)
Miscellaneous	Regulatory, Safety, Environmental	Regulatory		9520	Oil spill in Gulf of Mexico (OMC)
Miscellaneous	Regulatory, Safety, Environmental	Regulatory		9590	Miscellaneous regulatory (this code is primarily intended for use with event contribution code 2 to indicate that a regulatory-related factor contributed to the primary cause of the event)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-122 Regulatory, Safety, Environmental: Safety

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Regulatory, Safety, Environmental	Safety		9700	OSHA-related retrofit or inspection
Miscellaneous	Regulatory, Safety, Environmental	Safety		9720	Other safety problems

Notes: 1) For use with Unit Codes 800–899.

TABLE B12-123 Regulatory, Safety, Environmental: Stack Emission					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9600	SO2 stack emissions - fossil
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9603	SO2 stack emissions - gas turbines
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9604	SO2 stack emissions - jet engines
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9605	SO2 stack emissions (Internal Combustion/Reciprocating Engines)
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9610	NOx stack emissions - fossil
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9613	NOx stack emissions - gas turbines
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9614	NOx stack emissions - jet engines
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9615	NOx stack emissions (Internal Combustion/Reciprocating Engines)
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9616	CO stack emissions - fossil
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9620	Particulate stack emissions - fossil
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9623	Particulate stack emissions - gas turbines
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9624	Particulate stack emissions - jet engines
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9625	Particulate stack emissions (Internal Combustion/Reciprocating Engines)
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9630	Opacity - fossil
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9633	Opacity - gas turbines
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9634	Opacity - jet engines
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9635	Opacity (Internal Combustion/Reciprocating Engines)

Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9650	Other stack/exhaust emissions - fossil (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9653	Other stack or exhaust emissions - gas turbines (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9654	Other stack or exhaust emissions - jet engines (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9655	Other stack or exhaust emissions (Internal Combustion/Reciprocating Engines)
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9656	Other stack or exhaust emissions testing - fossil
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9657	Other stack or exhaust emissions testing - gas turbines
Miscellaneous	Regulatory, Safety, Environmental	Stack Emission		9658	Other stack or exhaust emissions testing - jet engines
Notes: 1) For use with Unit Codes 800–899. 2) Include exhaust emissions.					

STEAM TURBINE

Besides the turbine, this set includes the steam stop/control valves, turbine control system, and the turbine auxiliaries. The extraction steam codes are contained in the Balance of Plant set.

TABLE B12-124 Steam Turbine: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Steam Turbine	Controls		4290	Hydraulic system pumps
Miscellaneous	Steam Turbine	Controls		4291	Hydraulic system coolers
Miscellaneous	Steam Turbine	Controls		4292	Hydraulic system filters
Miscellaneous	Steam Turbine	Controls		4293	Hydraulic system pipes and valves
Miscellaneous	Steam Turbine	Controls		4299	Other hydraulic system problems
Miscellaneous	Steam Turbine	Controls		4300	Turbine supervisory system (use codes 4290 to 4299 for hydraulic oil)
Miscellaneous	Steam Turbine	Controls		4301	Turbine governing system

Miscellaneous	Steam Turbine	Controls		4302	Turbine trip devices (including instruments)
Miscellaneous	Steam Turbine	Controls		4303	Exhaust hood and spray controls
Miscellaneous	Steam Turbine	Controls		4304	Automatic turbine control systems - mechanical
Miscellaneous	Steam Turbine	Controls		4305	Automatic turbine control systems - mechanical - hydraulic
Miscellaneous	Steam Turbine	Controls		4306	Automatic turbine control systems - electro-hydraulic - analog
Miscellaneous	Steam Turbine	Controls		4307	Automatic turbine control systems - electro-hydraulic - digital
Miscellaneous	Steam Turbine	Controls		4308	Automatic turbine control systems - digital control and monitoring
Miscellaneous	Steam Turbine	Controls		4309	Other turbine instrument and control problems
Miscellaneous	Steam Turbine	Controls		4310	Steam Turbine Control System - data highway
Miscellaneous	Steam Turbine	Controls		4311	Steam Turbine Control System - hardware problems (including card failure)
Miscellaneous	Steam Turbine	Controls		4312	Steam Turbine Control System - internal and termination wiring
Miscellaneous	Steam Turbine	Controls		4313	Steam Turbine Control System - logic problems
Miscellaneous	Steam Turbine	Controls		4314	Steam Turbine Control System - upgrades
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-125 Steam Turbine: High Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Steam Turbine	High Pressure Turbine		4000	Outer casing
Miscellaneous	Steam Turbine	High Pressure Turbine		4001	Inner casing
Miscellaneous	Steam Turbine	High Pressure Turbine		4009	Nozzle bolting
Miscellaneous	Steam Turbine	High Pressure Turbine		4010	Nozzles and nozzle blocks
Miscellaneous	Steam Turbine	High Pressure Turbine		4011	Diaphragms
Miscellaneous	Steam Turbine	High Pressure Turbine		4012	Buckets or blades
Miscellaneous	Steam Turbine	High Pressure Turbine		4013	Diaphragms unit and shroud type
Miscellaneous	Steam Turbine	High Pressure Turbine		4014	Bucket or blade fouling

Miscellaneous	Steam Turbine	High Pressure Turbine		4015	Wheels or spindles
Miscellaneous	Steam Turbine	High Pressure Turbine		4020	Shaft seals
Miscellaneous	Steam Turbine	High Pressure Turbine		4021	Dummy rings
Miscellaneous	Steam Turbine	High Pressure Turbine		4022	Gland rings
Miscellaneous	Steam Turbine	High Pressure Turbine		4030	Rotor shaft
Miscellaneous	Steam Turbine	High Pressure Turbine		4040	Bearings
Miscellaneous	Steam Turbine	High Pressure Turbine		4041	Thrust bearings
Miscellaneous	Steam Turbine	High Pressure Turbine		4099	Other high pressure turbine problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-126 Steam Turbine: Intermediate Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Steam Turbine	Intermediate Pressure Turbine		4100	Outer casing
Miscellaneous	Steam Turbine	Intermediate Pressure Turbine		4101	Inner casing
Miscellaneous	Steam Turbine	Intermediate Pressure Turbine		4109	Nozzle bolting
Miscellaneous	Steam Turbine	Intermediate Pressure Turbine		4110	Nozzles and nozzle blocks
Miscellaneous	Steam Turbine	Intermediate Pressure Turbine		4111	Diaphragms
Miscellaneous	Steam Turbine	Intermediate Pressure Turbine		4112	Buckets or blades
Miscellaneous	Steam Turbine	Intermediate Pressure Turbine		4113	Bucket or blade fouling
Miscellaneous	Steam Turbine	Intermediate Pressure Turbine		4115	Wheels or spindles
Miscellaneous	Steam Turbine	Intermediate Pressure Turbine		4120	Shaft seals
Miscellaneous	Steam Turbine	Intermediate Pressure Turbine		4121	Dummy rings
Miscellaneous	Steam Turbine	Intermediate Pressure Turbine		4122	Gland rings
Miscellaneous	Steam Turbine	Intermediate Pressure Turbine		4130	Rotor shaft
Miscellaneous	Steam Turbine	Intermediate Pressure Turbine		4140	Bearings
Miscellaneous	Steam Turbine	Intermediate Pressure Turbine		4141	Thrust bearings
Miscellaneous	Steam Turbine	Intermediate Pressure Turbine		4199	Other intermediate pressure turbine problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-127 Steam Turbine: Low Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Steam Turbine	Low Pressure Turbine		4200	Outer casing
Miscellaneous	Steam Turbine	Low Pressure Turbine		4201	Inner casing
Miscellaneous	Steam Turbine	Low Pressure Turbine		4209	Nozzle bolting
Miscellaneous	Steam Turbine	Low Pressure Turbine		4210	Nozzles and nozzle blocks

Miscellaneous	Steam Turbine	Low Pressure Turbine		4211	Diaphragms
Miscellaneous	Steam Turbine	Low Pressure Turbine		4212	Buckets or blades
Miscellaneous	Steam Turbine	Low Pressure Turbine		4213	Bucket or blade fouling
Miscellaneous	Steam Turbine	Low Pressure Turbine		4215	Wheels or spindles
Miscellaneous	Steam Turbine	Low Pressure Turbine		4220	Shaft seals
Miscellaneous	Steam Turbine	Low Pressure Turbine		4221	Dummy rings
Miscellaneous	Steam Turbine	Low Pressure Turbine		4222	Gland rings
Miscellaneous	Steam Turbine	Low Pressure Turbine		4230	Rotor shaft
Miscellaneous	Steam Turbine	Low Pressure Turbine		4240	Bearings
Miscellaneous	Steam Turbine	Low Pressure Turbine		4241	Thrust bearings
Miscellaneous	Steam Turbine	Low Pressure Turbine		4250	Other low pressure turbine problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-128 Steam Turbine: Lube Oil

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Steam Turbine	Lube Oil		4280	Lube oil pumps
Miscellaneous	Steam Turbine	Lube Oil		4281	Lube oil coolers
Miscellaneous	Steam Turbine	Lube Oil		4282	Lube oil conditioners
Miscellaneous	Steam Turbine	Lube Oil		4283	Lube oil system valves and piping
Miscellaneous	Steam Turbine	Lube Oil		4284	Lube oil pump drive
Miscellaneous	Steam Turbine	Lube Oil		4289	Other lube oil system problems
Notes: 1) For use with Unit Codes 800–899. 2) Do not include bearing failures due to lube oil.					

TABLE B12-129 Steam Turbine: Miscellaneous (Steam Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Steam Turbine	Miscellaneous (Steam Turbine)		4400	Major turbine overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Miscellaneous	Steam Turbine	Miscellaneous (Steam Turbine)		4401	Inspection
Miscellaneous	Steam Turbine	Miscellaneous (Steam Turbine)		4402	Minor turbine overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Miscellaneous	Steam Turbine	Miscellaneous (Steam Turbine)		4410	Turning gear and motor
Miscellaneous	Steam Turbine	Miscellaneous (Steam Turbine)		4411	Steam turbine gear box (single shaft configuration)

Miscellaneous	Steam Turbine	Miscellaneous (Steam Turbine)		4412	Steam turbine clutch (single shaft configuration)
Miscellaneous	Steam Turbine	Miscellaneous (Steam Turbine)		4415	Shaft coupling mechanism
Miscellaneous	Steam Turbine	Miscellaneous (Steam Turbine)		4420	Vibration of the turbine generator unit that cannot be attributed to a specific cause such as bearings or blades (use this code for balance moves)
Miscellaneous	Steam Turbine	Miscellaneous (Steam Turbine)		4430	Gland seal system
Miscellaneous	Steam Turbine	Miscellaneous (Steam Turbine)		4440	Moisture separator/reheater (nuclear including MSR drains, controls, etc.)
Miscellaneous	Steam Turbine	Miscellaneous (Steam Turbine)		4445	Steam reheater
Miscellaneous	Steam Turbine	Miscellaneous (Steam Turbine)		4450	Water induction
Miscellaneous	Steam Turbine	Miscellaneous (Steam Turbine)		4460	Turbine overspeed trip test
Miscellaneous	Steam Turbine	Miscellaneous (Steam Turbine)		4470	Differential expansion
Miscellaneous	Steam Turbine	Miscellaneous (Steam Turbine)		4490	Turbine performance testing (use code 9999 for total unit performance testing)
Miscellaneous	Steam Turbine	Miscellaneous (Steam Turbine)		4499	Other miscellaneous steam turbine problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-130 Steam Turbine: Piping

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Steam Turbine	Piping		4270	Crossover or under piping
Miscellaneous	Steam Turbine	Piping		4279	Miscellaneous turbine piping
Notes: 1) For use with Unit Codes 800–899.					

TABLE B12-131 Steam Turbine: Valves

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Miscellaneous	Steam Turbine	Valves		4260	Main stop valves
Miscellaneous	Steam Turbine	Valves		4261	Control valves
Miscellaneous	Steam Turbine	Valves		4262	Intercept valves
Miscellaneous	Steam Turbine	Valves		4263	Reheat stop valves
Miscellaneous	Steam Turbine	Valves		4264	Combined intercept valves
Miscellaneous	Steam Turbine	Valves		4265	Miscellaneous drain and vent valves
Miscellaneous	Steam Turbine	Valves		4266	Main stop valve testing
Miscellaneous	Steam Turbine	Valves		4267	Control valve testing

Miscellaneous	Steam Turbine	Valves		4268	Reheat/intercept valve testing
Miscellaneous	Steam Turbine	Valves		4269	Other turbine valves (including LP steam admission valves)
Notes: 1) For use with Unit Codes 800–899.					

Appendix B13: Index To Multi-boiler/Multi-turbine Unit Cause Codes

MULTI-BOILER/MULTI-TURBINE UNITS

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
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B13-2	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems
B13-3	Balance of Plant	Auxiliary Systems	Fire Protection System
B13-4	Balance of Plant	Auxiliary Systems	Instrument Air
B13-5	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System
B13-6	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)
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B13-10	Balance of Plant	Auxiliary Systems	Service Water (Open System)
B13-11	Balance of Plant	Circulating Water Systems	
B13-12	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators
B13-13	Balance of Plant	Condensate System	Miscellaneous (Condensate System)
B13-14	Balance of Plant	Condensate System	Polishers/Chemical Addition
B13-15	Balance of Plant	Condensate System	Pumps, Piping, and Valves
B13-16	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals
B13-17	Balance of Plant	Condensing System	Condenser Controls
B13-18	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment
B13-19	Balance of Plant	Condensing System	Miscellaneous (Condensing System)
B13-20	Balance of Plant	Condensing System	Vacuum Equipment
B13-21	Balance of Plant	Electrical	
B13-22	Balance of Plant	Extraction Steam	
B13-23	Balance of Plant	Feedwater System	
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B13-26	Balance of Plant	Power Station Switchyard	
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B13-28	Boiler	Bed Material Preparation System (FBC only)	
B13-29	Boiler	Bed Material Removal System	
B13-30	Boiler	Bed Solids Recirculation	
B13-31	Boiler	Boiler Air and Gas Systems	Air Supply
B13-32	Boiler	Boiler Air and Gas Systems	Flue Gas

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
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B13-34	Boiler	Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)
B13-35	Boiler	Boiler Control Systems	
B13-36	Boiler	Boiler Design Limitations	
B13-37	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners
B13-38	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone
B13-39	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)
B13-40	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts
B13-41	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers
B13-42	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)
B13-43	Boiler	Boiler Internals and Structures	
B13-44	Boiler	Boiler Overhaul and Inspections	
B13-45	Boiler	Boiler Piping System	Boiler Recirculation
B13-46	Boiler	Boiler Piping System	Cold and Hot Reheat Steam
B13-47	Boiler	Boiler Piping System	Desuperheaters/Attemperators
B13-48	Boiler	Boiler Piping System	Feedwater and Blowdown
B13-49	Boiler	Boiler Piping System	Main Steam
B13-50	Boiler	Boiler Piping System	Miscellaneous (Piping)
B13-51	Boiler	Boiler Piping System	Startup Bypass
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B13-53	Boiler	Boiler Tube Leaks	
B13-54	Boiler	Boiler Water Condition	
B13-55	Boiler	External Fluidized Bed Heat Exchanger	
B13-56	Boiler	Miscellaneous (Boiler)	
B13-57	Boiler	Miscellaneous Boiler Tube Problems	
B13-58	Boiler	Slag and Ash Removal	
B13-59	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)
B13-60	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)
B13-61	Expander Turbine	Expander Turbine	
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INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
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B13-67	Gas Turbine	Exhaust Systems	
B13-68	Gas Turbine	Fuel, Ignition, and Combustion Systems	
B13-69	Gas Turbine	Inlet Air System and Compressors	Compressors
B13-70	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters
B13-71	Gas Turbine	Miscellaneous (Gas Turbine)	
B13-72	Gas Turbine	Turbine	
B13-73	Generator	Controls	
B13-74	Generator	Cooling System	
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B13-77	Generator	Miscellaneous (Generator)	
B13-78	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)	
B13-79	Inactive States	Inactive States	
B13-80	Jet Engine	Auxiliary Systems	
B13-81	Jet Engine	Exhaust Systems	
B13-82	Jet Engine	Fuel, Ignition, and Combustion Systems	
B13-83	Jet Engine	Inlet Air System and Compressors	Compressors
B13-84	Jet Engine	Inlet Air System and Compressors	Ducts and Filters
B13-85	Jet Engine	Miscellaneous (Jet Engine)	
B13-86	Jet Engine	Turbine	
B13-87	Miscellaneous	Instruments and Controls	
B13-88	Performance	Performance	
B13-89	Personnel or Procedural Errors	Personnel or Procedural Errors	
B13-90	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)	
B13-91	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber
B13-92	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)
B13-93	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers
B13-94	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply
B13-95	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery
B13-96	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)	
B13-97	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters
B13-98	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems
B13-99	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems
B13-100	Pollution Control Equipment	Precipitators	
B13-101	Pollution Control Equipment	Wet Scrubbers	Chemical Supply

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B13-102	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)
B13-103	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans
B13-104	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery
B13-105	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber
B13-106	Regulatory, Safety, Environmental	Other Operating Environmental Limitations	
B13-107	Regulatory, Safety, Environmental	Regulatory	
B13-108	Regulatory, Safety, Environmental	Safety	
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B13-115	Steam Turbine	Miscellaneous (Steam Turbine)	
B13-116	Steam Turbine	Piping	
B13-117	Steam Turbine	Valves	

BALANCE OF PLANT

TABLE B13-1 Balance of Plant: Auxiliary Systems - Auxiliary Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3830	Auxiliary boiler
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3831	Auxiliary steam piping
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3832	Auxiliary steam valves
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3833	Auxiliary steam controls and instruments
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3834	Auxiliary boiler tube leaks
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3835	Auxiliary boiler burner management system
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3836	Steam transfer to other unit

Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3839	Other auxiliary steam problems (also see extraction steam codes 3520 to 3529; startup bypass codes 0630 to 0660; and soot blower steam code 0870)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-2 Balance of Plant: Auxiliary Systems - Closed Cooling Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3820	Closed cooling water pumps and motors
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3821	Closed cooling water piping
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3822	Closed cooling water valves
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3823	Closed cooling water heat exchangers
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3824	Closed cooling water system fouling
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3825	Closed cooling water instrumentation
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3826	Closed cooling water strainer
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3829	Other closed cooling water system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-3 Balance of Plant: Auxiliary Systems - Fire Protection System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Fire Protection System	3860	Fire protection system pumps
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Fire Protection System	3861	Fire protection system piping
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Fire Protection System	3862	Fire protection system valves
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Fire Protection System	3863	Fire protection system fouling

Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Fire Protection System	3864	Fire protection system instrumentation and controls
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Fire Protection System	3869	Other fire protection system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-4 Balance of Plant: Auxiliary Systems - Instrument Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Instrument Air	3850	Instrument air compressors
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Instrument Air	3851	Instrument air piping
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Instrument Air	3852	Instrument air valves
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Instrument Air	3853	Instrument air dryers
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Instrument Air	3854	N2 backup to instrument air
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Instrument Air	3859	Other instrument air problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-5 Balance of Plant: Auxiliary Systems - Low-pressure Gas Compression System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3870	Fuel Gas Compressor and Motors
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3871	Fuel Gas Compressor Piping
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3875	Fuel Gas Compressor Filters
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3876	Fuel Gas Compressor Fire System
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3879	Fuel Gas Compressor - other
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-6 Balance of Plant: Auxiliary Systems - Miscellaneous (Auxiliary Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3898	Miscellaneous plant auxiliary process and services instrumentation and controls
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3899	Other miscellaneous auxiliary system problems
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	6299	Other combined cycle block problems (Use other gas turbine problem codes, other steam turbine codes, etc., whenever appropriate.)
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	6399	Other coal gasification equipment problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-7 Balance of Plant: Auxiliary Systems - Open Cooling Water System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3800	Open cooling water pumps and motors
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3801	Open cooling water piping
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3802	Open cooling water valves
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3803	Open cooling water heat exchangers
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3804	Open cooling water system fouling
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3805	Open cooling water system instrumentation
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3806	Open cooling water strainer
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3809	Other open cooling water problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-8 Balance of Plant: Auxiliary Systems - Seal Air Fans

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Seal Air Fans	3880	Seal air fan
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Seal Air Fans	3881	Seal air fan drive - motor
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Seal Air Fans	3882	Seal air control dampers and drives
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Seal Air Fans	3883	Seal air filters
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Seal Air Fans	3889	Other seal air fan problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-9 Balance of Plant: Auxiliary Systems - Service Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Service Air	3840	Service air compressors
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Service Air	3841	Service air piping
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Service Air	3842	Service air valves
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Service Air	3843	Service air dryers
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Service Air	3844	Soot blowing air compressor and system
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Service Air	3849	Other service air problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-10 Balance of Plant: Auxiliary Systems - Service Water (Open System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3810	Service water pumps and motors
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3811	Service water piping
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3812	Service water valves

Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3813	Service water heat exchangers
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3814	Service water system fouling
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3815	Service water strainer
Multi-boiler/Multi-turbine	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3819	Other service water problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-11 Balance of Plant: Circulating Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3210	Circulating water pumps
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3211	Circulating water pump motors
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3220	Circulating water piping
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3221	Circulating water piping fouling
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3230	Circulating water valves
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3231	Waterbox
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3232	Condenser tube cleaning system including debris filter
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3233	Circulating water priming system
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3235	Cooling tower booster pump
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3236	Cooling tower booster motor
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3238	Cooling tower fan motors
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3239	Cooling tower fan motors - variable speed
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3240	Cooling tower fans

Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3241	Cooling tower efficiency below design
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3242	Cooling tower fill damage
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3243	Cooling tower icing
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3244	Cooling tower fires
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3245	Other cooling tower problems
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3246	Cooling tower fouling
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3247	Cooling tower instrumentation
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3248	Cooling Tower Overhaul
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3250	Circulating water system instruments and controls
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3260	Traveling screens
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3261	Traveling screen fouling
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3269	Circulating water biological conditions (ie, zebra mussels)
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3270	Intake system problems other than traveling screens
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3271	Intake grating fouling
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3272	Circulating water screenwash system
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3273	Debris in circulating water from outside sources (leaves, mud, etc.)
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3280	High circulating water temperature (not due to season, tower efficiency below design, or other listed equipment problem)
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3281	Circulating water tempering system
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3282	Circulating water cooling ponds

Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3285	Circulating water chemistry
Multi-boiler/Multi-turbine	Balance of Plant	Circulating Water Systems		3299	Other circulating water system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-12 Balance of Plant: Condensate System - Low/Intermediate Pressure Heater and Deaerators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3339	LP heater head leaks
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3340	LP heater tube leaks
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3341	Other LP heater - general
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3342	IP heater tube leaks
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3343	Other IP heater - general
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3344	Deaerator (including level control)
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3345	IP heater head leaks
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-13 Balance of Plant: Condensate System - Miscellaneous (Condensate System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3360	Condensate makeup and return (including storage tanks)
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3370	Condensate system controls and instrumentation (not hotwell level, heater level, or deaerator level controls; see codes 3150-3159, 3344, 3502).
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3380	Condensate coolers
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3399	Other miscellaneous condensate system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-14 Balance of Plant: Condensate System - Polishers/Chemical Addition					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Polishers/Chemical Addition	3350	Condensate polishing and filtering systems
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Polishers/Chemical Addition	3351	Chemical addition systems
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Polishers/Chemical Addition	3352	Feedwater chemistry (not specific to condenser, polishers, or chemical addition)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-15 Balance of Plant: Condensate System - Pumps, Piping, and Valves					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3300	Condensate water pre-treatment
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3310	Condensate/hotwell pumps
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3311	Condensate/hotwell pump motor
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3312	Condensate booster pump
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3313	Condensate booster pump motor
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3314	Condensate booster pump motor - variable speed
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3315	Condensate booster pump drive (other than 3313 and 3314)
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3320	Condensate piping
Multi-boiler/Multi-turbine	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3330	Condensate valves
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-16 Balance of Plant: Condensing System - Condenser Casing or Shell and Internals					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**

Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3120	Tube sheets
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3121	Expansion joint
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3122	Gaskets and seals
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3123	Hot well
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3124	Tube sheet fouling
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3129	Other condenser casing or shell and internal problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-17 Balance of Plant: Condensing System - Condenser Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Controls	3150	Hot well level controls
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Controls	3151	Vacuum pump and air ejector controls
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Controls	3152	Air-cooled condenser controls
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Controls	3159	Other condensing system controls and instruments
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-18 Balance of Plant: Condensing System - Condenser Tubes and Support Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3110	Condenser tube leaks
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3111	Condenser tube fouling shell side
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3112	Condenser tube fouling tube side
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3113	Condenser tube and water box cleaning (including circulating water flow reversal)

Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3114	Air-cooled condenser tubes
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3115	Air-cooled condenser pumps
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3116	Air-cooled condenser fans
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3117	Air-cooled condenser fan motors
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3118	Other Air-cooled condenser problems
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3119	Other condenser tube casing or shell and internal problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-19 Balance of Plant: Condensing System - Miscellaneous (Condensing System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3170	Condenser inspection (use code 3110 to report looking for tube leaks)
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3171	Air-cooled condenser inspections
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3180	Major condenser overhaul
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3185	Water side cathodic protection
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3186	Auxiliary condenser and associated equipment
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3190	Air leakage (for losses not attributable to previously noted equipment related codes)
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3199	Other miscellaneous condensing system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-20 Balance of Plant: Condensing System - Vacuum Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Vacuum Equipment	3130	Air ejectors

Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Vacuum Equipment	3131	Air ejector piping and valves
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Vacuum Equipment	3132	Inter and after condensers
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Vacuum Equipment	3133	Vacuum pumps
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Vacuum Equipment	3134	Vacuum pump piping and valves
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Vacuum Equipment	3135	Vacuum pump motor and auxiliaries
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Vacuum Equipment	3139	Other air extraction system problems - general
Multi-boiler/Multi-turbine	Balance of Plant	Condensing System	Vacuum Equipment	3149	Loss of vacuum not attributable to a particular component such as air ejectors or valves, or high back pressure not attributable to high circulating water temperature, or vacuum losses from a known cause.
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-21 Balance of Plant: Electrical

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3600	Switchyard transformers and associated cooling systems - external (OMC)
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3601	Switchyard transformers and associated cooling systems - external (not OMC)
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3610	Switchyard circuit breakers - external (not OMC)
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3611	Switchyard circuit breakers - external (OMC)
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3612	Switchyard system protection devices - external (OMC)
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3613	Switchyard system protection devices - external (not OMC)
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3618	Other switchyard equipment - external (not OMC)
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3619	Other switchyard equipment - external (OMC)

Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3620	Main transformer
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3621	Unit auxiliaries transformer
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3622	Station service startup transformer
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3623	Auxiliary generators
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3624	Auxiliary generator voltage supply system
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3629	Other switchyard or high voltage system problems - external
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3630	400-700 volt transformers
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3631	400-700 volt circuit breakers
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3632	400-700 volt conductors and buses
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3633	400-700 volt insulators
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3634	400-700 volt protection devices
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3639	Other 400-700 volt problems
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3640	AC instrument power transformers
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3641	AC Circuit breakers
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3642	AC Conductors and buses
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3643	AC Inverters
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3644	AC Protection devices
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3649	Other AC instrument power problems
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3650	DC instrument power battery chargers

Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3651	DC circuit breakers
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3652	DC conductors and buses
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3653	DC protection devices
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3659	Other DC power problems
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3660	4000-7000 volt transformers
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3661	4000-7000 volt circuit breakers
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3662	4000-7000 volt conductors and buses
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3663	4000-7000 volt insulators
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3664	4000-7000 volt protection devices
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3669	Other 4000-7000 volt problems
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3670	12-15kV transformers
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3671	12-15kV circuit breakers
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3672	12-15kV conductors and buses
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3673	12-15kV insulators
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3674	12-15kV protection devices
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3679	Other 12-15kV problems
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3680	Other voltage transformers
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3681	Other voltage circuit breakers
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3682	Other voltage conductors and buses

Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3683	Other voltage insulators
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3684	Other voltage protection devices
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3689	Other voltage problems
Multi-boiler/Multi-turbine	Balance of Plant	Electrical		3690	Station Service Power Distribution System, General
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-22 Balance of Plant: Extraction Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Extraction Steam		3520	HP Extraction steam piping
Multi-boiler/Multi-turbine	Balance of Plant	Extraction Steam		3521	HP Extraction steam valves
Multi-boiler/Multi-turbine	Balance of Plant	Extraction Steam		3522	HP Extraction steam instruments and controls
Multi-boiler/Multi-turbine	Balance of Plant	Extraction Steam		3529	Other HP extraction steam system problems
Multi-boiler/Multi-turbine	Balance of Plant	Extraction Steam		3530	IP Extraction steam piping
Multi-boiler/Multi-turbine	Balance of Plant	Extraction Steam		3531	IP Extraction steam valves
Multi-boiler/Multi-turbine	Balance of Plant	Extraction Steam		3532	IP Extraction steam instruments and controls
Multi-boiler/Multi-turbine	Balance of Plant	Extraction Steam		3539	Other IP extraction steam system problems
Multi-boiler/Multi-turbine	Balance of Plant	Extraction Steam		3540	LP Extraction steam piping
Multi-boiler/Multi-turbine	Balance of Plant	Extraction Steam		3541	LP Extraction steam valves
Multi-boiler/Multi-turbine	Balance of Plant	Extraction Steam		3542	LP Extraction steam instruments and controls
Multi-boiler/Multi-turbine	Balance of Plant	Extraction Steam		3549	Other LP extraction steam system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-23 Balance of Plant: Feedwater System					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3401	Startup feedwater pump
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3402	Startup feedwater pump drives - all types
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3407	Feedwater pump suction screens
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3408	Feedwater pump drive - local controls
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3409	Feedwater pump drive motor - variable speed
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3410	Feedwater pump
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3411	Feedwater pump drive - motor
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3412	Feedwater pump drive - steam turbine
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3413	Feedwater pump coupling and drive shaft
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3414	Feedwater pump local controls
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3415	Feedwater pump/drive lube oil system
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3416	Other feedwater pump problems
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3417	Feedwater pump drive - main shaft
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3418	Feedwater pump drive - other
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3419	Feedwater pump drive - gear
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3420	Feedwater piping and supports
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3430	Feedwater regulating (boiler level control) valve
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3431	Other feedwater valves

Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3439	HP heater head leaks
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3440	High pressure heater tube leaks
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3441	Other high pressure heater problems (see condensate system for LP and IP heater codes)
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3451	Feedwater booster pump suction screens
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3452	Feedwater booster pump drive - local controls
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3453	Feedwater booster pump drive motor - variable speed
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3454	Feedwater booster pump
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3455	Feedwater booster pump drive - motor
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3456	Feedwater booster pump drive - steam turbine
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3457	Feedwater booster pump coupling and drive shaft
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3458	Feedwater booster pump local controls
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3459	Feedwater booster pump/drive lube oil system
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3460	Other feedwater booster pump problems
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3461	Feedwater booster pump drive - main shaft
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3462	Feedwater booster pump drive - other
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3463	Feedwater booster pump drive - gear
Multi-boiler/Multi-turbine	Balance of Plant	Feedwater System		3499	Other feedwater system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-24 Balance of Plant: Heater Drain Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Multi-boiler/Multi-turbine	Balance of Plant	Heater Drain Systems		3501	Heater drain pumps
Multi-boiler/Multi-turbine	Balance of Plant	Heater Drain Systems		3502	Heater level control
Multi-boiler/Multi-turbine	Balance of Plant	Heater Drain Systems		3503	Heater drain piping
Multi-boiler/Multi-turbine	Balance of Plant	Heater Drain Systems		3504	Heater drain valves
Multi-boiler/Multi-turbine	Balance of Plant	Heater Drain Systems		3505	Heater drain pump drive
Multi-boiler/Multi-turbine	Balance of Plant	Heater Drain Systems		3509	Other heater drain system problems
Notes: 1) For use with Unit Codes 800–899. 2) Excluding extraction or drain systems.					

TABLE B13-25 Balance of Plant: Miscellaneous (Balance of Plant)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Miscellaneous (Balance of Plant)		3950	Process computer
Multi-boiler/Multi-turbine	Balance of Plant	Miscellaneous (Balance of Plant)		3960	Thermal derating (thermal efficiency losses in balance of plant when specific cause(s) unknown)
Multi-boiler/Multi-turbine	Balance of Plant	Miscellaneous (Balance of Plant)		3970	Distributive Control System (DCS) - process computer
Multi-boiler/Multi-turbine	Balance of Plant	Miscellaneous (Balance of Plant)		3971	DCS - data highway
Multi-boiler/Multi-turbine	Balance of Plant	Miscellaneous (Balance of Plant)		3972	DCS - hardware problems (including card failure)
Multi-boiler/Multi-turbine	Balance of Plant	Miscellaneous (Balance of Plant)		3973	DCS - internal and termination wiring
Multi-boiler/Multi-turbine	Balance of Plant	Miscellaneous (Balance of Plant)		3974	DCS - logic problems
Multi-boiler/Multi-turbine	Balance of Plant	Miscellaneous (Balance of Plant)		3975	DCS - upgrades
Multi-boiler/Multi-turbine	Balance of Plant	Miscellaneous (Balance of Plant)		3979	Other DCS problems
Multi-boiler/Multi-turbine	Balance of Plant	Miscellaneous (Balance of Plant)		3980	Programmable Logic Controller (PLC)

Multi-boiler/Multi-turbine	Balance of Plant	Miscellaneous (Balance of Plant)		3981	PLC - data highway
Multi-boiler/Multi-turbine	Balance of Plant	Miscellaneous (Balance of Plant)		3982	PLC - hardware problems (including card failure)
Multi-boiler/Multi-turbine	Balance of Plant	Miscellaneous (Balance of Plant)		3983	PLC - internal and termination wiring
Multi-boiler/Multi-turbine	Balance of Plant	Miscellaneous (Balance of Plant)		3984	PLC - logic problems
Multi-boiler/Multi-turbine	Balance of Plant	Miscellaneous (Balance of Plant)		3985	PLC - upgrades
Multi-boiler/Multi-turbine	Balance of Plant	Miscellaneous (Balance of Plant)		3989	Other PLC problems
Multi-boiler/Multi-turbine	Balance of Plant	Miscellaneous (Balance of Plant)		3998	Balance of plant overhaul/outage
Multi-boiler/Multi-turbine	Balance of Plant	Miscellaneous (Balance of Plant)		3999	Other miscellaneous balance of plant problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-26 Balance of Plant: Power Station Switchyard

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Power Station Switchyard		3700	Power Station switchyard (non generating unit equipment)
Multi-boiler/Multi-turbine	Balance of Plant	Power Station Switchyard		3710	Transmission line (connected to powerhouse switchyard to 1st Substation)
Multi-boiler/Multi-turbine	Balance of Plant	Power Station Switchyard		3720	Transmission equipment at the 1st substation (see code 9300 if applicable)
Multi-boiler/Multi-turbine	Balance of Plant	Power Station Switchyard		3730	Transmission equipment beyond the 1st substation (see code 9300 if applicable)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-27 Balance of Plant: Waste Water (zero discharge) Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Balance of Plant	Waste Water (zero discharge) Systems		3290	Waste water (zero discharge) tanks, pumps, and motors
Multi-boiler/Multi-turbine	Balance of Plant	Waste Water (zero discharge) Systems		3291	Waste water (zero discharge) system fouling

Multi-boiler/Multi-turbine	Balance of Plant	Waste Water (zero discharge) Systems		3292	Waste water (zero discharge) piping
Multi-boiler/Multi-turbine	Balance of Plant	Waste Water (zero discharge) Systems		3293	Waste water (zero discharge) valves
Multi-boiler/Multi-turbine	Balance of Plant	Waste Water (zero discharge) Systems		3294	Waste water (zero discharge) controls and instrumentation
Multi-boiler/Multi-turbine	Balance of Plant	Waste Water (zero discharge) Systems		3295	Other waste water (zero discharge) problems
Notes: 1) For use with Unit Codes 800–899.					

BOILER

This set of codes contains the following:

- Boiler
- Boiler internals (tubes, refractory, supports, etc.)
- All the fuel handling, storage, preparation, and burning equipment.
- The forced/induced draft air system.
- Slag and ash removal except for particulate and gas cleanup. These latter items are covered under pollution control equipment.
- The main steam and reheat steam systems up to but not including the turbine stop or isolation valves.
- The feedwater system downstream of the final valve prior to entry into the economizer or boiler.
- Boiler blowdown systems.
- The startup bypass system including drains up to the heaters or condenser.
- Boiler water chemistry problems not due to problems in the condensate/feedwater system, the chemical addition system, or the demineralizer/polisher system.
- The instruments and controls associated with the above equipment.

TABLE B13-28 Boiler: Bed Material Preparation System (FBC only)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Bed Material Preparation System (FBC only)		160	Bed material tanks/hoppers
Multi-boiler /Multi-turbine	Boiler	Bed Material Preparation System (FBC only)		162	Bed material conveyors
Multi-boiler /Multi-turbine	Boiler	Bed Material Preparation System (FBC only)		163	Bed material feeders
Multi-boiler /Multi-turbine	Boiler	Bed Material Preparation System (FBC only)		164	Bed material feeder motors

Multi-boiler /Multi-turbine	Boiler	Bed Material Preparation System (FBC only)		165	Bed material crushers
Multi-boiler /Multi-turbine	Boiler	Bed Material Preparation System (FBC only)		166	Bed material crusher motors
Multi-boiler /Multi-turbine	Boiler	Bed Material Preparation System (FBC only)		167	Bed material screens
Multi-boiler /Multi-turbine	Boiler	Bed Material Preparation System (FBC only)		168	Bed material blowers/fans
Multi-boiler /Multi-turbine	Boiler	Bed Material Preparation System (FBC only)		169	Bed material blower/fan motors
Multi-boiler /Multi-turbine	Boiler	Bed Material Preparation System (FBC only)		170	Bed material cyclone
Multi-boiler /Multi-turbine	Boiler	Bed Material Preparation System (FBC only)		171	Bed material baghouse
Multi-boiler /Multi-turbine	Boiler	Bed Material Preparation System (FBC only)		172	Bed material drying equipment
Multi-boiler /Multi-turbine	Boiler	Bed Material Preparation System (FBC only)		173	Bed material pneumatic transport system including piping and valves
Multi-boiler /Multi-turbine	Boiler	Bed Material Preparation System (FBC only)		174	Other bed material handling equipment
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-29 Boiler: Bed Material Removal System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Bed Material Removal System		930	Bed material coolers
Multi-boiler /Multi-turbine	Boiler	Bed Material Removal System		931	Bed material transport piping/valves
Multi-boiler /Multi-turbine	Boiler	Bed Material Removal System		932	Bed material transport tanks/hoppers
Multi-boiler /Multi-turbine	Boiler	Bed Material Removal System		933	Bed material fans/blowers
Multi-boiler /Multi-turbine	Boiler	Bed Material Removal System		934	Bed material fan/blower motors
Multi-boiler /Multi-turbine	Boiler	Bed Material Removal System		935	Bed material disposal conditioner
Multi-boiler /Multi-turbine	Boiler	Bed Material Removal System		936	Bed material conveyors

Multi-boiler /Multi-turbine	Boiler	Bed Material Removal System		937	Bed material mechanical separators and baghouse
Multi-boiler /Multi-turbine	Boiler	Bed Material Removal System		950	Other bed material system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-30 Boiler: Bed Solids Recirculation

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Bed Solids Recirculation		951	Char reinjection feeders
Multi-boiler /Multi-turbine	Boiler	Bed Solids Recirculation		952	Char reinjection piping/valves
Multi-boiler /Multi-turbine	Boiler	Bed Solids Recirculation		953	Char reinjection controls
Multi-boiler /Multi-turbine	Boiler	Bed Solids Recirculation		959	Other char reinjection equipment problems
Multi-boiler /Multi-turbine	Boiler	Bed Solids Recirculation		960	Char transport piping and valves
Multi-boiler /Multi-turbine	Boiler	Bed Solids Recirculation		961	Char transfer tanks/hoppers
Multi-boiler /Multi-turbine	Boiler	Bed Solids Recirculation		962	Char conditioner
Multi-boiler /Multi-turbine	Boiler	Bed Solids Recirculation		969	Other char equipment problems
Multi-boiler /Multi-turbine	Boiler	Bed Solids Recirculation		970	Flue gas-solids separator
Multi-boiler /Multi-turbine	Boiler	Bed Solids Recirculation		971	Flue gas-solids separator piping and valves
Multi-boiler /Multi-turbine	Boiler	Bed Solids Recirculation		972	Flue gas-solids separator controls
Multi-boiler /Multi-turbine	Boiler	Bed Solids Recirculation		973	Flue gas-solids separator refractory
Multi-boiler /Multi-turbine	Boiler	Bed Solids Recirculation		980	High pressure loop seal recirculation fans/blowers
Multi-boiler /Multi-turbine	Boiler	Bed Solids Recirculation		981	High pressure loop seal recirculation fan/blower motors
Multi-boiler /Multi-turbine	Boiler	Bed Solids Recirculation		982	High pressure loop seal recirculation fan/blower controls

Multi-boiler /Multi-turbine	Boiler	Bed Solids Recirculation		989	Other bed solids recirculation problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-31 Boiler: Boiler Air and Gas Systems - Air Supply

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Air Supply	1400	Forced draft fans
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Air Supply	1401	Forced draft fan dampers
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Air Supply	1407	Forced draft fan lubrication system
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Air Supply	1410	Forced draft fan motors
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Air Supply	1411	Forced draft fan motors - variable speed
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Air Supply	1412	Forced draft fan drives (other than motor)
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Air Supply	1413	Forced draft fan couplings
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Air Supply	1415	Forced draft fan controls
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Air Supply	1420	Other forced draft fan problems
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Air Supply	1421	Secondary air fans/blowers
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Air Supply	1422	Secondary air fan/blower motors - single speed
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Air Supply	1423	Secondary air fan/blower motors - variable speed
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Air Supply	1424	Secondary air fan/blower controls
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Air Supply	1430	Air supply ducts from FD fan
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Air Supply	1431	Air supply dampers from FD fan
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Air Supply	1432	Air supply duct expansion joints

Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Air Supply	1440	Air supply dampers
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Air Supply	1450	Other air supply problems
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Air Supply	1451	Fluidized Air Fan (FBC Only)
Notes: 1) For use with Unit Codes 800–899. 2) Excluding burner pipes, wind boxes, primary air, or pulverizer exhausters.					

TABLE B13-32 Boiler: Boiler Air and Gas Systems - Flue Gas

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1455	Induced draft fans
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1456	Induced draft fan dampers
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1457	Induced draft fan lubrication systems
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1460	Induced draft fan fouling
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1470	Induced draft fan motors and drives
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1471	Induced draft fan motors - variable speed
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1472	Inducted draft fan coupling
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1475	Induced draft fan controls
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1476	Induced draft fan speed changer
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1480	Other induced draft fan problems
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1487	Air heater (tubular)
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1488	Air heater (regenerative)
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1489	Air heater (heat pipe, plate-type)
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1492	Air heater fouling (tubular)

Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1493	Air heater fouling (regenerative)
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1495	Other air heater fouling (heat pipe, plate-type)
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1500	Air heater soot blowers
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1510	Flue gas ducts (except recirculation)
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1512	Flue gas expansion joints
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1520	Flue gas dampers (except recirculation)
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas	1530	Other flue gas problems
Notes: 1) For use with Unit Codes 800–899. 2) Excluding burner pipes, wind boxes, primary air, or pulverizer exhausters.					

TABLE B13-33 Boiler: Boiler Air and Gas Systems - Flue Gas Recirculation

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1535	Flue gas recirculating fan
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1536	Flue gas recirculating fan dampers
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1537	Flue gas recirculating fan lubrication systems
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1540	Flue gas recirculation fan fouling
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1550	Flue gas recirculation fan motors
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1555	Flue gas recirculation fan controls
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1560	Other flue gas recirculation fan problems
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1570	Flue gas recirculation ducts
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1572	Flue gas recirculation duct expansion joints
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation	1580	Flue gas recirculation dampers

Notes: 1) For use with Unit Codes 800–899. 2) Excluding burner pipes, wind boxes, primary air, or pulverizer exhausters.

TABLE B13-34 Boiler: Boiler Air and Gas Systems - Miscellaneous (Boiler Air and Gas Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1590	Stacks (use code 8430 for stack problems due to pollution control equipment)
Multi-boiler /Multi-turbine	Boiler	Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1599	Other miscellaneous boiler air and gas system problems
Notes: 1) For use with Unit Codes 800–899. 2) Excluding burner pipes, wind boxes, primary air, or pulverizer exhausters.					

TABLE B13-35 Boiler: Boiler Control Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Control Systems		1700	Feedwater controls (report local controls - feedwater pump, feedwater regulator valve, etc., - with component or system)
Multi-boiler /Multi-turbine	Boiler	Boiler Control Systems		1710	Combustion/steam condition controls (report local controls - burners, pulverizers, etc., - with component or system)
Multi-boiler /Multi-turbine	Boiler	Boiler Control Systems		1720	Desuperheater/attemperator controls
Multi-boiler /Multi-turbine	Boiler	Boiler Control Systems		1730	Boiler explosion or implosion
Multi-boiler /Multi-turbine	Boiler	Boiler Control Systems		1740	Boiler drum gage glasses / level indicator
Multi-boiler /Multi-turbine	Boiler	Boiler Control Systems		1750	Burner management system
Multi-boiler /Multi-turbine	Boiler	Boiler Control Systems		1760	Feedwater instrumentation (not local controls)
Multi-boiler /Multi-turbine	Boiler	Boiler Control Systems		1799	Other boiler instrumentation and control problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-36 Boiler: Boiler Design Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Design Limitations		1900	Improper balance between tube sections not due to fouling or plugging
Multi-boiler /Multi-turbine	Boiler	Boiler Design Limitations		1910	Inadequate air not due to equipment problems
Notes: 1) For use with Unit Codes 800–899. 2) Including instruments which input to the controls.					

TABLE B13-37 Boiler: Boiler Fuel Supply from Bunkers to Boiler - Burners

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	358	Oil burner piping and valves
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	359	Gas burner piping and valves
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	360	Burners
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	361	Burner orifices
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	362	Burner tilts
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	365	Bed warmup burners (FBC only)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	366	Duct burners (FBC only)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	370	Burner instruments and controls (except light off)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	375	Burner instruments and controls (FBC light-off system)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	380	Light off (igniter) systems (including fuel supply)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	385	Igniters
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	390	Burner wind boxes and dampers
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	400	Burner wind box fires
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners	410	Other burner problems

Notes: 1) For use with Unit Codes 800–899.

TABLE B13-38 Boiler: Boiler Fuel Supply from Bunkers to Boiler - Cyclone					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	415	Cyclone feeders
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	420	Cyclone crusher
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	425	Cyclone dampers
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	426	Cyclone air ducts
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	430	Cyclone furnace
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone	435	Other cyclone problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-39 Boiler: Boiler Fuel Supply from Bunkers to Boiler - Oil and Gas Systems (except light off)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	440	Fuel oil pumps (general)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	441	Fuel oil pumps (burner supply)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	442	Fuel oil pumps (forwarding/transfer)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	443	Fuel oil (burner supply) pump drives
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	444	Fuel oil (forwarding/transfer) pump drives
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	450	Fuel oil heaters
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	460	Fuel oil atomizers
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	470	Oil and gas fires

Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	475	Fuel lance (FBC only)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)	480	Other oil and gas fuel supply problems (see codes 0360-0410 for burner problems)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-40 Boiler: Boiler Fuel Supply from Bunkers to Boiler - Pulverizers, Primary Air Fans, and Associated Ducts

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	200	Pulverizer exhauster fan (for indirect firing)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	205	Pulverizer exhauster fan drive
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	210	Pulverizer heater (for indirect firing)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	220	Pulverizer system cyclone separator
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	230	Pulverizer bag filter
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	240	Pulverized coal bin
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	250	Pulverizer feeders
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	253	Pulverizer feeder motor
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	255	Pulverizer feeder coal scales
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	256	Seal air system (air to pulverizers)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	257	Coal Crusher/dryer between feeder and pulverizer
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	260	Primary air fan
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	262	Primary air fan lube oil system
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	263	Primary air fan drives

Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	264	Other primary air fan problems
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	265	Primary air heater
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	266	Primary air heater fouling
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	267	Primary air flow instrumentation
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	270	Primary air duct and dampers
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	280	Pulverizer fires
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	290	Pulverizer reduced capacity due to wear
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	300	Pulverizer motors and drives
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	310	Pulverizer mills
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	312	Pulverizer mill classifiers
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	313	Pulverizer mill trunnion seals
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	314	Pulverizer mill ball charger hopper (ball mills only)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	315	Pulverizer mill coal level controls
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	320	Foreign object in Pulverizers mill
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	325	Pulverizer skidding
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	330	Pulverizer coal leak (pulverizers only)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	331	Pulverizer system coal leaks (other than pulverizers, see code 0330)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	335	Pulverizer lube oil system
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	338	Pulverizer control systems (temperature and pressure)

Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	340	Other pulverizer problems
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	341	Pulverizer deluge system
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	342	Pulverizer inert system
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	344	Pulverizer inspection
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	345	Pulverizer overhaul
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	346	Pulverizer pyrite removal system
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts	350	Pulverized fuel and air piping (from pulverizer to wind box) (see code 0898 for pulverizer reject system problems)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-41 Boiler: Boiler Fuel Supply to Bunker - Coal Handling Equipment up Through Bunkers

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	10	Thaw shed failure or fire
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	20	Coal car dumpers, shakers, and unloaders
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	22	Unloading/receiving hopper (train/truck)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	24	Rotary plow
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	26	Dust suppression system
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	28	Dust collection system
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	30	Coal conveyors and feeders
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	35	Metal detector/collector (including magnetic separator)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	40	Coal elevators

Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	50	Coal storage fires
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	60	Coal crushers including motors
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	70	Coal samplers
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	75	Storage silos/hoppers
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	80	Stackers/reclaimers
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	84	Coal conveyor scales storage coal pile
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	85	Bunker feeder coal scales
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	90	Bunker fires
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	95	Bunker flow problems
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	100	Bunker gates
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	105	Bunker structures
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	106	Coal drying system (see additional codes 0125-0127)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	107	Screen (prior to bunkers)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	110	Other coal fuel supply problems up through bunkers
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	125	Coal crusher dryer hammers (see code 0106)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	126	Coal crusher lube oil system (see code 0106)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	127	Other coal crusher dryer problems (see code 0106)
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers	129	Other coal processing system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-42 Boiler: Boiler Fuel Supply to Bunker - Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	111	Solid fuel feeder conveyors
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	112	Solid fuel feed tanks/hoppers
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	113	Solid fuel tank/hopper fires
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	114	Solid fuel volumetric feeder
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	115	Solid fuel gravimetric feeder
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	116	Solid fuel feeder motors
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	117	Solid fuel pneumatic transport system including piping and valves
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	118	Solid fuel drying system including screens
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	119	Solid fuel crushers
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	120	Solid fuel crusher motors
Multi-boiler /Multi-turbine	Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)	121	Other solid fuel feed problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-43 Boiler: Boiler Internals and Structures

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Internals and Structures		800	Drums and drum internals (single drum only)
Multi-boiler /Multi-turbine	Boiler	Boiler Internals and Structures		810	Boiler supports and structures (use code 1320 for tube supports)
Multi-boiler /Multi-turbine	Boiler	Boiler Internals and Structures		811	Convection pass enclosure (FBC only)
Multi-boiler /Multi-turbine	Boiler	Boiler Internals and Structures		812	Distribution plate (FBC only)
Multi-boiler /Multi-turbine	Boiler	Boiler Internals and Structures		813	Lower furnace (in-bed) tube supports (FBC only)

Multi-boiler /Multi-turbine	Boiler	Boiler Internals and Structures		814	In-bed bubble caps (FBC only)
Multi-boiler /Multi-turbine	Boiler	Boiler Internals and Structures		820	Casing
Multi-boiler /Multi-turbine	Boiler	Boiler Internals and Structures		830	Doors
Multi-boiler /Multi-turbine	Boiler	Boiler Internals and Structures		840	Refractory and insulation
Multi-boiler /Multi-turbine	Boiler	Boiler Internals and Structures		845	Windbox expansion joints
Multi-boiler /Multi-turbine	Boiler	Boiler Internals and Structures		846	Convection pass expansion joints (FBC only)
Multi-boiler /Multi-turbine	Boiler	Boiler Internals and Structures		847	Other expansion joints
Multi-boiler /Multi-turbine	Boiler	Boiler Internals and Structures		850	Other internal or structural problems
Multi-boiler /Multi-turbine	Boiler	Boiler Internals and Structures		855	Drum relief/safety valves (single drum only)
Multi-boiler /Multi-turbine	Boiler	Boiler Internals and Structures		859	Tube external fins/membranes
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-44 Boiler: Boiler Overhaul and Inspections

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Overhaul and Inspections		1800	Major boiler overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Multi-boiler /Multi-turbine	Boiler	Boiler Overhaul and Inspections		1801	Minor boiler overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Multi-boiler /Multi-turbine	Boiler	Boiler Overhaul and Inspections		1810	Other boiler inspections
Multi-boiler /Multi-turbine	Boiler	Boiler Overhaul and Inspections		1811	Boiler Inspections - problem identification / investigation
Multi-boiler /Multi-turbine	Boiler	Boiler Overhaul and Inspections		1812	Boiler Inspections - scheduled or routine
Multi-boiler /Multi-turbine	Boiler	Boiler Overhaul and Inspections		1820	Chemical cleaning/steam blows

Notes: 1) For use with Unit Codes 800–899.

TABLE B13-45 Boiler: Boiler Piping System - Boiler Recirculation

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Boiler Recirculation	740	Boiler recirculation pumps
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Boiler Recirculation	741	Boiler recirculation pumps - motors
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Boiler Recirculation	742	Boiler recirculation pumps - motors - cooling system
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Boiler Recirculation	750	Boiler recirculation piping including downcomers
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Boiler Recirculation	760	Boiler recirculation valves
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Boiler Recirculation	770	Other boiler recirculation problems

Notes: 1) For use with Unit Codes 800–899.

TABLE B13-46 Boiler: Boiler Piping System - Cold and Hot Reheat Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	540	Hot reheat steam piping up to turbine stop valves
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	541	Cold reheat steam piping up to boiler
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	550	Reheat steam relief/safety valves
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	560	Other hot reheat steam valves (not including turbine stop or intercept valves)
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	561	Other cold reheat steam valves (not including turbine stop or intercept valves)
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Cold and Hot Reheat Steam	570	Other reheat steam problems

Notes: 1) For use with Unit Codes 800–899.

TABLE B13-47 Boiler: Boiler Piping System - Desuperheaters/Attemperators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Desuperheaters/Attemperators	580	Desuperheater/attemperator piping
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Desuperheaters/Attemperators	590	Desuperheater/attemperator valves
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Desuperheaters/Attemperators	600	Desuperheater/attemperator spray nozzles
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Desuperheaters/Attemperators	610	Desuperheater/attemperator drums
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Desuperheaters/Attemperators	620	Other desuperheater/attemperator problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-48 Boiler: Boiler Piping System - Feedwater and Blowdown

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Feedwater and Blowdown	670	Feedwater piping downstream of feedwater regulating valve
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Feedwater and Blowdown	680	Feedwater valves (not feedwater regulating valve)
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Feedwater and Blowdown	690	Other feedwater problems downstream of feedwater regulating valve (use codes 3401 to 3499 for remainder of feedwater system)
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Feedwater and Blowdown	700	Blowdown system valves
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Feedwater and Blowdown	710	Blowdown system piping
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Feedwater and Blowdown	720	Blowdown system controls / instrumentation
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Feedwater and Blowdown	730	Other blowdown system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-49 Boiler: Boiler Piping System - Main Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Main Steam	500	Main steam piping up to turbine stop valves
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Main Steam	510	Main steam relief/safety valves off superheater
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Main Steam	520	Other main steam valves (including vent and drain valves but not including the turbine stop valves)
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Main Steam	530	Other main steam system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-50 Boiler: Boiler Piping System - Miscellaneous (Piping)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Miscellaneous (Piping)	775	Economizer piping
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Miscellaneous (Piping)	780	Headers between tube bundles
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Miscellaneous (Piping)	782	Headers and caps
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Miscellaneous (Piping)	790	Pipe hangers, brackets, supports (general)
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Miscellaneous (Piping)	799	Other miscellaneous piping system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-51 Boiler: Boiler Piping System - Startup Bypass

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Startup Bypass	630	Startup bypass system piping (including drain lines up to heaters or condenser)
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Startup Bypass	640	Startup bypass system valves
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Startup Bypass	650	Startup bypass tanks or flash tanks
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Startup Bypass	655	Steam by-pass system instrumentation and controls
Multi-boiler /Multi-turbine	Boiler	Boiler Piping System	Startup Bypass	660	Other startup bypass system problems

Notes: 1) For use with Unit Codes 800–899.

TABLE B13-52 Boiler: Boiler Tube Fireside Slagging or Fouling

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Fireside Slagging or Fouling		1100	Waterwall (Furnace wall)
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Fireside Slagging or Fouling		1105	Generating tubes
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Fireside Slagging or Fouling		1110	Cyclone Furnace (in cyclone area only)
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Fireside Slagging or Fouling		1120	Convection Pass Wall
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Fireside Slagging or Fouling		1130	Boiler screen, wing wall, or slag screen (water tubes only)
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Fireside Slagging or Fouling		1140	First superheater
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Fireside Slagging or Fouling		1150	Second superheater
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Fireside Slagging or Fouling		1160	First reheater
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Fireside Slagging or Fouling		1170	Second reheater
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Fireside Slagging or Fouling		1180	Economizer
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Fireside Slagging or Fouling		1190	Other tube slagging or fouling
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Fireside Slagging or Fouling		1191	Bed agglomeration (FBC only)
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Fireside Slagging or Fouling		1200	Operation at reduced power to avoid slagging or fouling (use codes 1100 to 1190 to report power reductions for slag accumulation or slag removal)

Notes: 1) For use with Unit Codes 800–899.

TABLE B13-53 Boiler: Boiler Tube Leaks

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Multi-boiler /Multi-turbine	Boiler	Boiler Tube Leaks		1000	Waterwall (Furnace wall)
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Leaks		1003	Steam generating tubes between steam drum and mud drum
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Leaks		1005	Generating tubes
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Leaks		1006	In-bed reheat tubes (FBC only - includes external heat exchangers)
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Leaks		1010	Cyclone furnace (in cyclone area only)
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Leaks		1020	Convection pass wall (water tubes only)
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Leaks		1030	Boiler screen, wing wall, or slag screen (water tubes only)
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Leaks		1035	Platen superheater
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Leaks		1040	First superheater
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Leaks		1045	In-bed superheater tubes (FBC only - includes external heat exchangers)
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Leaks		1050	Second superheater
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Leaks		1055	External superheater link tubing
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Leaks		1060	First reheater
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Leaks		1070	Second reheater
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Leaks		1075	External reheater link tubing
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Leaks		1080	Economizer
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Leaks		1085	In-bed evaporative tubes (FBC only - includes external heat exchangers)
Multi-boiler /Multi-turbine	Boiler	Boiler Tube Leaks		1090	Other boiler tube leaks
Notes: 1) For use with Unit Codes 800–899. 2) Use codes 860 and 870 for fouling or slagging due to unavailability of soot blowers or their air or steam supply.					

TABLE B13-54 Boiler: Boiler Water Condition

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Boiler Water Condition		1850	Boiler water condition (not feedwater water quality)
Notes: 1) For use with Unit Codes 800–899. 2) Use code 859 for tube/membrane failures.					

TABLE B13-55 Boiler: External Fluidized Bed Heat Exchanger

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	External Fluidized Bed Heat Exchanger		990	Refractory
Multi-boiler /Multi-turbine	Boiler	External Fluidized Bed Heat Exchanger		991	Tube leaks
Multi-boiler /Multi-turbine	Boiler	External Fluidized Bed Heat Exchanger		992	Tube supports
Multi-boiler /Multi-turbine	Boiler	External Fluidized Bed Heat Exchanger		999	Other heat exchanger problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-56 Boiler: Miscellaneous (Boiler)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Miscellaneous (Boiler)		1980	Boiler safety valve test
Multi-boiler /Multi-turbine	Boiler	Miscellaneous (Boiler)		1990	Boiler performance testing (use code 9999 for total unit performance testing)
Multi-boiler /Multi-turbine	Boiler	Miscellaneous (Boiler)		1999	Boiler, miscellaneous
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-57 Boiler: Miscellaneous Boiler Tube Problems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Miscellaneous Boiler Tube Problems		1300	Water side fouling
Multi-boiler /Multi-turbine	Boiler	Miscellaneous Boiler Tube Problems		1305	Fireside cleaning (which requires a full outage) Use code 1200 for cleanings that cause deratings.

Multi-boiler /Multi-turbine	Boiler	Miscellaneous Boiler Tube Problems		1310	Water side cleaning (acid cleaning)
Multi-boiler /Multi-turbine	Boiler	Miscellaneous Boiler Tube Problems		1320	Tube supports/attachments
Multi-boiler /Multi-turbine	Boiler	Miscellaneous Boiler Tube Problems		1330	Slag fall damage
Multi-boiler /Multi-turbine	Boiler	Miscellaneous Boiler Tube Problems		1340	Tube modifications (including addition and removal of tubes)
Multi-boiler /Multi-turbine	Boiler	Miscellaneous Boiler Tube Problems		1350	Other miscellaneous boiler tube problems
Multi-boiler /Multi-turbine	Boiler	Miscellaneous Boiler Tube Problems		1360	Boiler drains system
Notes: 1) For use with Unit Codes 800–899. 2) Use more specific codes - other slagging and fouling problems, other control problems, etc. - whenever possible. Describe miscellaneous problems in the verbal description.					

TABLE B13-58 Boiler: Slag and Ash Removal

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		860	Soot blowers - air (see code 3844 for air delivery system)
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		870	Soot blowers - steam
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		871	Soot blowers - sonic
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		872	Soot blowers - water
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		873	Soot blower drives
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		876	Soot blower controls
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		880	Fly Ash Removal System (not precipitators, scrubbers, mechanical collectors, or baghouses)
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		885	Fly ash Removal System - wet transport
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		890	Bottom ash systems (wet or dry)
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		891	Bottom ash hoppers (including gates)

Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		892	Bottom ash clinker grinders
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		893	Bottom ash water pumps and motors
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		894	Bottom ash piping and valves
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		895	Ashpit trouble
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		896	Bottom ash dewatering bin system, instruments and controls
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		897	Bottom ash rotary (drag chain type) conveyor and motor
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		898	Bottom ash pyrite hopper (pulverizer reject) system
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		899	Bottom ash controls and instrumentation
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		900	Slag tap (cyclone furnace)
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		910	Slag tap (other than cyclone furnace)
Multi-boiler /Multi-turbine	Boiler	Slag and Ash Removal		920	Other slag and ash removal problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-59 Boiler: Sorbent Supply (FBC only) - Sorbent Feed Equipment from Bunkers to Boiler (FBC only)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	150	Sorbent feed conveyors
Multi-boiler /Multi-turbine	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	151	Sorbent feed tanks/hoppers
Multi-boiler /Multi-turbine	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	152	Sorbent feed volumetric feeder
Multi-boiler /Multi-turbine	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	153	Sorbent feed gravimetric feeder
Multi-boiler /Multi-turbine	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	154	Sorbent feed feeder motors
Multi-boiler /Multi-turbine	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	155	Sorbent feed pneumatic transport system including piping and valves

Multi-boiler /Multi-turbine	Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)	156	Other sorbent feed problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-60 Boiler: Sorbent Supply (FBC only) - Sorbent Handling System up Through Bunkers (FBC only)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	130	Sorbent handling tanks/hoppers
Multi-boiler /Multi-turbine	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	131	Sorbent handling conveyors
Multi-boiler /Multi-turbine	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	132	Sorbent handling feeders
Multi-boiler /Multi-turbine	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	133	Sorbent handling feeder motors
Multi-boiler /Multi-turbine	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	134	Sorbent handling crushers
Multi-boiler /Multi-turbine	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	135	Sorbent handling crusher motors
Multi-boiler /Multi-turbine	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	136	Sorbent handling blowers/fans
Multi-boiler /Multi-turbine	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	137	Sorbent handling blower/fan motors
Multi-boiler /Multi-turbine	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	138	Sorbent handling baghouse
Multi-boiler /Multi-turbine	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	139	Sorbent handling drying equipment
Multi-boiler /Multi-turbine	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	140	Sorbent handling screens
Multi-boiler /Multi-turbine	Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)	141	Other sorbent handling equipment problems
Notes: 1) For use with Unit Codes 800–899.					

EXPANDER TURBINE

TABLE B13-61 Expander Turbine: Expander Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Expander Turbine	Expander Turbine		7800	Couplings

Multi-boiler /Multi-turbine	Expander Turbine	Expander Turbine		7810	Shaft
Multi-boiler /Multi-turbine	Expander Turbine	Expander Turbine		7820	Bearings
Multi-boiler /Multi-turbine	Expander Turbine	Expander Turbine		7830	Blades
Multi-boiler /Multi-turbine	Expander Turbine	Expander Turbine		7840	Discs
Multi-boiler /Multi-turbine	Expander Turbine	Expander Turbine		7850	Spacers
Multi-boiler /Multi-turbine	Expander Turbine	Expander Turbine		7860	Nozzles/vanes
Multi-boiler /Multi-turbine	Expander Turbine	Expander Turbine		7870	Heat shields
Multi-boiler /Multi-turbine	Expander Turbine	Expander Turbine		7880	Exhaust diffusers
Multi-boiler /Multi-turbine	Expander Turbine	Expander Turbine		7890	Seal oil system and seals
Multi-boiler /Multi-turbine	Expander Turbine	Expander Turbine		7900	Inner casing
Multi-boiler /Multi-turbine	Expander Turbine	Expander Turbine		7910	Outer exhaust casing
Multi-boiler /Multi-turbine	Expander Turbine	Expander Turbine		7920	Lube oil system
Multi-boiler /Multi-turbine	Expander Turbine	Expander Turbine		7930	Controls and instrumentation
Multi-boiler /Multi-turbine	Expander Turbine	Expander Turbine		7940	Evactor
Multi-boiler /Multi-turbine	Expander Turbine	Expander Turbine		7950	Major overhaul
Multi-boiler /Multi-turbine	Expander Turbine	Expander Turbine		7960	Other expander turbine problems
Notes: 1) For use with Unit Codes 800–899.					

EXTERNAL

Use this set of codes to report events caused by external factors (flood, lightning, etc.); economic factors (lack of fuel, labor strikes, etc.); operator training; and transmission system problems external to the plant.

TABLE B13-62 External: Catastrophe

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	External	Catastrophe		9000	Flood
Multi-boiler /Multi-turbine	External	Catastrophe		9001	Drought
Multi-boiler /Multi-turbine	External	Catastrophe		9010	Fire including wildfires, not related to a specific component
Multi-boiler /Multi-turbine	External	Catastrophe		9020	Lightning
Multi-boiler /Multi-turbine	External	Catastrophe		9025	Geomagnetic disturbance
Multi-boiler /Multi-turbine	External	Catastrophe		9030	Earthquake
Multi-boiler /Multi-turbine	External	Catastrophe		9031	Tornado

Multi-boiler /Multi-turbine	External	Catastrophe		9035	Hurricane
Multi-boiler /Multi-turbine	External	Catastrophe		9036	Storms (ice, snow, etc)
Multi-boiler /Multi-turbine	External	Catastrophe		9040	Other catastrophe
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-63 External: Economic

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	External	Economic		0	Reserve shutdown
Multi-boiler /Multi-turbine	External	Economic		9130	Failure of fuel supplier to fulfill contractual obligations or a pre-arranged deal due to physical fuel disruptions or operational impairments (e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)
Multi-boiler /Multi-turbine	External	Economic		9131	Lack of fuel – due to contractual or tariff provisions that allow for service interruption or price fluctuations during peak demand periods.
Multi-boiler /Multi-turbine	External	Economic		9132	Wet Fuel - Biomass
Multi-boiler /Multi-turbine	External	Economic		9134	Fuel conservation
Multi-boiler /Multi-turbine	External	Economic		9135	Lack of water
Multi-boiler /Multi-turbine	External	Economic		9137	Ground water or other water supply problems
Multi-boiler /Multi-turbine	External	Economic		9140	Plant modifications to burn different fuel that are not regulatory mandated
Multi-boiler /Multi-turbine	External	Economic		9150	Labor strikes company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.

Multi-boiler /Multi-turbine	External	Economic		9151	Labor strikes direct plant management grievances that result in a walkout or strike are under plant management control.
Multi-boiler /Multi-turbine	External	Economic		9160	Other economic problems
Multi-boiler /Multi-turbine	External	Economic		9180	Economic (for internal use at plants only)
Multi-boiler /Multi-turbine	External	Economic		9181	Economic (for internal use at plants only)
Multi-boiler /Multi-turbine	External	Economic		9182	Economic (for internal use at plants only)
Multi-boiler /Multi-turbine	External	Economic		9183	Economic (for internal use at plants only)
Multi-boiler /Multi-turbine	External	Economic		9184	Economic (for internal use at plants only)
Multi-boiler /Multi-turbine	External	Economic		9185	Economic (for internal use at plants only)
Multi-boiler /Multi-turbine	External	Economic		9186	Economic (for internal use at plants only)
Multi-boiler /Multi-turbine	External	Economic		9187	Economic (for internal use at plants only)
Multi-boiler /Multi-turbine	External	Economic		9188	Economic (for internal use at plants only)
Multi-boiler /Multi-turbine	External	Economic		9189	Economic (for internal use at plants only)
Multi-boiler /Multi-turbine	External	Economic		9190	Economic (for internal use at plants only)
Multi-boiler /Multi-turbine	External	Economic		9191	Economic (for internal use at plants only)
Multi-boiler /Multi-turbine	External	Economic		9192	Economic (for internal use at plants only)
Multi-boiler /Multi-turbine	External	Economic		9193	Economic (for internal use at plants only)
Multi-boiler /Multi-turbine	External	Economic		9194	Economic (for internal use at plants only)
Multi-boiler /Multi-turbine	External	Economic		9195	Economic (for internal use at plants only)

Multi-boiler /Multi-turbine	External	Economic		9196	Economic (for internal use at plants only)
Multi-boiler /Multi-turbine	External	Economic		9197	Economic (for internal use at plants only)
Multi-boiler /Multi-turbine	External	Economic		9198	Economic (for internal use at plants only)
Multi-boiler /Multi-turbine	External	Economic		9199	Economic (for internal use at plants only)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-64 External: Fuel Quality

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	External	Fuel Quality		9200	High ash content (OMC)
Multi-boiler /Multi-turbine	External	Fuel Quality		9201	High ash content (not OMC)
Multi-boiler /Multi-turbine	External	Fuel Quality		9205	Poor quality natural gas fuel, low heat content
Multi-boiler /Multi-turbine	External	Fuel Quality		9210	Low grindability (OMC)
Multi-boiler /Multi-turbine	External	Fuel Quality		9211	Low grindability (not OMC)
Multi-boiler /Multi-turbine	External	Fuel Quality		9220	High sulfur content (OMC)
Multi-boiler /Multi-turbine	External	Fuel Quality		9221	High sulfur content (not OMC)
Multi-boiler /Multi-turbine	External	Fuel Quality		9230	High vanadium content (OMC)
Multi-boiler /Multi-turbine	External	Fuel Quality		9231	High vanadium content (not OMC)
Multi-boiler /Multi-turbine	External	Fuel Quality		9240	High sodium content (OMC)
Multi-boiler /Multi-turbine	External	Fuel Quality		9241	High sodium content (not OMC)
Multi-boiler /Multi-turbine	External	Fuel Quality		9250	Low BTU coal (OMC)
Multi-boiler /Multi-turbine	External	Fuel Quality		9251	Low BTU coal (not OMC)

Multi-boiler /Multi-turbine	External	Fuel Quality		9260	Low BTU oil (OMC)
Multi-boiler /Multi-turbine	External	Fuel Quality		9261	Low BTU oil (not OMC)
Multi-boiler /Multi-turbine	External	Fuel Quality		9270	Wet coal (OMC)
Multi-boiler /Multi-turbine	External	Fuel Quality		9271	Wet coal (not OMC)
Multi-boiler /Multi-turbine	External	Fuel Quality		9280	Frozen coal (OMC)
Multi-boiler /Multi-turbine	External	Fuel Quality		9281	Frozen coal (not OMC)
Multi-boiler /Multi-turbine	External	Fuel Quality		9290	Other fuel quality problems (OMC)
Multi-boiler /Multi-turbine	External	Fuel Quality		9291	Other fuel quality problems (not OMC)
Notes: 1) For use with Unit Codes 800–899. 2) Use code 9600 to 9650 if the fuel quality results in excess stack emissions through no fault in the pollution control equipment. Use the appropriate equipment code to report fouling and slagging.					

TABLE B13-65 External: Miscellaneous (External)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	External	Miscellaneous (External)		9300	Transmission system problems other than catastrophes (do not include switchyard problems in this category; see codes 3600 to 3629, 3720 to 3730)
Multi-boiler /Multi-turbine	External	Miscellaneous (External)		9305	Ash disposal problem
Multi-boiler /Multi-turbine	External	Miscellaneous (External)		9310	Operator training
Multi-boiler /Multi-turbine	External	Miscellaneous (External)		9320	Other miscellaneous external problems
Multi-boiler /Multi-turbine	External	Miscellaneous (External)		9340	Synchronous Condenser Operation
Notes: 1) For use with Unit Codes 800–899.					

GAS TURBINE

TABLE B13-66 Gas Turbine: Auxiliary Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Gas Turbine	Auxiliary Systems		5110	Lube oil system - general
Multi-boiler /Multi-turbine	Gas Turbine	Auxiliary Systems		5111	Lube oil pumps
Multi-boiler /Multi-turbine	Gas Turbine	Auxiliary Systems		5112	Lube oil coolers
Multi-boiler /Multi-turbine	Gas Turbine	Auxiliary Systems		5113	Lube oil valves/piping
Multi-boiler /Multi-turbine	Gas Turbine	Auxiliary Systems		5114	Lube oil filters
Multi-boiler /Multi-turbine	Gas Turbine	Auxiliary Systems		5115	Oil vapor extractor
Multi-boiler /Multi-turbine	Gas Turbine	Auxiliary Systems		5117	Power augmentation piping
Multi-boiler /Multi-turbine	Gas Turbine	Auxiliary Systems		5118	Power augmentation valves
Multi-boiler /Multi-turbine	Gas Turbine	Auxiliary Systems		5119	Power augmentation controls
Multi-boiler /Multi-turbine	Gas Turbine	Auxiliary Systems		5120	Hydraulic oil system
Multi-boiler /Multi-turbine	Gas Turbine	Auxiliary Systems		5130	Starting system (including motor)
Multi-boiler /Multi-turbine	Gas Turbine	Auxiliary Systems		5140	Battery and charger system
Multi-boiler /Multi-turbine	Gas Turbine	Auxiliary Systems		5150	Turning gear and motor
Multi-boiler /Multi-turbine	Gas Turbine	Auxiliary Systems		5160	Cooling and seal air system
Multi-boiler /Multi-turbine	Gas Turbine	Auxiliary Systems		5170	Cooling water system
Multi-boiler /Multi-turbine	Gas Turbine	Auxiliary Systems		5180	Anti-icing system
Multi-boiler /Multi-turbine	Gas Turbine	Auxiliary Systems		5190	Other auxiliary system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-67 Gas Turbine: Exhaust Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Gas Turbine	Exhaust Systems		5100	Chamber
Multi-boiler /Multi-turbine	Gas Turbine	Exhaust Systems		5101	Hoods
Multi-boiler /Multi-turbine	Gas Turbine	Exhaust Systems		5102	Vanes/nozzles
Multi-boiler /Multi-turbine	Gas Turbine	Exhaust Systems		5103	Silencer
Multi-boiler /Multi-turbine	Gas Turbine	Exhaust Systems		5104	Cones
Multi-boiler /Multi-turbine	Gas Turbine	Exhaust Systems		5108	High engine exhaust temperature
Multi-boiler /Multi-turbine	Gas Turbine	Exhaust Systems		5109	Other exhaust problems (including high exhaust system temperature not attributable to a specific problem)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-68 Gas Turbine: Fuel, Ignition, and Combustion Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Gas Turbine	Fuel, Ignition, and Combustion Systems		5040	Fuel tanks
Multi-boiler /Multi-turbine	Gas Turbine	Fuel, Ignition, and Combustion Systems		5041	Fuel piping and valves
Multi-boiler /Multi-turbine	Gas Turbine	Fuel, Ignition, and Combustion Systems		5042	Fuel nozzles/vanes
Multi-boiler /Multi-turbine	Gas Turbine	Fuel, Ignition, and Combustion Systems		5043	Fuel filters
Multi-boiler /Multi-turbine	Gas Turbine	Fuel, Ignition, and Combustion Systems		5044	Liquid fuel oil pump
Multi-boiler /Multi-turbine	Gas Turbine	Fuel, Ignition, and Combustion Systems		5046	Liquid fuel oil transfer/forwarding pump
Multi-boiler /Multi-turbine	Gas Turbine	Fuel, Ignition, and Combustion Systems		5048	Gas fuel system including controls and instrumentation
Multi-boiler /Multi-turbine	Gas Turbine	Fuel, Ignition, and Combustion Systems		5049	Other fuel system problems

Multi-boiler /Multi-turbine	Gas Turbine	Fuel, Ignition, and Combustion Systems		5050	Ignition system
Multi-boiler /Multi-turbine	Gas Turbine	Fuel, Ignition, and Combustion Systems		5060	Atomizing air system
Multi-boiler /Multi-turbine	Gas Turbine	Fuel, Ignition, and Combustion Systems		5070	Combustor casing
Multi-boiler /Multi-turbine	Gas Turbine	Fuel, Ignition, and Combustion Systems		5071	Combustor liner
Multi-boiler /Multi-turbine	Gas Turbine	Fuel, Ignition, and Combustion Systems		5072	Combustor caps
Multi-boiler /Multi-turbine	Gas Turbine	Fuel, Ignition, and Combustion Systems		5073	Flame scanners
Multi-boiler /Multi-turbine	Gas Turbine	Fuel, Ignition, and Combustion Systems		5079	Other combustor problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-69 Gas Turbine: Inlet Air System and Compressors - Compressors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Gas Turbine	Inlet Air System and Compressors	Compressors	5010	High pressure shaft
Multi-boiler /Multi-turbine	Gas Turbine	Inlet Air System and Compressors	Compressors	5011	High pressure bearings
Multi-boiler /Multi-turbine	Gas Turbine	Inlet Air System and Compressors	Compressors	5012	High pressure blades/buckets
Multi-boiler /Multi-turbine	Gas Turbine	Inlet Air System and Compressors	Compressors	5013	Compressor casing and bolts
Multi-boiler /Multi-turbine	Gas Turbine	Inlet Air System and Compressors	Compressors	5014	Compressor diaphragms
Multi-boiler /Multi-turbine	Gas Turbine	Inlet Air System and Compressors	Compressors	5015	Compressor seals
Multi-boiler /Multi-turbine	Gas Turbine	Inlet Air System and Compressors	Compressors	5016	High pressure compressor bleed valves
Multi-boiler /Multi-turbine	Gas Turbine	Inlet Air System and Compressors	Compressors	5019	Other high pressure problems
Multi-boiler /Multi-turbine	Gas Turbine	Inlet Air System and Compressors	Compressors	5020	Low pressure shaft
Multi-boiler /Multi-turbine	Gas Turbine	Inlet Air System and Compressors	Compressors	5021	Low pressure bearings

Multi-boiler /Multi-turbine	Gas Turbine	Inlet Air System and Compressors	Compressors	5022	Low pressure blades/buckets
Multi-boiler /Multi-turbine	Gas Turbine	Inlet Air System and Compressors	Compressors	5029	Other low pressure problems
Multi-boiler /Multi-turbine	Gas Turbine	Inlet Air System and Compressors	Compressors	5030	Supercharging fans
Multi-boiler /Multi-turbine	Gas Turbine	Inlet Air System and Compressors	Compressors	5039	Other compressor problems
Notes: 1) For use with Unit Codes 800–899. 2) Use HP compressor if only one.					

TABLE B13-70 Gas Turbine: Inlet Air System and Compressors - Ducts and Filters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5000	Inlet air ducts
Multi-boiler /Multi-turbine	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5001	Inlet air vanes/nozzles
Multi-boiler /Multi-turbine	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5002	Inlet air filters
Multi-boiler /Multi-turbine	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5003	Inlet cone
Multi-boiler /Multi-turbine	Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5009	Other inlet air problems
Notes: 1) For use with Unit Codes 800–899. 2) Use HP compressor if only one.					

TABLE B13-71 Gas Turbine: Miscellaneous (Gas Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5200	Reduction gear
Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5201	Load shaft and bearings
Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5210	Intercoolers
Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5220	Regenerators
Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5230	Heat shields

Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5240	Fire detection and extinguishing system (including hazardous gas detection system)
Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5241	Fire in unit
Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5250	Other controls and instrumentation problems
Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5255	Computer
Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5260	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5261	Gas turbine/compressor washing
Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5262	Gas turbine exchange
Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5270	Hot end inspection
Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5272	Boroscope inspection
Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5274	General unit inspection
Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5280	Vibration (not engine) in unit not attributable to bearings or other components
Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5285	Gas turbine vibration
Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5290	Gas turbine performance testing - individual engines (use code 9999 for total unit performance testing)
Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5298	Main gas filter
Multi-boiler /Multi-turbine	Gas Turbine	Miscellaneous (Gas Turbine)		5299	Other miscellaneous gas turbine problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-72 Gas Turbine: Turbine					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**

Multi-boiler /Multi-turbine	Gas Turbine	Turbine		5080	High pressure shaft
Multi-boiler /Multi-turbine	Gas Turbine	Turbine		5081	High pressure bearings
Multi-boiler /Multi-turbine	Gas Turbine	Turbine		5082	High pressure blades/buckets
Multi-boiler /Multi-turbine	Gas Turbine	Turbine		5083	High pressure nozzles/vanes
Multi-boiler /Multi-turbine	Gas Turbine	Turbine		5084	High pressure casing/expansion joints
Multi-boiler /Multi-turbine	Gas Turbine	Turbine		5085	Interstage gas passages - HP
Multi-boiler /Multi-turbine	Gas Turbine	Turbine		5086	High pressure shaft seals
Multi-boiler /Multi-turbine	Gas Turbine	Turbine		5089	Other high pressure problems
Multi-boiler /Multi-turbine	Gas Turbine	Turbine		5090	Low pressure shaft
Multi-boiler /Multi-turbine	Gas Turbine	Turbine		5091	Low pressure bearings
Multi-boiler /Multi-turbine	Gas Turbine	Turbine		5092	Low pressure blades/buckets
Multi-boiler /Multi-turbine	Gas Turbine	Turbine		5093	Low pressure nozzles/vanes
Multi-boiler /Multi-turbine	Gas Turbine	Turbine		5094	Low pressure casing/expansion joints
Multi-boiler /Multi-turbine	Gas Turbine	Turbine		5095	Interstage gas passages - LP
Multi-boiler /Multi-turbine	Gas Turbine	Turbine		5096	Low pressure shaft seals
Multi-boiler /Multi-turbine	Gas Turbine	Turbine		5097	Other low pressure problems
Multi-boiler /Multi-turbine	Gas Turbine	Turbine		5098	Expansion joints
Multi-boiler /Multi-turbine	Gas Turbine	Turbine		5099	HP to LP coupling
Notes: 1) For use with Unit Codes 800–899. 2) Use HP if only one.					

GENERATOR

This set of codes contains the generator, exciter, generator cooling systems, and generator controls. Note the main leads up to and includes the generator output breaker in this set of codes.

TABLE B13-73 Generator: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Generator	Controls		4700	Generator voltage control
Multi-boiler /Multi-turbine	Generator	Controls		4710	Generator metering devices
Multi-boiler /Multi-turbine	Generator	Controls		4720	Generator synchronization equipment
Multi-boiler /Multi-turbine	Generator	Controls		4730	Generator current and potential transformers
Multi-boiler /Multi-turbine	Generator	Controls		4740	Emergency generator trip devices
Multi-boiler /Multi-turbine	Generator	Controls		4750	Other generator controls and metering problems

Notes: 1) For use with Unit Codes 800–899.

TABLE B13-74 Generator: Cooling System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Generator	Cooling System		4610	Hydrogen cooling system piping and valves
Multi-boiler /Multi-turbine	Generator	Cooling System		4611	Hydrogen coolers
Multi-boiler /Multi-turbine	Generator	Cooling System		4612	Hydrogen storage system
Multi-boiler /Multi-turbine	Generator	Cooling System		4613	Hydrogen seals
Multi-boiler /Multi-turbine	Generator	Cooling System		4619	Other hydrogen system problems
Multi-boiler /Multi-turbine	Generator	Cooling System		4620	Air cooling system
Multi-boiler /Multi-turbine	Generator	Cooling System		4630	Liquid cooling system

Multi-boiler /Multi-turbine	Generator	Cooling System		4640	Seal oil system and seals
Multi-boiler /Multi-turbine	Generator	Cooling System		4650	Other cooling system problems
Notes: 1) For use with Unit Codes 800–899. 2) Report failures caused by water leaks into generator as codes 4500, 4510, etc.					

TABLE B13-75 Generator: Exciter

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Generator	Exciter		4600	Exciter drive - motor
Multi-boiler /Multi-turbine	Generator	Exciter		4601	Exciter field rheostat
Multi-boiler /Multi-turbine	Generator	Exciter		4602	Exciter commutator and brushes
Multi-boiler /Multi-turbine	Generator	Exciter		4603	Solid state exciter element
Multi-boiler /Multi-turbine	Generator	Exciter		4604	Exciter drive - shaft
Multi-boiler /Multi-turbine	Generator	Exciter		4605	Exciter transformer
Multi-boiler /Multi-turbine	Generator	Exciter		4609	Other exciter problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-76 Generator: Generator

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Generator	Generator		4500	Rotor windings (including damper windings and fan blades on hydro units)
Multi-boiler /Multi-turbine	Generator	Generator		4510	Rotor collector rings
Multi-boiler /Multi-turbine	Generator	Generator		4511	Rotor, General
Multi-boiler /Multi-turbine	Generator	Generator		4512	Retaining Rings
Multi-boiler /Multi-turbine	Generator	Generator		4520	Stator windings, bushings, and terminals

Multi-boiler /Multi-turbine	Generator	Generator		4530	Stator core iron
Multi-boiler /Multi-turbine	Generator	Generator		4535	Stator, General
Multi-boiler /Multi-turbine	Generator	Generator		4536	Generator Heaters
Multi-boiler /Multi-turbine	Generator	Generator		4540	Brushes and brush rigging
Multi-boiler /Multi-turbine	Generator	Generator		4550	Generator bearings and lube oil system (including thrust bearings on hydro units)
Multi-boiler /Multi-turbine	Generator	Generator		4551	Generator bearings
Multi-boiler /Multi-turbine	Generator	Generator		4552	Generator lube oil system
Multi-boiler /Multi-turbine	Generator	Generator		4555	Bearing cooling system
Multi-boiler /Multi-turbine	Generator	Generator		4560	Generator vibration (excluding vibration due to failed bearing and other components)
Multi-boiler /Multi-turbine	Generator	Generator		4570	Generator casing
Multi-boiler /Multi-turbine	Generator	Generator		4580	Generator end bells and bolting
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-77 Generator: Miscellaneous (Generator)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Generator	Miscellaneous (Generator)		4800	Generator main leads
Multi-boiler /Multi-turbine	Generator	Miscellaneous (Generator)		4805	Generator Bus Duct Cooling System
Multi-boiler /Multi-turbine	Generator	Miscellaneous (Generator)		4810	Generator output breaker
Multi-boiler /Multi-turbine	Generator	Miscellaneous (Generator)		4830	Major generator overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)

Multi-boiler /Multi-turbine	Generator	Miscellaneous (Generator)		4831	Minor generator overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Multi-boiler /Multi-turbine	Generator	Miscellaneous (Generator)		4840	Inspection
Multi-boiler /Multi-turbine	Generator	Miscellaneous (Generator)		4841	Generator doble testing
Multi-boiler /Multi-turbine	Generator	Miscellaneous (Generator)		4842	Reactive and capability testing
Multi-boiler /Multi-turbine	Generator	Miscellaneous (Generator)		4850	Core monitor alarm
Multi-boiler /Multi-turbine	Generator	Miscellaneous (Generator)		4860	Generator neutral grounding equipment
Multi-boiler /Multi-turbine	Generator	Miscellaneous (Generator)		4899	Other miscellaneous generator problems
Notes: 1) For use with Unit Codes 800–899.					

HEAT RECOVERY STEAM GENERATOR (HRSG)

TABLE B13-78 Heat Recovery Steam Generator (HRSG): Miscellaneous (HRSG Boiler)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		6100	Steam turbine to gas turbine coupling. For additional codes, use Fossil Steam Cause Codes 4000 to 4499.
Multi-boiler /Multi-turbine	Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		6000	Heat recovery steam generator to gas turbine connecting equipment. For additional codes, use Fossil Steam Cause Codes 0010 to 1999.
Notes: 1) For use with Unit Codes 800–899.					

INACTIVE STATES

TABLE B13-79 Inactive States: Inactive States

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler /Multi-turbine	Inactive States	Inactive States		2	Inactive Reserve Shutdown
Multi-boiler /Multi-turbine	Inactive States	Inactive States		9990	Retired unit
Multi-boiler /Multi-turbine	Inactive States	Inactive States		9991	Mothballed unit

Notes: 1) For use with Unit Codes 800–899.

JET ENGINE

TABLE B13-80 Jet Engine: Auxiliary Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Jet Engine	Auxiliary Systems		5510	Lube oil system
Multi-boiler/Multi-turbine	Jet Engine	Auxiliary Systems		5520	Hydraulic oil system
Multi-boiler/Multi-turbine	Jet Engine	Auxiliary Systems		5530	Starting system (including motor)
Multi-boiler/Multi-turbine	Jet Engine	Auxiliary Systems		5540	Battery and charger system
Multi-boiler/Multi-turbine	Jet Engine	Auxiliary Systems		5550	Turning gear and motor
Multi-boiler/Multi-turbine	Jet Engine	Auxiliary Systems		5560	Cooling and seal air system
Multi-boiler/Multi-turbine	Jet Engine	Auxiliary Systems		5570	Cooling water system
Multi-boiler/Multi-turbine	Jet Engine	Auxiliary Systems		5580	Anti-icing system
Multi-boiler/Multi-turbine	Jet Engine	Auxiliary Systems		5590	Other auxiliary system problems

Notes: 1) For use with Unit Codes 800–899.

TABLE B13-81 Jet Engine: Exhaust Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Jet Engine	Exhaust Systems		5500	Chamber
Multi-boiler/Multi-turbine	Jet Engine	Exhaust Systems		5501	Hoods
Multi-boiler/Multi-turbine	Jet Engine	Exhaust Systems		5502	Vanes/nozzles
Multi-boiler/Multi-turbine	Jet Engine	Exhaust Systems		5503	Silencer

Multi-boiler/Multi-turbine	Jet Engine	Exhaust Systems		5504	Cones
Multi-boiler/Multi-turbine	Jet Engine	Exhaust Systems		5508	High engine exhaust temperature
Multi-boiler/Multi-turbine	Jet Engine	Exhaust Systems		5509	Other exhaust problems (including high exhaust temperature not attributable to a specific problem)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-82 Jet Engine: Fuel, Ignition, and Combustion Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Jet Engine	Fuel, Ignition, and Combustion Systems		5440	Fuel tanks
Multi-boiler/Multi-turbine	Jet Engine	Fuel, Ignition, and Combustion Systems		5441	Fuel piping and valves
Multi-boiler/Multi-turbine	Jet Engine	Fuel, Ignition, and Combustion Systems		5442	Fuel nozzles/vanes
Multi-boiler/Multi-turbine	Jet Engine	Fuel, Ignition, and Combustion Systems		5443	Fuel filters
Multi-boiler/Multi-turbine	Jet Engine	Fuel, Ignition, and Combustion Systems		5449	Other fuel system problems
Multi-boiler/Multi-turbine	Jet Engine	Fuel, Ignition, and Combustion Systems		5450	Ignition system
Multi-boiler/Multi-turbine	Jet Engine	Fuel, Ignition, and Combustion Systems		5455	Fuel nozzle/vane cooling air system
Multi-boiler/Multi-turbine	Jet Engine	Fuel, Ignition, and Combustion Systems		5460	Atomizing air system
Multi-boiler/Multi-turbine	Jet Engine	Fuel, Ignition, and Combustion Systems		5470	Combustor casing
Multi-boiler/Multi-turbine	Jet Engine	Fuel, Ignition, and Combustion Systems		5471	Combustor liner
Multi-boiler/Multi-turbine	Jet Engine	Fuel, Ignition, and Combustion Systems		5472	Combustor caps
Multi-boiler/Multi-turbine	Jet Engine	Fuel, Ignition, and Combustion Systems		5479	Other combustor problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-83 Jet Engine: Inlet Air System and Compressors - Compressors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Jet Engine	Inlet Air System and Compressors	Compressors	5410	High pressure shaft
Multi-boiler/Multi-turbine	Jet Engine	Inlet Air System and Compressors	Compressors	5411	High pressure bearings
Multi-boiler/Multi-turbine	Jet Engine	Inlet Air System and Compressors	Compressors	5412	High pressure blades/buckets
Multi-boiler/Multi-turbine	Jet Engine	Inlet Air System and Compressors	Compressors	5413	Other high pressure problems
Multi-boiler/Multi-turbine	Jet Engine	Inlet Air System and Compressors	Compressors	5420	Low pressure shaft
Multi-boiler/Multi-turbine	Jet Engine	Inlet Air System and Compressors	Compressors	5421	Low pressure bearings
Multi-boiler/Multi-turbine	Jet Engine	Inlet Air System and Compressors	Compressors	5422	Low pressure blades/buckets
Multi-boiler/Multi-turbine	Jet Engine	Inlet Air System and Compressors	Compressors	5429	Other low pressure problems
Multi-boiler/Multi-turbine	Jet Engine	Inlet Air System and Compressors	Compressors	5430	Supercharging fans
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-84 Jet Engine: Inlet Air System and Compressors - Ducts and Filters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5400	Inlet air ducts
Multi-boiler/Multi-turbine	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5401	Inlet air vanes/nozzles
Multi-boiler/Multi-turbine	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5402	Inlet air filters
Multi-boiler/Multi-turbine	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5403	Inlet and exhaust cones
Multi-boiler/Multi-turbine	Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5409	Other inlet air problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-85 Jet Engine: Miscellaneous (Jet Engine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Jet Engine	Miscellaneous (Jet Engine)		5600	Reduction gear
Multi-boiler/Multi-turbine	Jet Engine	Miscellaneous (Jet Engine)		5601	Load shaft and bearings
Multi-boiler/Multi-turbine	Jet Engine	Miscellaneous (Jet Engine)		5610	Intercoolers
Multi-boiler/Multi-turbine	Jet Engine	Miscellaneous (Jet Engine)		5620	Regenerators
Multi-boiler/Multi-turbine	Jet Engine	Miscellaneous (Jet Engine)		5630	Heat shields
Multi-boiler/Multi-turbine	Jet Engine	Miscellaneous (Jet Engine)		5640	Fire detection and extinguishing system
Multi-boiler/Multi-turbine	Jet Engine	Miscellaneous (Jet Engine)		5641	Fire in unit
Multi-boiler/Multi-turbine	Jet Engine	Miscellaneous (Jet Engine)		5650	Other controls and instrumentation problems
Multi-boiler/Multi-turbine	Jet Engine	Miscellaneous (Jet Engine)		5660	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
Multi-boiler/Multi-turbine	Jet Engine	Miscellaneous (Jet Engine)		5661	Engine/compressor washing
Multi-boiler/Multi-turbine	Jet Engine	Miscellaneous (Jet Engine)		5662	Engine exchange
Multi-boiler/Multi-turbine	Jet Engine	Miscellaneous (Jet Engine)		5665	Engine shafts and bearings
Multi-boiler/Multi-turbine	Jet Engine	Miscellaneous (Jet Engine)		5670	Hot end inspection
Multi-boiler/Multi-turbine	Jet Engine	Miscellaneous (Jet Engine)		5672	Boroscope inspection
Multi-boiler/Multi-turbine	Jet Engine	Miscellaneous (Jet Engine)		5674	General unit inspection
Multi-boiler/Multi-turbine	Jet Engine	Miscellaneous (Jet Engine)		5680	Vibration (not engine) in unit not attributable to bearings or other components
Multi-boiler/Multi-turbine	Jet Engine	Miscellaneous (Jet Engine)		5685	Engine vibration
Multi-boiler/Multi-turbine	Jet Engine	Miscellaneous (Jet Engine)		5690	Engine performance testing - individual engines (use code 9999 for total unit performance testing)

Multi-boiler/Multi-turbine	Jet Engine	Miscellaneous (Jet Engine)		5699	Other miscellaneous jet engine problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-86 Jet Engine: Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Jet Engine	Turbine		5480	High pressure shaft
Multi-boiler/Multi-turbine	Jet Engine	Turbine		5481	High pressure bearings
Multi-boiler/Multi-turbine	Jet Engine	Turbine		5482	High pressure blades/buckets
Multi-boiler/Multi-turbine	Jet Engine	Turbine		5483	High pressure nozzles/vanes
Multi-boiler/Multi-turbine	Jet Engine	Turbine		5484	High pressure casing/expansion joint
Multi-boiler/Multi-turbine	Jet Engine	Turbine		5485	Interstage gas passages
Multi-boiler/Multi-turbine	Jet Engine	Turbine		5486	High pressure shaft seals
Multi-boiler/Multi-turbine	Jet Engine	Turbine		5489	Other high pressure problems
Multi-boiler/Multi-turbine	Jet Engine	Turbine		5490	Low pressure shaft
Multi-boiler/Multi-turbine	Jet Engine	Turbine		5491	Low pressure bearings
Multi-boiler/Multi-turbine	Jet Engine	Turbine		5492	Low pressure blades/buckets
Multi-boiler/Multi-turbine	Jet Engine	Turbine		5493	Low pressure nozzles/vanes
Multi-boiler/Multi-turbine	Jet Engine	Turbine		5494	Low pressure casing/expansion joints
Multi-boiler/Multi-turbine	Jet Engine	Turbine		5497	Other low pressure problems
Multi-boiler/Multi-turbine	Jet Engine	Turbine		5498	Expansion joints
Multi-boiler/Multi-turbine	Jet Engine	Turbine		5499	Shaft seals

Notes: 1) For use with Unit Codes 800–899.

MISCELLANEOUS

TABLE B13-87 Miscellaneous: Instruments and Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/ Multi-turbine	Miscellaneous	Instruments and Controls		6200	Combined cycle instruments and controls. (Report instruments and controls specific to the gas turbine, steam turbine, boiler, generator, or balance of plant using the codes for the appropriate piece of equipment.)
Notes: 1) For use with Unit Codes 800–899.					

PERFORMANCE

TABLE B13-88 Performance: Performance

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Performance	Performance		9997	NERC Reliability Standard Requirement
Multi-boiler/Multi-turbine	Performance	Performance		9998	Black start testing
Multi-boiler/Multi-turbine	Performance	Performance		9999	Total unit performance testing (use appropriate codes for individual component testing)
Notes: 1) For use with Unit Codes 800–899.					

PERSONNEL OR PROCEDURAL ERRORS

TABLE B13-89 Personnel or Procedural Errors: Personnel or Procedural Errors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Personnel or Procedural Errors	Personnel or Procedural Errors		9900	Operator error
Multi-boiler/Multi-turbine	Personnel or Procedural Errors	Personnel or Procedural Errors		9910	Maintenance personnel error
Multi-boiler/Multi-turbine	Personnel or Procedural Errors	Personnel or Procedural Errors		9920	Contractor error
Multi-boiler/Multi-turbine	Personnel or Procedural Errors	Personnel or Procedural Errors		9930	Operating procedure error

Multi-boiler/Multi-turbine	Personnel or Procedural Errors	Personnel or Procedural Errors		9940	Maintenance procedure error
Multi-boiler/Multi-turbine	Personnel or Procedural Errors	Personnel or Procedural Errors		9950	Contractor procedure error
Multi-boiler/Multi-turbine	Personnel or Procedural Errors	Personnel or Procedural Errors		9960	Staff shortage
Notes: 1) For use with Unit Codes 800–899.					

POLLUTION CONTROL EQUIPMENT

Use this set of codes to report problems with flue gas desulphurization equipment and stack gas particulate removal equipment. If outages or deratings occur due to reasons other than equipment problems, use the set of codes for Regulatory, Safety, Environmental stack emission limits.

TABLE B13-90 Pollution Control Equipment: Continuous Emissions Monitoring Systems (CEMS)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8700	CEMS Certification and Recertification
Multi-boiler/Multi-turbine	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8710	SO2 analyzer problems
Multi-boiler/Multi-turbine	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8720	NOx analyzer problems
Multi-boiler/Multi-turbine	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8730	CO analyzer problems
Multi-boiler/Multi-turbine	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8740	CO2 analyzer problems
Multi-boiler/Multi-turbine	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8750	O2 analyzer problems
Multi-boiler/Multi-turbine	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8760	Opacity monitor problems
Multi-boiler/Multi-turbine	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8770	Flow monitor problems
Multi-boiler/Multi-turbine	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8780	Data acquisition system problems
Multi-boiler/Multi-turbine	Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8790	Miscellaneous CEMS problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-91 Pollution Control Equipment: Dry Scrubbers - Dry Scrubber

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8529	Gas dispersers
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8530	Spray towers
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8531	Spray machine/atomizer
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8532	Spray machine/atomizer motors
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8533	Spray machine/atomizer lubrication systems
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Dry Scrubber	8534	Spray machine/atomizer vibration problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-92 Pollution Control Equipment: Dry Scrubbers - Miscellaneous (Dry Scrubber)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8544	Mechanical failures
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8545	Electrical failures
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8546	Major overhaul
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8547	Inspection
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8548	Testing
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)	8549	Other dry scrubber problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-93 Pollution Control Equipment: Dry Scrubbers - Piping, Ducting, and Dampers

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8522	Piping

Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8523	Valves
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8524	Strainers or filters
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8525	Ducting
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8526	Dampers
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers	8527	Other piping, ducting, and damper problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-94 Pollution Control Equipment: Dry Scrubbers - Reagent\Slurry Supply

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8500	Slurry storage and feed tanks
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8501	Reagent storage, feed bins, and conveyors
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8502	Weigh feeders
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8503	Screw conveyors
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8504	Mills/slakers
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8505	Scalping screens
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8506	Slurry pipelines
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8507	Reagent uploading and transfer systems
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8508	Reagent unavailability
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8510	Slurry mixers and agitators
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8520	Slurry transfer pumps and motors
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply	8521	Reagent/slurry problems

Notes: 1) For use with Unit Codes 800–899.

TABLE B13-95 Pollution Control Equipment: Dry Scrubbers - Waste Disposal and Recovery					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8535	Fly ash conveyors
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8536	Bucket elevators
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8537	Weigh hoppers
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8538	Recycle storage and feed tanks including agitators
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8539	Recycle slurry transfer pumps
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8540	Waste disposal
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8541	Recycle feed bins
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8542	Recycle feed bins aeration systems
Multi-boiler/Multi-turbine	Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery	8543	Powder coolers
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-96 Pollution Control Equipment: Miscellaneous (Pollution Control Equipment)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Multi-boiler/Multi-turbine	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8565	Electrostatic Precipitator rebuild/overhaul
Multi-boiler/Multi-turbine	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8600	Flue gas additives (furnace injection)
Multi-boiler/Multi-turbine	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8601	SO3 mitigation
Multi-boiler/Multi-turbine	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8620	Mercury Abatement Equipment
Multi-boiler/Multi-turbine	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8650	Baghouse systems, general

Multi-boiler/Multi-turbine	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8651	Bag failures and rebagging
Multi-boiler/Multi-turbine	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8652	Shakers and rappers
Multi-boiler/Multi-turbine	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8653	Inflation and deflation fans and motors
Multi-boiler/Multi-turbine	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8654	Baghouse booster fans and motors
Multi-boiler/Multi-turbine	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8655	Structural duct work and dampers
Multi-boiler/Multi-turbine	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8656	Controls and instrumentation
Multi-boiler/Multi-turbine	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8657	Ash handling system and hoppers
Multi-boiler/Multi-turbine	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8658	Slurry system from precipitators
Multi-boiler/Multi-turbine	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8670	Emission monitors (other than CEMS)
Multi-boiler/Multi-turbine	Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)		8699	Other miscellaneous pollution control equipment problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-97 Pollution Control Equipment: NOx Reduction Systems - Catalytic Air Heaters

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8830	CAH NOx Active catalyst
Multi-boiler/Multi-turbine	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8831	CAH NOx Support materials
Multi-boiler/Multi-turbine	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8832	CAH NOx Plugging
Multi-boiler/Multi-turbine	Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8835	Other CAH problems
Notes: 1) For use with Unit Codes 800–899. 2) Use code 360 for Low NOx Burners.					

TABLE B13-98 Pollution Control Equipment: NOx Reduction Systems - Selective Catalytic Reduction Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Multi-boiler/Multi-turbine	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8810	SCR NOx Reactor
Multi-boiler/Multi-turbine	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8811	SCR NOx Reagent
Multi-boiler/Multi-turbine	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8812	SCR NOx Catalyst
Multi-boiler/Multi-turbine	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8813	SCR NOx Injection grid piping/valves
Multi-boiler/Multi-turbine	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8814	SCR NOx Catalyst support material
Multi-boiler/Multi-turbine	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8815	SCR NOx Soot blowers
Multi-boiler/Multi-turbine	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8816	SCR NOx Plugging
Multi-boiler/Multi-turbine	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8817	SCR NOx Control system
Multi-boiler/Multi-turbine	Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8825	Other SCR NOx problems
Notes: 1) For use with Unit Codes 800–899. 2) Use code 360 for Low NOx Burners.					

TABLE B13-99 Pollution Control Equipment: NOx Reduction Systems - Selective Non-Catalytic Reduction Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8800	SNCR NOx Reagent
Multi-boiler/Multi-turbine	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8801	SNCR NOx Carrier gas
Multi-boiler/Multi-turbine	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8802	SNCR NOx Control system
Multi-boiler/Multi-turbine	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8803	SNCR Performance Testing
Multi-boiler/Multi-turbine	Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8809	Other SNCR NOx problems
Notes: 1) For use with Unit Codes 800–899. 2) Use code 360 for Low NOx Burners.					

TABLE B13-100 Pollution Control Equipment: Precipitators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Multi-boiler/Multi-turbine	Pollution Control Equipment	Precipitators		8550	Electrostatic precipitator fouling
Multi-boiler/Multi-turbine	Pollution Control Equipment	Precipitators		8551	Electrostatic precipitator field out of service
Multi-boiler/Multi-turbine	Pollution Control Equipment	Precipitators		8560	Electrostatic precipitator problems
Multi-boiler/Multi-turbine	Pollution Control Equipment	Precipitators		8570	Mechanical precipitator fouling
Multi-boiler/Multi-turbine	Pollution Control Equipment	Precipitators		8580	Mechanical precipitator problems
Multi-boiler/Multi-turbine	Pollution Control Equipment	Precipitators		8590	Other precipitator problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-101 Pollution Control Equipment: Wet Scrubbers - Chemical Supply

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8000	Chemical feed storage, mill feeders, and conveyors
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8002	Screw conveyors
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8003	Bucket elevators
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8006	Weigh feeders
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8010	Crushers/mills
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8020	Mill slurry tanks supply problems
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8030	Classifiers
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8040	Slurry transfer pumps and motors
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8050	Chemical unavailability
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Chemical Supply	8099	Other chemical supply problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-102 Pollution Control Equipment: Wet Scrubbers - Miscellaneous (Wet Scrubber)					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8400	Scrubber gas discharge reheaters - general
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8402	Scrubber gas discharge reheaters - vibration
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8404	Scrubber gas discharge reheaters - tube leaks
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8406	Scrubber gas discharge reheaters - ducts
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8410	Scrubber instruments and controls
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8415	Liquid level controls
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8420	Heat tracer
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8425	Miscellaneous mechanical failures
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8426	Miscellaneous electrical failures
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8430	Stack damage related to scrubber system
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8440	Major overhaul
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8450	Inspection
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8460	Testing
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8470	SO2 monitor
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)	8499	Other miscellaneous wet scrubber problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-103 Pollution Control Equipment: Wet Scrubbers - Piping, Ducting, Dampers, and Fans					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**

Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8200	Piping
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8210	Valves
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8220	Strainers or filters
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8225	Drain pots
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8230	Ducting
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8235	Demister
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8240	Bypass dampers
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8250	Dampers other than bypass
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8260	Scrubber booster I.D. fan (fan specific to the scrubber)
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8261	Scrubber booster I.D. fan drive
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8262	Scrubber booster I.D. fan vibration (fan specific to the scrubber)
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8264	Scrubber booster I.D. fan blades (fan specific to the scrubber)
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8265	Scrubber booster I.D. fan dampers
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8270	Scrubber booster F.D. fan (fan specific to the scrubber)
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8271	Scrubber booster F.D. fan drive
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8272	Scrubber booster F.D. fan vibration (fan specific to the scrubber)
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8274	Scrubber booster F.D. fan blades (fan specific to the scrubber)
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8275	Scrubber booster F.D. fan dampers
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8280	Reagent feed piping

Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8290	Demister wash piping assembly
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans	8299	Other piping, ducting, damper, and fan problems
Notes: 1) For use with Unit Codes 800–899. 2) Use code 9510 for outages or deratings required to install pollution control equipment. Use codes 9600 to 9650 only when the pollution control equipment problems are not responsible for exceeding emission limits.					

TABLE B13-104 Pollution Control Equipment: Wet Scrubbers - Waste Disposal and Recovery

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8300	Waste disposal/recovery tanks
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8310	Waste disposal/recovery pumps
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8320	Waste disposal ponds
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8325	Ash disposal problems
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8330	Dewatering equipment (thickener, centrifuge, etc.)
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8335	Dryers
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8340	Centrifuge/vacuum filter
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8345	Calciners
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8349	Other waste disposal and recovery problems
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery	8399	Solids conveying and mixing system problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-105 Pollution Control Equipment: Wet Scrubbers - Wet Scrubber

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8100	Scrubber/absorber tower or module
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8110	Spray nozzles

Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8115	Disc scrubber throats
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8120	Spray pumps and motors
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8125	Scrubber recycle (liquid) pumps
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8127	Scrubber recycle (liquid) pump motors
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8130	Recirculation tanks including agitators
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8140	Reaction tanks including agitators
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8150	Tubes
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8160	Mist eliminators/demisters and washdown
Multi-boiler/Multi-turbine	Pollution Control Equipment	Wet Scrubbers	Wet Scrubber	8199	Other scrubber problems
Notes: 1) For use with Unit Codes 800–899.					

REGULATORY, SAFETY, ENVIRONMENTAL

Use these codes only for events not directly attributable to equipment failures. Inspections or testing of certain equipment due to regulation are reported using the appropriate equipment cause codes, and the fact that it was a regulatory requirement noted in the verbal description section.

TABLE B13-106 Regulatory, Safety, Environmental: Other Operating Environmental Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9660	Thermal discharge limits - fossil and nuclear
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9663	Thermal discharge limits - gas turbines
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9664	Thermal discharge limits - jet engines
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9665	Thermal discharge limits (Internal Combustion/Reciprocating Engines)
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9670	Noise limits (not for personnel safety) - fossil and nuclear
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9673	Noise limits (not for personnel safety) - gas turbines
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9674	Noise limits (not for personnel safety) - jet engines
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9675	Noise limits (not for personnel safety) (Internal Combustion/Reciprocating Engines)
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9676	Noise limits (not for personnel safety) - hydro and pumped storage
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9680	Fish kill - fossil and nuclear
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9683	Fish kill - gas turbines
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9684	Fish kill - jet engines
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9685	Fish kill (Internal Combustion/Reciprocating Engines)
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9686	Fish kill - hydro and pumped storage
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9690	Other miscellaneous operational environmental limits - fossil and nuclear
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9693	Other miscellaneous operational environmental limits - gas turbines

Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9694	Other miscellaneous operational environmental limits - jet engines
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9695	Other miscellaneous operational environmental limits (Internal Combustion/Reciprocating Engines)
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9696	Other miscellaneous operational environmental limits - hydro and pumped storage
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-107 Regulatory, Safety, Environmental: Regulatory

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Regulatory		9504	Regulatory (environmental) proceedings and hearings - regulatory agency initiated
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Regulatory		9506	Regulatory (environmental) proceedings and hearings - intervenor initiated
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Regulatory		9510	Plant modifications strictly for compliance with new or changed regulatory requirements (scrubbers, cooling towers, etc.)
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Regulatory		9520	Oil spill in Gulf of Mexico (OMC)
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Regulatory		9590	Miscellaneous regulatory (this code is primarily intended for use with event contribution code 2 to indicate that a regulatory-related factor contributed to the primary cause of the event)
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-108 Regulatory, Safety, Environmental: Safety

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Safety		9700	OSHA-related retrofit or inspection
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Safety		9720	Other safety problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-109 Regulatory, Safety, Environmental: Stack Emission					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9600	SO2 stack emissions - fossil
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9603	SO2 stack emissions - gas turbines
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9604	SO2 stack emissions - jet engines
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9605	SO2 stack emissions (Internal Combustion/Reciprocating Engines)
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9610	NOx stack emissions - fossil
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9613	NOx stack emissions - gas turbines
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9614	NOx stack emissions - jet engines
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9615	NOx stack emissions (Internal Combustion/Reciprocating Engines)
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9616	CO stack emissions - fossil
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9620	Particulate stack emissions - fossil
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9623	Particulate stack emissions - gas turbines
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9624	Particulate stack emissions - jet engines
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9625	Particulate stack emissions (Internal Combustion/Reciprocating Engines)
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9630	Opacity - fossil
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9633	Opacity - gas turbines
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9634	Opacity - jet engines
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9635	Opacity (Internal Combustion/Reciprocating Engines)

Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9650	Other stack/exhaust emissions - fossil (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9653	Other stack or exhaust emissions - gas turbines (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9654	Other stack or exhaust emissions - jet engines (use codes 9200 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)
Multi-boiler/Multi-turbine	Regulatory, Safety, Environmental	Stack Emission		9656	Other stack or exhaust emissions testing - fossil
Notes: 1) For use with Unit Codes 800–899. 2) Include exhaust emissions.					

STEAM TURBINE

Besides the turbine, this set includes the steam stop/control valves, turbine control system, and the turbine auxiliaries. The extraction steam codes are contained in the Balance of Plant set.

TABLE B13-110 Steam Turbine: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Steam Turbine	Controls		4290	Hydraulic system pumps
Multi-boiler/Multi-turbine	Steam Turbine	Controls		4291	Hydraulic system coolers
Multi-boiler/Multi-turbine	Steam Turbine	Controls		4292	Hydraulic system filters
Multi-boiler/Multi-turbine	Steam Turbine	Controls		4293	Hydraulic system pipes and valves
Multi-boiler/Multi-turbine	Steam Turbine	Controls		4299	Other hydraulic system problems
Multi-boiler/Multi-turbine	Steam Turbine	Controls		4300	Turbine supervisory system (use codes 4290 to 4299 for hydraulic oil)
Multi-boiler/Multi-turbine	Steam Turbine	Controls		4301	Turbine governing system

Multi-boiler/Multi-turbine	Steam Turbine	Controls		4302	Turbine trip devices (including instruments)
Multi-boiler/Multi-turbine	Steam Turbine	Controls		4303	Exhaust hood and spray controls
Multi-boiler/Multi-turbine	Steam Turbine	Controls		4304	Automatic turbine control systems - mechanical
Multi-boiler/Multi-turbine	Steam Turbine	Controls		4305	Automatic turbine control systems - mechanical - hydraulic
Multi-boiler/Multi-turbine	Steam Turbine	Controls		4306	Automatic turbine control systems - electro-hydraulic - analog
Multi-boiler/Multi-turbine	Steam Turbine	Controls		4307	Automatic turbine control systems - electro-hydraulic - digital
Multi-boiler/Multi-turbine	Steam Turbine	Controls		4308	Automatic turbine control systems - digital control and monitoring
Multi-boiler/Multi-turbine	Steam Turbine	Controls		4309	Other turbine instrument and control problems
Multi-boiler/Multi-turbine	Steam Turbine	Controls		4310	Steam Turbine Control System - data highway
Multi-boiler/Multi-turbine	Steam Turbine	Controls		4311	Steam Turbine Control System - hardware problems (including card failure)
Multi-boiler/Multi-turbine	Steam Turbine	Controls		4312	Steam Turbine Control System - internal and termination wiring
Multi-boiler/Multi-turbine	Steam Turbine	Controls		4313	Steam Turbine Control System - logic problems
Multi-boiler/Multi-turbine	Steam Turbine	Controls		4314	Steam Turbine Control System - upgrades
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-111 Steam Turbine: High Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Steam Turbine	High Pressure Turbine		4000	Outer casing
Multi-boiler/Multi-turbine	Steam Turbine	High Pressure Turbine		4001	Inner casing
Multi-boiler/Multi-turbine	Steam Turbine	High Pressure Turbine		4009	Nozzle bolting
Multi-boiler/Multi-turbine	Steam Turbine	High Pressure Turbine		4010	Nozzles and nozzle blocks

Multi-boiler/Multi-turbine	Steam Turbine	High Pressure Turbine		4011	Diaphragms
Multi-boiler/Multi-turbine	Steam Turbine	High Pressure Turbine		4012	Buckets or blades
Multi-boiler/Multi-turbine	Steam Turbine	High Pressure Turbine		4013	Diaphragms unit and shroud type
Multi-boiler/Multi-turbine	Steam Turbine	High Pressure Turbine		4014	Bucket or blade fouling
Multi-boiler/Multi-turbine	Steam Turbine	High Pressure Turbine		4015	Wheels or spindles
Multi-boiler/Multi-turbine	Steam Turbine	High Pressure Turbine		4020	Shaft seals
Multi-boiler/Multi-turbine	Steam Turbine	High Pressure Turbine		4021	Dummy rings
Multi-boiler/Multi-turbine	Steam Turbine	High Pressure Turbine		4022	Gland rings
Multi-boiler/Multi-turbine	Steam Turbine	High Pressure Turbine		4030	Rotor shaft
Multi-boiler/Multi-turbine	Steam Turbine	High Pressure Turbine		4040	Bearings
Multi-boiler/Multi-turbine	Steam Turbine	High Pressure Turbine		4041	Thrust bearings
Multi-boiler/Multi-turbine	Steam Turbine	High Pressure Turbine		4099	Other high pressure turbine problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-112 Steam Turbine: Intermediate Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Steam Turbine	Intermediate Pressure Turbine		4100	Outer casing
Multi-boiler/Multi-turbine	Steam Turbine	Intermediate Pressure Turbine		4101	Inner casing
Multi-boiler/Multi-turbine	Steam Turbine	Intermediate Pressure Turbine		4109	Nozzle bolting
Multi-boiler/Multi-turbine	Steam Turbine	Intermediate Pressure Turbine		4110	Nozzles and nozzle blocks
Multi-boiler/Multi-turbine	Steam Turbine	Intermediate Pressure Turbine		4111	Diaphragms

Multi-boiler/Multi-turbine	Steam Turbine	Intermediate Pressure Turbine		4112	Buckets or blades
Multi-boiler/Multi-turbine	Steam Turbine	Intermediate Pressure Turbine		4113	Bucket or blade fouling
Multi-boiler/Multi-turbine	Steam Turbine	Intermediate Pressure Turbine		4115	Wheels or spindles
Multi-boiler/Multi-turbine	Steam Turbine	Intermediate Pressure Turbine		4120	Shaft seals
Multi-boiler/Multi-turbine	Steam Turbine	Intermediate Pressure Turbine		4121	Dummy rings
Multi-boiler/Multi-turbine	Steam Turbine	Intermediate Pressure Turbine		4122	Gland rings
Multi-boiler/Multi-turbine	Steam Turbine	Intermediate Pressure Turbine		4130	Rotor shaft
Multi-boiler/Multi-turbine	Steam Turbine	Intermediate Pressure Turbine		4140	Bearings
Multi-boiler/Multi-turbine	Steam Turbine	Intermediate Pressure Turbine		4141	Thrust bearings
Multi-boiler/Multi-turbine	Steam Turbine	Intermediate Pressure Turbine		4199	Other intermediate pressure turbine problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-113 Steam Turbine: Low Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Steam Turbine	Low Pressure Turbine		4200	Outer casing
Multi-boiler/Multi-turbine	Steam Turbine	Low Pressure Turbine		4201	Inner casing
Multi-boiler/Multi-turbine	Steam Turbine	Low Pressure Turbine		4209	Nozzle bolting
Multi-boiler/Multi-turbine	Steam Turbine	Low Pressure Turbine		4210	Nozzles and nozzle blocks
Multi-boiler/Multi-turbine	Steam Turbine	Low Pressure Turbine		4211	Diaphragms
Multi-boiler/Multi-turbine	Steam Turbine	Low Pressure Turbine		4212	Buckets or blades
Multi-boiler/Multi-turbine	Steam Turbine	Low Pressure Turbine		4213	Bucket or blade fouling

Multi-boiler/Multi-turbine	Steam Turbine	Low Pressure Turbine		4215	Wheels or spindles
Multi-boiler/Multi-turbine	Steam Turbine	Low Pressure Turbine		4220	Shaft seals
Multi-boiler/Multi-turbine	Steam Turbine	Low Pressure Turbine		4221	Dummy rings
Multi-boiler/Multi-turbine	Steam Turbine	Low Pressure Turbine		4222	Gland rings
Multi-boiler/Multi-turbine	Steam Turbine	Low Pressure Turbine		4230	Rotor shaft
Multi-boiler/Multi-turbine	Steam Turbine	Low Pressure Turbine		4240	Bearings
Multi-boiler/Multi-turbine	Steam Turbine	Low Pressure Turbine		4241	Thrust bearings
Multi-boiler/Multi-turbine	Steam Turbine	Low Pressure Turbine		4250	Other low pressure turbine problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-114 Steam Turbine: Lube Oil

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Steam Turbine	Lube Oil		4280	Lube oil pumps
Multi-boiler/Multi-turbine	Steam Turbine	Lube Oil		4281	Lube oil coolers
Multi-boiler/Multi-turbine	Steam Turbine	Lube Oil		4282	Lube oil conditioners
Multi-boiler/Multi-turbine	Steam Turbine	Lube Oil		4283	Lube oil system valves and piping
Multi-boiler/Multi-turbine	Steam Turbine	Lube Oil		4284	Lube oil pump drive
Multi-boiler/Multi-turbine	Steam Turbine	Lube Oil		4289	Other lube oil system problems
Notes: 1) For use with Unit Codes 800–899. 2) Do not include bearing failures due to lube oil.					

TABLE B13-115 Steam Turbine: Miscellaneous (Steam Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Multi-boiler/Multi-turbine	Steam Turbine	Miscellaneous (Steam Turbine)		4400	Major turbine overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Multi-boiler/Multi-turbine	Steam Turbine	Miscellaneous (Steam Turbine)		4401	Inspection
Multi-boiler/Multi-turbine	Steam Turbine	Miscellaneous (Steam Turbine)		4402	Minor turbine overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Multi-boiler/Multi-turbine	Steam Turbine	Miscellaneous (Steam Turbine)		4410	Turning gear and motor
Multi-boiler/Multi-turbine	Steam Turbine	Miscellaneous (Steam Turbine)		4420	Vibration of the turbine generator unit that cannot be attributed to a specific cause such as bearings or blades (use this code for balance moves)
Multi-boiler/Multi-turbine	Steam Turbine	Miscellaneous (Steam Turbine)		4430	Gland seal system
Multi-boiler/Multi-turbine	Steam Turbine	Miscellaneous (Steam Turbine)		4440	Moisture separator/reheater (nuclear including MSR drains, controls, etc.)
Multi-boiler/Multi-turbine	Steam Turbine	Miscellaneous (Steam Turbine)		4445	Steam reheater
Multi-boiler/Multi-turbine	Steam Turbine	Miscellaneous (Steam Turbine)		4450	Water induction
Multi-boiler/Multi-turbine	Steam Turbine	Miscellaneous (Steam Turbine)		4460	Turbine overspeed trip test
Multi-boiler/Multi-turbine	Steam Turbine	Miscellaneous (Steam Turbine)		4470	Differential expansion
Multi-boiler/Multi-turbine	Steam Turbine	Miscellaneous (Steam Turbine)		4490	Turbine performance testing (use code 9999 for total unit performance testing)
Multi-boiler/Multi-turbine	Steam Turbine	Miscellaneous (Steam Turbine)		4499	Other miscellaneous steam turbine problems
Notes: 1) For use with Unit Codes 800–899.					

TABLE B13-116 Steam Turbine: Piping

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Multi-boiler/Multi-turbine	Steam Turbine	Piping		4270	Crossover or under piping
Multi-boiler/Multi-turbine	Steam Turbine	Piping		4279	Miscellaneous turbine piping

Notes: 1) For use with Unit Codes 800–899.

TABLE B13-117 Steam Turbine: Valves					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Multi-boiler/Multi-turbine	Steam Turbine	Valves		4260	Main stop valves
Multi-boiler/Multi-turbine	Steam Turbine	Valves		4261	Control valves
Multi-boiler/Multi-turbine	Steam Turbine	Valves		4262	Intercept valves
Multi-boiler/Multi-turbine	Steam Turbine	Valves		4263	Reheat stop valves
Multi-boiler/Multi-turbine	Steam Turbine	Valves		4264	Combined intercept valves
Multi-boiler/Multi-turbine	Steam Turbine	Valves		4265	Miscellaneous drain and vent valves
Multi-boiler/Multi-turbine	Steam Turbine	Valves		4266	Main stop valve testing
Multi-boiler/Multi-turbine	Steam Turbine	Valves		4267	Control valve testing
Multi-boiler/Multi-turbine	Steam Turbine	Valves		4268	Reheat/intercept valve testing
Multi-boiler/Multi-turbine	Steam Turbine	Valves		4269	Other turbine valves (including LP steam admission valves)
Notes: 1) For use with Unit Codes 800–899.					

Appendix B14: Index To Nuclear Unit Cause Codes

NUCLEAR UNITS

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BALANCE OF PLANT

TABLE B14-1 Balance of Plant: Auxiliary Systems - Auxiliary Steam					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Nuclear	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3830	Auxiliary boiler
Nuclear	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3831	Auxiliary steam piping
Nuclear	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3832	Auxiliary steam valves
Nuclear	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3833	Auxiliary steam controls and instruments
Nuclear	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3834	Auxiliary boiler tube leaks
Nuclear	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3835	Auxiliary boiler burner management system

Nuclear	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3836	Steam transfer to other unit
Nuclear	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3839	Other auxiliary steam problems (also see extraction steam codes 3520 to 3529; startup bypass codes 0630 to 0660; and soot blower steam code 0870)
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-2 Balance of Plant: Auxiliary Systems - Closed Cooling Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3820	Closed cooling water pumps and motors
Nuclear	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3821	Closed cooling water piping
Nuclear	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3822	Closed cooling water valves
Nuclear	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3823	Closed cooling water heat exchangers
Nuclear	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3824	Closed cooling water system fouling
Nuclear	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3825	Closed cooling water instrumentation
Nuclear	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3826	Closed cooling water strainer
Nuclear	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3829	Other closed cooling water system problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-3 Balance of Plant: Auxiliary Systems - Fire Protection System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Auxiliary Systems	Fire Protection System	3860	Fire protection system pumps
Nuclear	Balance of Plant	Auxiliary Systems	Fire Protection System	3861	Fire protection system piping
Nuclear	Balance of Plant	Auxiliary Systems	Fire Protection System	3862	Fire protection system valves
Nuclear	Balance of Plant	Auxiliary Systems	Fire Protection System	3863	Fire protection system fouling
Nuclear	Balance of Plant	Auxiliary Systems	Fire Protection System	3864	Fire protection system instrumentation and controls
Nuclear	Balance of Plant	Auxiliary Systems	Fire Protection System	3869	Other fire protection system problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-4 Balance of Plant: Auxiliary Systems - Instrument Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Auxiliary Systems	Instrument Air	3850	Instrument air compressors
Nuclear	Balance of Plant	Auxiliary Systems	Instrument Air	3851	Instrument air piping
Nuclear	Balance of Plant	Auxiliary Systems	Instrument Air	3852	Instrument air valves
Nuclear	Balance of Plant	Auxiliary Systems	Instrument Air	3853	Instrument air dryers
Nuclear	Balance of Plant	Auxiliary Systems	Instrument Air	3854	N2 backup to instrument air
Nuclear	Balance of Plant	Auxiliary Systems	Instrument Air	3859	Other instrument air problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-5 Balance of Plant: Auxiliary Systems - Miscellaneous (Auxiliary Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3898	Miscellaneous plant auxiliary process and services instrumentation and controls
Nuclear	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3899	Other miscellaneous auxiliary system problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-6 Balance of Plant: Auxiliary Systems - Open Cooling Water System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3800	Open cooling water pumps and motors
Nuclear	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3801	Open cooling water piping
Nuclear	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3802	Open cooling water valves
Nuclear	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3803	Open cooling water heat exchangers
Nuclear	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3804	Open cooling water system fouling
Nuclear	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3805	Open cooling water system instrumentation
Nuclear	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3806	Open cooling water strainer
Nuclear	Balance of Plant	Auxiliary Systems	Open Cooling Water System	3809	Other open cooling water problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-7 Balance of Plant: Auxiliary Systems - Seal Air Fans

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Auxiliary Systems	Seal Air Fans	3880	Seal air fan
Nuclear	Balance of Plant	Auxiliary Systems	Seal Air Fans	3881	Seal air fan drive - motor
Nuclear	Balance of Plant	Auxiliary Systems	Seal Air Fans	3882	Seal air control dampers and drives
Nuclear	Balance of Plant	Auxiliary Systems	Seal Air Fans	3883	Seal air filters
Nuclear	Balance of Plant	Auxiliary Systems	Seal Air Fans	3889	Other seal air fan problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-8 Balance of Plant: Auxiliary Systems - Service Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Auxiliary Systems	Service Air	3840	Service air compressors
Nuclear	Balance of Plant	Auxiliary Systems	Service Air	3841	Service air piping
Nuclear	Balance of Plant	Auxiliary Systems	Service Air	3842	Service air valves
Nuclear	Balance of Plant	Auxiliary Systems	Service Air	3843	Service air dryers
Nuclear	Balance of Plant	Auxiliary Systems	Service Air	3849	Other service air problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-9 Balance of Plant: Auxiliary Systems - Service Water (Open System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3810	Service water pumps and motors
Nuclear	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3811	Service water piping
Nuclear	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3812	Service water valves
Nuclear	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3813	Service water heat exchangers
Nuclear	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3814	Service water system fouling
Nuclear	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3815	Service water strainer
Nuclear	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3819	Other service water problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-10 Balance of Plant: Circulating Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Circulating Water Systems		3210	Circulating water pumps
Nuclear	Balance of Plant	Circulating Water Systems		3211	Circulating water pump motors
Nuclear	Balance of Plant	Circulating Water Systems		3220	Circulating water piping
Nuclear	Balance of Plant	Circulating Water Systems		3221	Circulating water piping fouling
Nuclear	Balance of Plant	Circulating Water Systems		3230	Circulating water valves
Nuclear	Balance of Plant	Circulating Water Systems		3231	Waterbox
Nuclear	Balance of Plant	Circulating Water Systems		3232	Condenser tube cleaning system including debris filter
Nuclear	Balance of Plant	Circulating Water Systems		3233	Circulating water priming system
Nuclear	Balance of Plant	Circulating Water Systems		3235	Cooling tower booster pump
Nuclear	Balance of Plant	Circulating Water Systems		3236	Cooling tower booster motor
Nuclear	Balance of Plant	Circulating Water Systems		3238	Cooling tower fan motors
Nuclear	Balance of Plant	Circulating Water Systems		3239	Cooling tower fan motors - variable speed
Nuclear	Balance of Plant	Circulating Water Systems		3240	Cooling tower fans
Nuclear	Balance of Plant	Circulating Water Systems		3241	Cooling tower efficiency below design
Nuclear	Balance of Plant	Circulating Water Systems		3242	Cooling tower fill damage
Nuclear	Balance of Plant	Circulating Water Systems		3243	Cooling tower icing
Nuclear	Balance of Plant	Circulating Water Systems		3244	Cooling tower fires
Nuclear	Balance of Plant	Circulating Water Systems		3245	Other cooling tower problems
Nuclear	Balance of Plant	Circulating Water Systems		3246	Cooling tower fouling
Nuclear	Balance of Plant	Circulating Water Systems		3247	Cooling tower instrumentation
Nuclear	Balance of Plant	Circulating Water Systems		3248	Cooling Tower Overhaul
Nuclear	Balance of Plant	Circulating Water Systems		3250	Circulating water system instruments and controls
Nuclear	Balance of Plant	Circulating Water Systems		3260	Traveling screens
Nuclear	Balance of Plant	Circulating Water Systems		3261	Traveling screen fouling
Nuclear	Balance of Plant	Circulating Water Systems		3269	Circulating water biological conditions (ie, zebra mussels)
Nuclear	Balance of Plant	Circulating Water Systems		3270	Intake system problems other than traveling screens

Nuclear	Balance of Plant	Circulating Water Systems		3271	Intake grating fouling
Nuclear	Balance of Plant	Circulating Water Systems		3272	Circulating water screenwash system
Nuclear	Balance of Plant	Circulating Water Systems		3273	Debris in circulating water from outside sources (leaves, mud, etc.)
Nuclear	Balance of Plant	Circulating Water Systems		3274	Ice blockages at intake structures including frazil ice, sheets, blocks of ice, etc.
Nuclear	Balance of Plant	Circulating Water Systems		3280	High circulating water temperature (not due to season, tower efficiency below design, or other listed equipment problem)
Nuclear	Balance of Plant	Circulating Water Systems		3281	Circulating water tempering system
Nuclear	Balance of Plant	Circulating Water Systems		3282	Circulating water cooling ponds
Nuclear	Balance of Plant	Circulating Water Systems		3285	Circulating water chemistry
Nuclear	Balance of Plant	Circulating Water Systems		3299	Other circulating water system problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-11 Balance of Plant: Condensate System - Low/Intermediate Pressure Heater and Deaerators

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3339	LP heater head leaks
Nuclear	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3340	LP heater tube leaks
Nuclear	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3341	Other LP heater - general
Nuclear	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3342	IP heater tube leaks
Nuclear	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3343	Other IP heater - general
Nuclear	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3344	Deaerator (including level control)
Nuclear	Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3345	IP heater head leaks
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-12 Balance of Plant: Condensate System - Miscellaneous (Condensate System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3360	Condensate makeup and return (including storage tanks)
Nuclear	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3370	Condensate system controls and instrumentation (not hotwell level, heater level, or deaerator level controls; see codes 3150-3159, 3344, 3502).
Nuclear	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3380	Condensate coolers
Nuclear	Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3399	Other miscellaneous condensate system problems

Notes: 1) For use with Unit Codes 200-299.

TABLE B14-13 Balance of Plant: Condensate System - Polishers/Chemical Addition

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Condensate System	Polishers/Chemical Addition	3350	Condensate polishing and filtering systems
Nuclear	Balance of Plant	Condensate System	Polishers/Chemical Addition	3351	Chemical addition systems
Nuclear	Balance of Plant	Condensate System	Polishers/Chemical Addition	3352	Feedwater chemistry (not specific to condenser, polishers, or chemical addition)

Notes: 1) For use with Unit Codes 200-299.

TABLE B14-14 Balance of Plant: Condensate System - Pumps, Piping, and Valves

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3300	Condensate water pre-treatment
Nuclear	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3310	Condensate/hotwell pumps
Nuclear	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3311	Condensate/hotwell pump motor
Nuclear	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3312	Condensate booster pump
Nuclear	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3313	Condensate booster pump motor
Nuclear	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3314	Condensate booster pump motor - variable speed
Nuclear	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3315	Condensate booster pump drive (other than 3313 and 3314)
Nuclear	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3320	Condensate piping
Nuclear	Balance of Plant	Condensate System	Pumps, Piping, and Valves	3330	Condensate valves

Notes: 1) For use with Unit Codes 200-299.

TABLE B14-15 Balance of Plant: Condensing System - Condenser Casing or Shell and Internals

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3120	Tube sheets
Nuclear	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3121	Expansion joint
Nuclear	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3122	Gaskets and seals
Nuclear	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3123	Hot well
Nuclear	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3124	Tube sheet fouling
Nuclear	Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3129	Other condenser casing or shell and internal problems

Notes: 1) For use with Unit Codes 200-299.

TABLE B14-16 Balance of Plant: Condensing System - Condenser Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Condensing System	Condenser Controls	3150	Hot well level controls
Nuclear	Balance of Plant	Condensing System	Condenser Controls	3151	Vacuum pump and air ejector controls

Nuclear	Balance of Plant	Condensing System	Condenser Controls	3152	Air-cooled condenser controls
Nuclear	Balance of Plant	Condensing System	Condenser Controls	3159	Other condensing system controls and instruments
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-17 Balance of Plant: Condensing System - Condenser Tubes and Support Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3110	Condenser tube leaks
Nuclear	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3111	Condenser tube fouling shell side
Nuclear	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3112	Condenser tube fouling tube side
Nuclear	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3113	Condenser tube and water box cleaning (including circulating water flow reversal)
Nuclear	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3114	Air-cooled condenser tubes
Nuclear	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3115	Air-cooled condenser pumps
Nuclear	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3116	Air-cooled condenser fans
Nuclear	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3117	Air-cooled condenser fan motors
Nuclear	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3118	Other Air-cooled condenser problems
Nuclear	Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3119	Other condenser tube casing or shell and internal problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-18 Balance of Plant: Condensing System - Miscellaneous (Condensing System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3170	Condenser inspection (use code 3110 to report looking for tube leaks)
Nuclear	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3171	Air-cooled condenser inspections
Nuclear	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3180	Major condenser overhaul
Nuclear	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3185	Water side cathodic protection
Nuclear	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3190	Air leakage (for losses not attributable to previously noted equipment related codes)
Nuclear	Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3199	Other miscellaneous condensing system problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-19 Balance of Plant: Condensing System - Vacuum Equipment

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Condensing System	Vacuum Equipment	3130	Air ejectors
Nuclear	Balance of Plant	Condensing System	Vacuum Equipment	3131	Air ejector piping and valves
Nuclear	Balance of Plant	Condensing System	Vacuum Equipment	3132	Inter and after condensers
Nuclear	Balance of Plant	Condensing System	Vacuum Equipment	3133	Vacuum pumps
Nuclear	Balance of Plant	Condensing System	Vacuum Equipment	3134	Vacuum pump piping and valves

Nuclear	Balance of Plant	Condensing System	Vacuum Equipment	3135	Vacuum pump motor and auxiliaries
Nuclear	Balance of Plant	Condensing System	Vacuum Equipment	3139	Other air extraction system problems - general
Nuclear	Balance of Plant	Condensing System	Vacuum Equipment	3149	Loss of vacuum not attributable to a particular component such as air ejectors or valves, or high back pressure not attributable to high circulating water temperature, or vacuum losses from a known cause.
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-20 Balance of Plant: Electrical

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Electrical		3600	Switchyard transformers and associated cooling systems - external (OMC)
Nuclear	Balance of Plant	Electrical		3601	Switchyard transformers and associated cooling systems - external (not OMC)
Nuclear	Balance of Plant	Electrical		3610	Switchyard circuit breakers - external (not OMC)
Nuclear	Balance of Plant	Electrical		3611	Switchyard circuit breakers - external (OMC)
Nuclear	Balance of Plant	Electrical		3612	Switchyard system protection devices - external (OMC)
Nuclear	Balance of Plant	Electrical		3613	Switchyard system protection devices - external (not OMC)
Nuclear	Balance of Plant	Electrical		3618	Other switchyard equipment - external (not OMC)
Nuclear	Balance of Plant	Electrical		3619	Other switchyard equipment - external (OMC)
Nuclear	Balance of Plant	Electrical		3620	Main transformer
Nuclear	Balance of Plant	Electrical		3621	Unit auxiliaries transformer
Nuclear	Balance of Plant	Electrical		3622	Station service startup transformer
Nuclear	Balance of Plant	Electrical		3623	Auxiliary generators
Nuclear	Balance of Plant	Electrical		3624	Auxiliary generator voltage supply system
Nuclear	Balance of Plant	Electrical		3629	Other switchyard or high voltage system problems - external
Nuclear	Balance of Plant	Electrical		3630	400-700 volt transformers
Nuclear	Balance of Plant	Electrical		3631	400-700 volt circuit breakers
Nuclear	Balance of Plant	Electrical		3632	400-700 volt conductors and buses
Nuclear	Balance of Plant	Electrical		3633	400-700 volt insulators
Nuclear	Balance of Plant	Electrical		3634	400-700 volt protection devices
Nuclear	Balance of Plant	Electrical		3639	Other 400-700 volt problems
Nuclear	Balance of Plant	Electrical		3640	AC instrument power transformers
Nuclear	Balance of Plant	Electrical		3641	AC Circuit breakers
Nuclear	Balance of Plant	Electrical		3642	AC Conductors and buses
Nuclear	Balance of Plant	Electrical		3643	AC Inverters
Nuclear	Balance of Plant	Electrical		3644	AC Protection devices

Nuclear	Balance of Plant	Electrical		3649	Other AC instrument power problems
Nuclear	Balance of Plant	Electrical		3650	DC instrument power battery chargers
Nuclear	Balance of Plant	Electrical		3651	DC circuit breakers
Nuclear	Balance of Plant	Electrical		3652	DC conductors and buses
Nuclear	Balance of Plant	Electrical		3653	DC protection devices
Nuclear	Balance of Plant	Electrical		3659	Other DC power problems
Nuclear	Balance of Plant	Electrical		3660	4000-7000 volt transformers
Nuclear	Balance of Plant	Electrical		3661	4000-7000 volt circuit breakers
Nuclear	Balance of Plant	Electrical		3662	4000-7000 volt conductors and buses
Nuclear	Balance of Plant	Electrical		3663	4000-7000 volt insulators
Nuclear	Balance of Plant	Electrical		3664	4000-7000 volt protection devices
Nuclear	Balance of Plant	Electrical		3669	Other 4000-7000 volt problems
Nuclear	Balance of Plant	Electrical		3670	12-15kV transformers
Nuclear	Balance of Plant	Electrical		3671	12-15kV circuit breakers
Nuclear	Balance of Plant	Electrical		3672	12-15kV conductors and buses
Nuclear	Balance of Plant	Electrical		3673	12-15kV insulators
Nuclear	Balance of Plant	Electrical		3674	12-15kV protection devices
Nuclear	Balance of Plant	Electrical		3679	Other 12-15kV problems
Nuclear	Balance of Plant	Electrical		3680	Other voltage transformers
Nuclear	Balance of Plant	Electrical		3681	Other voltage circuit breakers
Nuclear	Balance of Plant	Electrical		3682	Other voltage conductors and buses
Nuclear	Balance of Plant	Electrical		3683	Other voltage insulators
Nuclear	Balance of Plant	Electrical		3684	Other voltage protection devices
Nuclear	Balance of Plant	Electrical		3689	Other voltage problems
Nuclear	Balance of Plant	Electrical		3690	Station Service Power Distribution System, General
Notes: 1) For use with Unit Codes 200-299. 2) Exclude nuclear safety (Class 1E) systems.					

TABLE B14-21 Balance of Plant: Extraction Steam

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Extraction Steam		3520	HP Extraction steam piping
Nuclear	Balance of Plant	Extraction Steam		3521	HP Extraction steam valves
Nuclear	Balance of Plant	Extraction Steam		3522	HP Extraction steam instruments and controls
Nuclear	Balance of Plant	Extraction Steam		3529	Other HP extraction steam system problems
Nuclear	Balance of Plant	Extraction Steam		3530	IP Extraction steam piping
Nuclear	Balance of Plant	Extraction Steam		3531	IP Extraction steam valves
Nuclear	Balance of Plant	Extraction Steam		3532	IP Extraction steam instruments and controls
Nuclear	Balance of Plant	Extraction Steam		3539	Other IP extraction steam system problems
Nuclear	Balance of Plant	Extraction Steam		3540	LP Extraction steam piping
Nuclear	Balance of Plant	Extraction Steam		3541	LP Extraction steam valves
Nuclear	Balance of Plant	Extraction Steam		3542	LP Extraction steam instruments and controls

Nuclear	Balance of Plant	Extraction Steam		3549	Other LP extraction steam system problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-22 Balance of Plant: Feedwater System					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Nuclear	Balance of Plant	Feedwater System		3401	Startup feedwater pump
Nuclear	Balance of Plant	Feedwater System		3402	Startup feedwater pump drives - all types
Nuclear	Balance of Plant	Feedwater System		3407	Feedwater pump suction screens
Nuclear	Balance of Plant	Feedwater System		3408	Feedwater pump drive - local controls
Nuclear	Balance of Plant	Feedwater System		3409	Feedwater pump drive motor - variable speed
Nuclear	Balance of Plant	Feedwater System		3410	Feedwater pump
Nuclear	Balance of Plant	Feedwater System		3411	Feedwater pump drive - motor
Nuclear	Balance of Plant	Feedwater System		3412	Feedwater pump drive - steam turbine
Nuclear	Balance of Plant	Feedwater System		3413	Feedwater pump coupling and drive shaft
Nuclear	Balance of Plant	Feedwater System		3414	Feedwater pump local controls
Nuclear	Balance of Plant	Feedwater System		3415	Feedwater pump/drive lube oil system
Nuclear	Balance of Plant	Feedwater System		3416	Other feedwater pump problems
Nuclear	Balance of Plant	Feedwater System		3417	Feedwater pump drive - main shaft
Nuclear	Balance of Plant	Feedwater System		3418	Feedwater pump drive - other
Nuclear	Balance of Plant	Feedwater System		3419	Feedwater pump drive - gear
Nuclear	Balance of Plant	Feedwater System		3420	Feedwater piping and supports
Nuclear	Balance of Plant	Feedwater System		3430	Feedwater regulating (boiler level control) valve
Nuclear	Balance of Plant	Feedwater System		3431	Other feedwater valves
Nuclear	Balance of Plant	Feedwater System		3439	HP heater head leaks
Nuclear	Balance of Plant	Feedwater System		3440	High pressure heater tube leaks
Nuclear	Balance of Plant	Feedwater System		3441	Other high pressure heater problems (see condensate system for LP and IP heater codes)
Nuclear	Balance of Plant	Feedwater System		3451	Feedwater booster pump suction screens
Nuclear	Balance of Plant	Feedwater System		3452	Feedwater booster pump drive - local controls
Nuclear	Balance of Plant	Feedwater System		3453	Feedwater booster pump drive motor - variable speed
Nuclear	Balance of Plant	Feedwater System		3454	Feedwater booster pump
Nuclear	Balance of Plant	Feedwater System		3455	Feedwater booster pump drive - motor
Nuclear	Balance of Plant	Feedwater System		3456	Feedwater booster pump drive - steam turbine
Nuclear	Balance of Plant	Feedwater System		3457	Feedwater booster pump coupling and drive shaft
Nuclear	Balance of Plant	Feedwater System		3458	Feedwater booster pump local controls
Nuclear	Balance of Plant	Feedwater System		3459	Feedwater booster pump/drive lube oil system
Nuclear	Balance of Plant	Feedwater System		3460	Other feedwater booster pump problems

Nuclear	Balance of Plant	Feedwater System		3461	Feedwater booster pump drive - main shaft
Nuclear	Balance of Plant	Feedwater System		3462	Feedwater booster pump drive - other
Nuclear	Balance of Plant	Feedwater System		3463	Feedwater booster pump drive - gear
Nuclear	Balance of Plant	Feedwater System		3499	Other feedwater system problems
Notes: 1) For use with Unit Codes 200-299. 2) Excluding extraction or drain systems.					

TABLE B14-23 Balance of Plant: Heater Drain Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Heater Drain Systems		3501	Heater drain pumps
Nuclear	Balance of Plant	Heater Drain Systems		3502	Heater level control
Nuclear	Balance of Plant	Heater Drain Systems		3503	Heater drain piping
Nuclear	Balance of Plant	Heater Drain Systems		3504	Heater drain valves
Nuclear	Balance of Plant	Heater Drain Systems		3505	Heater drain pump drive
Nuclear	Balance of Plant	Heater Drain Systems		3509	Other heater drain system problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-24 Balance of Plant: Miscellaneous (Balance of Plant)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3950	Process computer
Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3960	Thermal derating (thermal efficiency losses in balance of plant when specific cause(s) unknown)
Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3970	Distributive Control System (DCS) - process computer
Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3971	DCS - data highway
Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3972	DCS - hardware problems (including card failure)
Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3973	DCS - internal and termination wiring
Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3974	DCS - logic problems
Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3975	DCS - upgrades
Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3979	Other DCS problems
Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3980	Programmable Logic Controller (PLC)
Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3981	PLC - data highway
Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3982	PLC - hardware problems (including card failure)
Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3983	PLC - internal and termination wiring
Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3984	PLC - logic problems
Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3985	PLC - upgrades
Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3989	Other PLC problems

Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3995	Powerhouse heating and ventilating systems
Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3996	Air conditioning systems - rooms and areas
Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3998	Balance of plant overhaul/outage
Nuclear	Balance of Plant	Miscellaneous (Balance of Plant)		3999	Other miscellaneous balance of plant problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-25 Balance of Plant: Power Station Switchyard

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Power Station Switchyard		3700	Power Station switchyard (non generating unit equipment)
Nuclear	Balance of Plant	Power Station Switchyard		3710	Transmission line (connected to powerhouse switchyard to 1st Substation)
Nuclear	Balance of Plant	Power Station Switchyard		3720	Transmission equipment at the 1st substation (see code 9300 if applicable)
Nuclear	Balance of Plant	Power Station Switchyard		3730	Transmission equipment beyond the 1st substation (see code 9300 if applicable)
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-26 Balance of Plant: Waste Water (zero discharge) Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Balance of Plant	Waste Water (zero discharge) Systems		3290	Waste water (zero discharge) tanks, pumps, and motors
Nuclear	Balance of Plant	Waste Water (zero discharge) Systems		3291	Waste water (zero discharge) system fouling
Nuclear	Balance of Plant	Waste Water (zero discharge) Systems		3292	Waste water (zero discharge) piping
Nuclear	Balance of Plant	Waste Water (zero discharge) Systems		3293	Waste water (zero discharge) valves
Nuclear	Balance of Plant	Waste Water (zero discharge) Systems		3294	Waste water (zero discharge) controls and instrumentation
Nuclear	Balance of Plant	Waste Water (zero discharge) Systems		3295	Other waste water (zero discharge) problems
Notes: 1) For use with Unit Codes 200-299.					

EXTERNAL

Use this set of codes to report events caused by external factors (flood, lightning, etc.); economic factors (lack of fuel, labor strikes, etc.); operator training; and transmission system problems external to the plant.

TABLE B14-27 External: Catastrophe

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	External	Catastrophe		9000	Flood
Nuclear	External	Catastrophe		9001	Drought
Nuclear	External	Catastrophe		9010	Fire including wildfires, not related to a specific component
Nuclear	External	Catastrophe		9020	Lightning
Nuclear	External	Catastrophe		9025	Geomagnetic disturbance
Nuclear	External	Catastrophe		9030	Earthquake
Nuclear	External	Catastrophe		9031	Tornado
Nuclear	External	Catastrophe		9035	Hurricane
Nuclear	External	Catastrophe		9036	Storms (ice, snow, etc)
Nuclear	External	Catastrophe		9040	Other catastrophe
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-28 External: Economic

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	External	Economic		0	Reserve shutdown
Nuclear	External	Economic		9110	Core coastdown (nuclear)
Nuclear	External	Economic		9120	Core conservation (nuclear)
Nuclear	External	Economic		9130	Failure of fuel supplier to fulfill contractual obligations or a pre-arranged deal due to physical fuel disruptions or operational impairments (e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)
Nuclear	External	Economic		9131	Lack of fuel – due to contractual or tariff provisions that allow for service interruption or price fluctuations during peak demand periods.
Nuclear	External	Economic		9134	Fuel conservation
Nuclear	External	Economic		9137	Ground water or other water supply problems
Nuclear	External	Economic		9150	Labor strikes company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.
Nuclear	External	Economic		9151	Labor strikes direct plant management grievances that result in a walkout or strike are under plant management control.

Nuclear	External	Economic		9160	Other economic problems
Nuclear	External	Economic		9180	Economic (for internal use at plants only)
Nuclear	External	Economic		9181	Economic (for internal use at plants only)
Nuclear	External	Economic		9182	Economic (for internal use at plants only)
Nuclear	External	Economic		9183	Economic (for internal use at plants only)
Nuclear	External	Economic		9184	Economic (for internal use at plants only)
Nuclear	External	Economic		9185	Economic (for internal use at plants only)
Nuclear	External	Economic		9186	Economic (for internal use at plants only)
Nuclear	External	Economic		9187	Economic (for internal use at plants only)
Nuclear	External	Economic		9188	Economic (for internal use at plants only)
Nuclear	External	Economic		9189	Economic (for internal use at plants only)
Nuclear	External	Economic		9190	Economic (for internal use at plants only)
Nuclear	External	Economic		9191	Economic (for internal use at plants only)
Nuclear	External	Economic		9192	Economic (for internal use at plants only)
Nuclear	External	Economic		9193	Economic (for internal use at plants only)
Nuclear	External	Economic		9194	Economic (for internal use at plants only)
Nuclear	External	Economic		9195	Economic (for internal use at plants only)
Nuclear	External	Economic		9196	Economic (for internal use at plants only)
Nuclear	External	Economic		9197	Economic (for internal use at plants only)
Nuclear	External	Economic		9198	Economic (for internal use at plants only)
Nuclear	External	Economic		9199	Economic (for internal use at plants only)
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-29 External: Miscellaneous (External)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	External	Miscellaneous (External)		9300	Transmission system problems other than catastrophes (do not include switchyard problems in this category; see codes 3600 to 3629, 3720 to 3730)
Nuclear	External	Miscellaneous (External)		9310	Operator training
Nuclear	External	Miscellaneous (External)		9320	Other miscellaneous external problems
Notes: 1) For use with Unit Codes 200-299.					

GENERATOR

This set of codes contains the generator, exciter, generator cooling systems, and generator controls. Note the main leads up to and includes the generator output breaker in this set of codes.

TABLE B14-30 Generator: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Generator	Controls		4700	Generator voltage control

Nuclear	Generator	Controls		4710	Generator metering devices
Nuclear	Generator	Controls		4720	Generator synchronization equipment
Nuclear	Generator	Controls		4730	Generator current and potential transformers
Nuclear	Generator	Controls		4740	Emergency generator trip devices
Nuclear	Generator	Controls		4750	Other generator controls and metering problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-31 Generator: Cooling System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Generator	Cooling System		4610	Hydrogen cooling system piping and valves
Nuclear	Generator	Cooling System		4611	Hydrogen coolers
Nuclear	Generator	Cooling System		4612	Hydrogen storage system
Nuclear	Generator	Cooling System		4613	Hydrogen seals
Nuclear	Generator	Cooling System		4619	Other hydrogen system problems
Nuclear	Generator	Cooling System		4620	Air cooling system
Nuclear	Generator	Cooling System		4630	Liquid cooling system
Nuclear	Generator	Cooling System		4640	Seal oil system and seals
Nuclear	Generator	Cooling System		4650	Other cooling system problems
Notes: 1) For use with Unit Codes 200-299. 2) Report failures caused by water leaks into generator as codes 4500, 4510, etc.					

TABLE B14-32 Generator: Exciter

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Generator	Exciter		4600	Exciter drive - motor
Nuclear	Generator	Exciter		4601	Exciter field rheostat
Nuclear	Generator	Exciter		4602	Exciter commutator and brushes
Nuclear	Generator	Exciter		4603	Solid state exciter element
Nuclear	Generator	Exciter		4604	Exciter drive - shaft
Nuclear	Generator	Exciter		4605	Exciter transformer
Nuclear	Generator	Exciter		4609	Other exciter problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-33 Generator: Generator

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Generator	Generator		4500	Rotor windings (including damper windings and fan blades on hydro units)
Nuclear	Generator	Generator		4510	Rotor collector rings
Nuclear	Generator	Generator		4511	Rotor, General
Nuclear	Generator	Generator		4512	Retaining Rings
Nuclear	Generator	Generator		4520	Stator windings, bushings, and terminals
Nuclear	Generator	Generator		4530	Stator core iron

Nuclear	Generator	Generator		4535	Stator, General
Nuclear	Generator	Generator		4536	Generator Heaters
Nuclear	Generator	Generator		4540	Brushes and brush rigging
Nuclear	Generator	Generator		4550	Generator bearings and lube oil system (including thrust bearings on hydro units)
Nuclear	Generator	Generator		4551	Generator bearings
Nuclear	Generator	Generator		4552	Generator lube oil system
Nuclear	Generator	Generator		4555	Bearing cooling system
Nuclear	Generator	Generator		4560	Generator vibration (excluding vibration due to failed bearing and other components)
Nuclear	Generator	Generator		4570	Generator casing
Nuclear	Generator	Generator		4580	Generator end bells and bolting
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-34 Generator: Miscellaneous (Generator)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Generator	Miscellaneous (Generator)		4800	Generator main leads
Nuclear	Generator	Miscellaneous (Generator)		4805	Generator Bus Duct Cooling System
Nuclear	Generator	Miscellaneous (Generator)		4810	Generator output breaker
Nuclear	Generator	Miscellaneous (Generator)		4830	Major generator overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Nuclear	Generator	Miscellaneous (Generator)		4831	Minor generator overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Nuclear	Generator	Miscellaneous (Generator)		4840	Inspection
Nuclear	Generator	Miscellaneous (Generator)		4841	Generator doble testing
Nuclear	Generator	Miscellaneous (Generator)		4842	Reactive and capability testing
Nuclear	Generator	Miscellaneous (Generator)		4850	Core monitor alarm
Nuclear	Generator	Miscellaneous (Generator)		4860	Generator neutral grounding equipment
Nuclear	Generator	Miscellaneous (Generator)		4899	Other miscellaneous generator problems
Notes: 1) For use with Unit Codes 200-299.					

INACTIVE STATES

TABLE B14-35 Inactive States: Inactive States

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Inactive States	Inactive States		2	Inactive Reserve Shutdown
Nuclear	Inactive States	Inactive States		9990	Retired unit
Nuclear	Inactive States	Inactive States		9991	Mothballed unit
Notes: 1) For use with Unit Codes 200-299.					

NUCLEAR REACTOR

This set of codes contains the following:

- The reactor
- The containment system
- The reactor coolant system, including chemical, volume, and pressure control system
- Safety systems, both electrical and mechanical
- Residual heat removal systems
- Closed loop cooling water for reactor systems
- Service water for closed loop cooling and other reactor systems
- Steam generators
- Main steam systems up to the outboard containment isolation valve
- Feedwater systems from the reactor or steam generator up to the outboard containment isolation valve
- Blowdown systems
- Radioactive waste and off-gas systems

TABLE B14-36 Nuclear Reactor: Auxiliary Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Nuclear Reactor	Auxiliary Systems		2840	Auxiliary feedwater pumps
Nuclear	Nuclear Reactor	Auxiliary Systems		2841	Auxiliary feedwater pump motors
Nuclear	Nuclear Reactor	Auxiliary Systems		2842	Auxiliary feedwater pump steam turbines (including steam control valves)
Nuclear	Nuclear Reactor	Auxiliary Systems		2843	Auxiliary feedwater piping
Nuclear	Nuclear Reactor	Auxiliary Systems		2844	Auxiliary feedwater valves
Nuclear	Nuclear Reactor	Auxiliary Systems		2849	Other auxiliary feedwater problems
Nuclear	Nuclear Reactor	Auxiliary Systems		2870	Radioactive liquid waste system problems
Nuclear	Nuclear Reactor	Auxiliary Systems		2880	Radioactive gas and waste system problems
Nuclear	Nuclear Reactor	Auxiliary Systems		2890	Condenser off-gas system problems
Notes: 1) For use with Unit Codes 200-299. 2) See codes 3110 to 3999 for other auxiliary systems.					

TABLE B14-37 Nuclear Reactor: Chemical and Volume Control/Reactor Water Cleanup

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Nuclear Reactor	Chemical and Volume Control/Reactor Water Cleanup		2805	Moderator systems (CANDU)
Nuclear	Nuclear Reactor	Chemical and Volume Control/Reactor Water Cleanup		2806	Moderator purification (CANDU)
Nuclear	Nuclear Reactor	Chemical and Volume Control/Reactor Water Cleanup		2807	Moderator poison injection (CANDU)

Nuclear	Nuclear Reactor	Chemical and Volume Control/Reactor Water Cleanup		2810	Makeup pumps
Nuclear	Nuclear Reactor	Chemical and Volume Control/Reactor Water Cleanup		2811	Boric acid transfer pumps
Nuclear	Nuclear Reactor	Chemical and Volume Control/Reactor Water Cleanup		2812	Tanks
Nuclear	Nuclear Reactor	Chemical and Volume Control/Reactor Water Cleanup		2813	Demineralizers
Nuclear	Nuclear Reactor	Chemical and Volume Control/Reactor Water Cleanup		2814	Filters
Nuclear	Nuclear Reactor	Chemical and Volume Control/Reactor Water Cleanup		2815	Heat exchangers
Nuclear	Nuclear Reactor	Chemical and Volume Control/Reactor Water Cleanup		2816	Valves and piping
Nuclear	Nuclear Reactor	Chemical and Volume Control/Reactor Water Cleanup		2817	Instruments and controls
Nuclear	Nuclear Reactor	Chemical and Volume Control/Reactor Water Cleanup		2819	Other CVCS and RWC problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-38 Nuclear Reactor: Containment System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Nuclear Reactor	Containment System		2700	Containment structure
Nuclear	Nuclear Reactor	Containment System		2701	Containment liner
Nuclear	Nuclear Reactor	Containment System		2702	Containment hatches
Nuclear	Nuclear Reactor	Containment System		2703	Containment penetrations
Nuclear	Nuclear Reactor	Containment System		2720	Containment isolation valves and dampers
Nuclear	Nuclear Reactor	Containment System		2730	Containment isolation actuation
Nuclear	Nuclear Reactor	Containment System		2740	Containment penetration pressurization system
Nuclear	Nuclear Reactor	Containment System		2750	Containment hydrogen control system (vents, recombiners, etc.)
Nuclear	Nuclear Reactor	Containment System		2760	Containment spray system (including actuation)
Nuclear	Nuclear Reactor	Containment System		2770	Containment cooling system - normal
Nuclear	Nuclear Reactor	Containment System		2771	Containment cooling and gas cleanup - post accident
Nuclear	Nuclear Reactor	Containment System		2780	Containment testing
Nuclear	Nuclear Reactor	Containment System		2799	Other containment system problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-39 Nuclear Reactor: Control Rods and Drives

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Nuclear Reactor	Control Rods and Drives		2110	Control rod drive motors
Nuclear	Nuclear Reactor	Control Rods and Drives		2111	Control rod magnetic jack drives

Nuclear	Nuclear Reactor	Control Rods and Drives		2112	Control rod hydraulic drives
Nuclear	Nuclear Reactor	Control Rods and Drives		2120	Control rod scram mechanisms
Nuclear	Nuclear Reactor	Control Rods and Drives		2125	Reactivity control units (CANDU)
Nuclear	Nuclear Reactor	Control Rods and Drives		2130	Control rod assemblies other than drive and scram mechanisms
Nuclear	Nuclear Reactor	Control Rods and Drives		2140	Control rod drive cooling
Nuclear	Nuclear Reactor	Control Rods and Drives		2150	Control rod instrumentation
Nuclear	Nuclear Reactor	Control Rods and Drives		2151	Control rod drive controls
Nuclear	Nuclear Reactor	Control Rods and Drives		2152	Control rod drive power supplies
Nuclear	Nuclear Reactor	Control Rods and Drives		2155	Control rod testing
Nuclear	Nuclear Reactor	Control Rods and Drives		2160	Other control rod drive problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-40 Nuclear Reactor: Core Cooling/Safety Injection

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Nuclear Reactor	Core Cooling/Safety Injection		2600	High pressure safety injection, core injection, or core spray pumps (including RCIC)
Nuclear	Nuclear Reactor	Core Cooling/Safety Injection		2601	Motors for high pressure pumps
Nuclear	Nuclear Reactor	Core Cooling/Safety Injection		2602	Steam turbine drives for high pressure pumps (including RCIC)
Nuclear	Nuclear Reactor	Core Cooling/Safety Injection		2603	High pressure piping
Nuclear	Nuclear Reactor	Core Cooling/Safety Injection		2604	High pressure valves
Nuclear	Nuclear Reactor	Core Cooling/Safety Injection		2609	Other high pressure injection problems
Nuclear	Nuclear Reactor	Core Cooling/Safety Injection		2620	Low pressure safety injection, core spray, or decay heat pumps
Nuclear	Nuclear Reactor	Core Cooling/Safety Injection		2621	Motors for low pressure pumps
Nuclear	Nuclear Reactor	Core Cooling/Safety Injection		2622	Low pressure piping
Nuclear	Nuclear Reactor	Core Cooling/Safety Injection		2623	Low pressure valves
Nuclear	Nuclear Reactor	Core Cooling/Safety Injection		2624	Low pressure heat exchangers
Nuclear	Nuclear Reactor	Core Cooling/Safety Injection		2625	Accumulators (up to and including check valves)
Nuclear	Nuclear Reactor	Core Cooling/Safety Injection		2628	Residual heat removal/decay heat removal system
Nuclear	Nuclear Reactor	Core Cooling/Safety Injection		2629	Other low pressure problems
Nuclear	Nuclear Reactor	Core Cooling/Safety Injection		2630	Safeguard actuation system (including sensors, logic, activators, and sequencers)
Nuclear	Nuclear Reactor	Core Cooling/Safety Injection		2649	Other emergency core cooling/residual heat removal system problems
Notes: 1) For use with Unit Codes 200-299. 2) Where portions of these systems also serve in the makeup system, report problems as CVCS problems.					

TABLE B14-41 Nuclear Reactor: Core/Fuel

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Nuclear	Nuclear Reactor	Core/Fuel		2010	Fuel failure, including high activity in Reactor Coolant System (RCS) or off-gas system
Nuclear	Nuclear Reactor	Core/Fuel		2020	Control rod pattern changes and control rod repatch. (Preconditioning following a pattern change is to be reported using code 2031.)
Nuclear	Nuclear Reactor	Core/Fuel		2021	Power limited by rod pattern. (If rod pattern is limited by fuel limits, use appropriate code below.)
Nuclear	Nuclear Reactor	Core/Fuel		2030	Fuel limits - peaking factors
Nuclear	Nuclear Reactor	Core/Fuel		2031	Fuel preconditioning
Nuclear	Nuclear Reactor	Core/Fuel		2032	Fuel limits - MCPR (Minimum Critical Power Ratio - BWR units only)
Nuclear	Nuclear Reactor	Core/Fuel		2033	Fuel limits - MAPLHGR (Maximum Average Planar Linear Heat Generation Rate - BWR units only)
Nuclear	Nuclear Reactor	Core/Fuel		2034	Core tilt restrictions
Nuclear	Nuclear Reactor	Core/Fuel		2035	Core xenon restrictions
Nuclear	Nuclear Reactor	Core/Fuel		2036	End of life scram reactivity/rod worth restrictions
Nuclear	Nuclear Reactor	Core/Fuel		2037	Other fuel limits (use codes 9110 and 9120 for core coastdown, conservation, or stretch)
Nuclear	Nuclear Reactor	Core/Fuel		2040	Core physics tests
Nuclear	Nuclear Reactor	Core/Fuel		2050	Burnable poison problems including poison curtains
Nuclear	Nuclear Reactor	Core/Fuel		2060	Excore nuclear instrumentation
Nuclear	Nuclear Reactor	Core/Fuel		2061	Incore nuclear instrumentation
Nuclear	Nuclear Reactor	Core/Fuel		2062	Other fuel/core related instrumentation problems
Nuclear	Nuclear Reactor	Core/Fuel		2070	Normal refueling
Nuclear	Nuclear Reactor	Core/Fuel		2071	Refueling equipment problems
Nuclear	Nuclear Reactor	Core/Fuel		2072	Fuel storage
Nuclear	Nuclear Reactor	Core/Fuel		2080	Fueling machine and auxiliaries (CANDU)
Nuclear	Nuclear Reactor	Core/Fuel		2082	Fuel transfer problems (CANDU)
Nuclear	Nuclear Reactor	Core/Fuel		2090	Other core/fuel problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-42 Nuclear Reactor: Electrical Safety Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Nuclear Reactor	Electrical Safety Systems		2650	Emergency diesel generators (including actuating systems)
Nuclear	Nuclear Reactor	Electrical Safety Systems		2651	Emergency diesel generator output breakers
Nuclear	Nuclear Reactor	Electrical Safety Systems		2660	Safeguard buses and associated equipment (transformers, breakers, etc.)
Nuclear	Nuclear Reactor	Electrical Safety Systems		2670	DC safety system power supplies

Nuclear	Nuclear Reactor	Electrical Safety Systems		2680	120V AC safety system power supplies (including inverter)
Nuclear	Nuclear Reactor	Electrical Safety Systems		2699	Other electrical safety system power supplies (use codes 3600 to 3659 for nonsafety electrical systems)
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-43 Nuclear Reactor: Miscellaneous (Reactor)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Nuclear Reactor	Miscellaneous (Reactor)		2900	Reactor overhaul (use for non-specific overhaul only; see page B-CCGT-2)
Nuclear	Nuclear Reactor	Miscellaneous (Reactor)		2990	Plant radiation levels
Nuclear	Nuclear Reactor	Miscellaneous (Reactor)		2991	Radioactivity discharge levels to the environment
Nuclear	Nuclear Reactor	Miscellaneous (Reactor)		2995	Reactor performance testing (use code 9999 for total unit performance testing)
Nuclear	Nuclear Reactor	Miscellaneous (Reactor)		2999	Other miscellaneous nuclear reactor problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-44 Nuclear Reactor: Nuclear Cooling Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Nuclear Reactor	Nuclear Cooling Water Systems		2820	Nuclear closed cooling water pumps
Nuclear	Nuclear Reactor	Nuclear Cooling Water Systems		2821	Nuclear closed cooling water piping
Nuclear	Nuclear Reactor	Nuclear Cooling Water Systems		2822	Nuclear closed cooling water valves
Nuclear	Nuclear Reactor	Nuclear Cooling Water Systems		2823	Nuclear closed cooling heat exchanger
Nuclear	Nuclear Reactor	Nuclear Cooling Water Systems		2825	Turbine building closed cooling water system
Nuclear	Nuclear Reactor	Nuclear Cooling Water Systems		2829	Other closed cooling water system problems
Nuclear	Nuclear Reactor	Nuclear Cooling Water Systems		2830	Nuclear service water pumps
Nuclear	Nuclear Reactor	Nuclear Cooling Water Systems		2831	Nuclear service water piping
Nuclear	Nuclear Reactor	Nuclear Cooling Water Systems		2832	Nuclear service water valves
Nuclear	Nuclear Reactor	Nuclear Cooling Water Systems		2833	Nuclear service water heat exchangers
Nuclear	Nuclear Reactor	Nuclear Cooling Water Systems		2839	Other service water problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-45 Nuclear Reactor: Reactor Coolant System - Instruments and Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Nuclear Reactor	Reactor Coolant System	Instruments and Controls	2330	Pressurizer level instruments and controls
Nuclear	Nuclear Reactor	Reactor Coolant System	Instruments and Controls	2340	Pressurizer pressure instruments and controls
Nuclear	Nuclear Reactor	Reactor Coolant System	Instruments and Controls	2350	BWR feedwater controls
Nuclear	Nuclear Reactor	Reactor Coolant System	Instruments and Controls	2360	BWR pressure controls

Nuclear	Nuclear Reactor	Reactor Coolant System	Instruments and Controls	2370	Reactor trip system including sensors, logic, and actuators (includes spurious trips but not valid trips)
Nuclear	Nuclear Reactor	Reactor Coolant System	Instruments and Controls	2380	Reactor control system/integrated control system problems
Nuclear	Nuclear Reactor	Reactor Coolant System	Instruments and Controls	2390	Other reactor coolant system instruments and controls
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-46 Nuclear Reactor: Reactor Coolant System - Miscellaneous (Reactor Coolant System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Nuclear Reactor	Reactor Coolant System	Miscellaneous (Reactor Coolant System)	2399	Other miscellaneous reactor coolant system problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-47 Nuclear Reactor: Reactor Coolant System - Piping

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Nuclear Reactor	Reactor Coolant System	Piping	2230	Reactor coolant system piping
Nuclear	Nuclear Reactor	Reactor Coolant System	Piping	2240	Reactor coolant system pipe supports
Nuclear	Nuclear Reactor	Reactor Coolant System	Piping	2250	Reactor coolant system filters and strainers
Nuclear	Nuclear Reactor	Reactor Coolant System	Piping	2260	Reactor coolant flanges, fittings, and manways
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-48 Nuclear Reactor: Reactor Coolant System - Pressurizer

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Nuclear Reactor	Reactor Coolant System	Pressurizer	2265	Pressurizer (also see codes 2290, 2330, and 2340)
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-49 Nuclear Reactor: Reactor Coolant System - Pumps

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Nuclear Reactor	Reactor Coolant System	Pumps	2200	Reactor coolant/recirculating pumps
Nuclear	Nuclear Reactor	Reactor Coolant System	Pumps	2210	Reactor coolant/recirculating pump motors
Nuclear	Nuclear Reactor	Reactor Coolant System	Pumps	2220	Reactor coolant/recirculating pump MG sets
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-50 Nuclear Reactor: Reactor Coolant System - Valves

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Nuclear Reactor	Reactor Coolant System	Valves	2270	Power operated relief and safety/relief valves

Nuclear	Nuclear Reactor	Reactor Coolant System	Valves	2280	Non-power operated safety valves
Nuclear	Nuclear Reactor	Reactor Coolant System	Valves	2290	Pressurizer spray valves
Nuclear	Nuclear Reactor	Reactor Coolant System	Valves	2300	Recirculation loop flow control valves
Nuclear	Nuclear Reactor	Reactor Coolant System	Valves	2320	Other reactor coolant valves (including RCS boundary valves in connected systems)
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-51 Nuclear Reactor: Reactor Vessel and Internals

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Nuclear Reactor	Reactor Vessel and Internals		2170	Reactor vessel flanges and seals
Nuclear	Nuclear Reactor	Reactor Vessel and Internals		2171	Reactor vessel nozzles
Nuclear	Nuclear Reactor	Reactor Vessel and Internals		2172	Feedwater sparges
Nuclear	Nuclear Reactor	Reactor Vessel and Internals		2173	Jet pumps
Nuclear	Nuclear Reactor	Reactor Vessel and Internals		2174	Core support
Nuclear	Nuclear Reactor	Reactor Vessel and Internals		2175	Specimen holders
Nuclear	Nuclear Reactor	Reactor Vessel and Internals		2176	Control rod guides (not in fuel)
Nuclear	Nuclear Reactor	Reactor Vessel and Internals		2180	Calandria and Calandria tubes (CANDU)
Nuclear	Nuclear Reactor	Reactor Vessel and Internals		2185	Coolant assemblies (pressure tubes) (CANDU)
Nuclear	Nuclear Reactor	Reactor Vessel and Internals		2199	Other reactor vessel problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-52 Nuclear Reactor: Steam Generators and Steam System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2400	Steam generator tube leaks
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2411	Steam generator tube inspections
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2412	Steam generator tube supports
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2420	Steam generator moisture separators and dryers
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2421	Steam generator feedwater nozzles
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2422	Other steam generator internals problems
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2430	Steam generator shell
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2431	Steam generator flanges, manways, and fittings
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2432	Steam generator supports and snubbers
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2440	Steam generator chemistry (excluding feedwater chemistry)
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2441	Steam generator tube lancing
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2442	Steam generator chemical cleaning
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2443	Steam generator modifications
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2450	Blowdown system piping
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2460	Blowdown system valves

Nuclear	Nuclear Reactor	Steam Generators and Steam System		2470	Blowdown system instruments and controls
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2480	Other blowdown
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2500	Steam piping (up to turbine stop valves and bypass valves)
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2510	Main steam isolation valves (BWR and PWR)
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2515	Main steam isolation valve testing
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2520	Main steam safety/relief valves
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2521	Main steam safety/relief valve testing
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2530	Atmospheric or condenser dump valves (not SRVs)
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2540	Other steam valves
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2550	Steam generator instruments (including piping and valves) (no RPS or SAS inputs)
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2560	Steam generator controls
Nuclear	Nuclear Reactor	Steam Generators and Steam System		2599	Other steam generator problems
Notes: 1) For use with Unit Codes 200-299.					

PERFORMANCE

TABLE B14-53 Performance: Performance

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Performance	Performance		9997	NERC Reliability Standard Requirement
Nuclear	Performance	Performance		9998	Black start testing
Nuclear	Performance	Performance		9999	Total unit performance testing (use appropriate codes for individual component testing)
Notes: 1) For use with Unit Codes 200-299.					

PERSONNEL OR PROCEDURAL ERRORS

TABLE B14-54 Personnel or Procedural Errors: Personnel or Procedural Errors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Personnel or Procedural Errors	Personnel or Procedural Errors		9900	Operator error
Nuclear	Personnel or Procedural Errors	Personnel or Procedural Errors		9910	Maintenance personnel error
Nuclear	Personnel or Procedural Errors	Personnel or Procedural Errors		9920	Contractor error
Nuclear	Personnel or Procedural Errors	Personnel or Procedural Errors		9930	Operating procedure error
Nuclear	Personnel or Procedural Errors	Personnel or Procedural Errors		9940	Maintenance procedure error
Nuclear	Personnel or Procedural Errors	Personnel or Procedural Errors		9950	Contractor procedure error

Nuclear	Personnel or Procedural Errors	Personnel or Procedural Errors		9960	Staff shortage
Notes: 1) For use with Unit Codes 200-299.					

REGULATORY, SAFETY, ENVIRONMENTAL

Use these codes only for events not directly attributable to equipment failures. Inspections or testing of certain equipment due to regulation are reported using the appropriate equipment cause codes, and the fact that it was a regulatory requirement noted in the verbal description section.

TABLE B14-55 Regulatory, Safety, Environmental: Other Operating Environmental Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9660	Thermal discharge limits - fossil and nuclear
Nuclear	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9670	Noise limits (not for personnel safety) – fossil and nuclear
Nuclear	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9680	Fish kill - fossil and nuclear
Nuclear	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9690	Other miscellaneous operational environmental limits - fossil and nuclear
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-56 Regulatory, Safety, Environmental: Regulatory

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Regulatory, Safety, Environmental	Regulatory		9500	Regulatory (nuclear) proceedings and hearings - regulatory agency initiated
Nuclear	Regulatory, Safety, Environmental	Regulatory		9502	Regulatory (nuclear) proceedings and hearings - intervenor initiated
Nuclear	Regulatory, Safety, Environmental	Regulatory		9504	Regulatory (environmental) proceedings and hearings - regulatory agency initiated
Nuclear	Regulatory, Safety, Environmental	Regulatory		9506	Regulatory (environmental) proceedings and hearings - intervenor initiated
Nuclear	Regulatory, Safety, Environmental	Regulatory		9510	Plant modifications strictly for compliance with new or changed regulatory requirements (scrubbers, cooling towers, etc.)
Nuclear	Regulatory, Safety, Environmental	Regulatory		9520	Oil spill in Gulf of Mexico (OMC)
Nuclear	Regulatory, Safety, Environmental	Regulatory		9590	Miscellaneous regulatory (this code is primarily intended for use with event contribution code 2 to indicate that a regulatory-related factor contributed to the primary cause of the event)
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-57 Regulatory, Safety, Environmental: Safety

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

Nuclear	Regulatory, Safety, Environmental	Safety		9700	OSHA-related retrofit or inspection
Nuclear	Regulatory, Safety, Environmental	Safety		9710	Investigation of possible nuclear safety problems
Nuclear	Regulatory, Safety, Environmental	Safety		9720	Other safety problems
Notes: 1) For use with Unit Codes 200-299.					

STEAM TURBINE

Besides the turbine, this set includes the steam stop/control valves, turbine control system, and the turbine auxiliaries. The extraction steam codes are contained in the Balance of Plant set.

TABLE B14-58 Steam Turbine: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Steam Turbine	Controls		4290	Hydraulic system pumps
Nuclear	Steam Turbine	Controls		4291	Hydraulic system coolers
Nuclear	Steam Turbine	Controls		4292	Hydraulic system filters
Nuclear	Steam Turbine	Controls		4293	Hydraulic system pipes and valves
Nuclear	Steam Turbine	Controls		4299	Other hydraulic system problems
Nuclear	Steam Turbine	Controls		4300	Turbine supervisory system (use codes 4290 to 4299 for hydraulic oil)
Nuclear	Steam Turbine	Controls		4301	Turbine governing system
Nuclear	Steam Turbine	Controls		4302	Turbine trip devices (including instruments)
Nuclear	Steam Turbine	Controls		4303	Exhaust hood and spray controls
Nuclear	Steam Turbine	Controls		4304	Automatic turbine control systems - mechanical
Nuclear	Steam Turbine	Controls		4305	Automatic turbine control systems - mechanical - hydraulic
Nuclear	Steam Turbine	Controls		4306	Automatic turbine control systems - electro-hydraulic - analog
Nuclear	Steam Turbine	Controls		4307	Automatic turbine control systems - electro-hydraulic - digital
Nuclear	Steam Turbine	Controls		4308	Automatic turbine control systems - digital control and monitoring
Nuclear	Steam Turbine	Controls		4309	Other turbine instrument and control problems
Nuclear	Steam Turbine	Controls		4310	Steam Turbine Control System - data highway
Nuclear	Steam Turbine	Controls		4311	Steam Turbine Control System - hardware problems (including card failure)
Nuclear	Steam Turbine	Controls		4312	Steam Turbine Control System - internal and termination wiring
Nuclear	Steam Turbine	Controls		4313	Steam Turbine Control System - logic problems
Nuclear	Steam Turbine	Controls		4314	Steam Turbine Control System - upgrades
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-59 Steam Turbine: High Pressure Turbine					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Nuclear	Steam Turbine	High Pressure Turbine		4000	Outer casing
Nuclear	Steam Turbine	High Pressure Turbine		4001	Inner casing
Nuclear	Steam Turbine	High Pressure Turbine		4009	Nozzle bolting
Nuclear	Steam Turbine	High Pressure Turbine		4010	Nozzles and nozzle blocks
Nuclear	Steam Turbine	High Pressure Turbine		4011	Diaphragms
Nuclear	Steam Turbine	High Pressure Turbine		4012	Buckets or blades
Nuclear	Steam Turbine	High Pressure Turbine		4013	Diaphragms unit and shroud type
Nuclear	Steam Turbine	High Pressure Turbine		4014	Bucket or blade fouling
Nuclear	Steam Turbine	High Pressure Turbine		4015	Wheels or spindles
Nuclear	Steam Turbine	High Pressure Turbine		4020	Shaft seals
Nuclear	Steam Turbine	High Pressure Turbine		4021	Dummy rings
Nuclear	Steam Turbine	High Pressure Turbine		4022	Gland rings
Nuclear	Steam Turbine	High Pressure Turbine		4030	Rotor shaft
Nuclear	Steam Turbine	High Pressure Turbine		4040	Bearings
Nuclear	Steam Turbine	High Pressure Turbine		4041	Thrust bearings
Nuclear	Steam Turbine	High Pressure Turbine		4099	Other high pressure turbine problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-60 Steam Turbine: Intermediate Pressure Turbine					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Nuclear	Steam Turbine	Intermediate Pressure Turbine		4100	Outer casing
Nuclear	Steam Turbine	Intermediate Pressure Turbine		4101	Inner casing
Nuclear	Steam Turbine	Intermediate Pressure Turbine		4109	Nozzle bolting
Nuclear	Steam Turbine	Intermediate Pressure Turbine		4110	Nozzles and nozzle blocks
Nuclear	Steam Turbine	Intermediate Pressure Turbine		4111	Diaphragms
Nuclear	Steam Turbine	Intermediate Pressure Turbine		4112	Buckets or blades
Nuclear	Steam Turbine	Intermediate Pressure Turbine		4113	Bucket or blade fouling
Nuclear	Steam Turbine	Intermediate Pressure Turbine		4115	Wheels or spindles
Nuclear	Steam Turbine	Intermediate Pressure Turbine		4120	Shaft seals
Nuclear	Steam Turbine	Intermediate Pressure Turbine		4121	Dummy rings
Nuclear	Steam Turbine	Intermediate Pressure Turbine		4122	Gland rings
Nuclear	Steam Turbine	Intermediate Pressure Turbine		4130	Rotor shaft
Nuclear	Steam Turbine	Intermediate Pressure Turbine		4140	Bearings
Nuclear	Steam Turbine	Intermediate Pressure Turbine		4141	Thrust bearings
Nuclear	Steam Turbine	Intermediate Pressure Turbine		4199	Other intermediate pressure turbine problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-61 Steam Turbine: Low Pressure Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Steam Turbine	Low Pressure Turbine		4200	Outer casing
Nuclear	Steam Turbine	Low Pressure Turbine		4201	Inner casing
Nuclear	Steam Turbine	Low Pressure Turbine		4209	Nozzle bolting
Nuclear	Steam Turbine	Low Pressure Turbine		4210	Nozzles and nozzle blocks
Nuclear	Steam Turbine	Low Pressure Turbine		4211	Diaphragms
Nuclear	Steam Turbine	Low Pressure Turbine		4212	Buckets or blades
Nuclear	Steam Turbine	Low Pressure Turbine		4213	Bucket or blade fouling
Nuclear	Steam Turbine	Low Pressure Turbine		4215	Wheels or spindles
Nuclear	Steam Turbine	Low Pressure Turbine		4220	Shaft seals
Nuclear	Steam Turbine	Low Pressure Turbine		4221	Dummy rings
Nuclear	Steam Turbine	Low Pressure Turbine		4222	Gland rings
Nuclear	Steam Turbine	Low Pressure Turbine		4230	Rotor shaft
Nuclear	Steam Turbine	Low Pressure Turbine		4240	Bearings
Nuclear	Steam Turbine	Low Pressure Turbine		4241	Thrust bearings
Nuclear	Steam Turbine	Low Pressure Turbine		4250	Other low pressure turbine problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-62 Steam Turbine: Lube Oil

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Steam Turbine	Lube Oil		4280	Lube oil pumps
Nuclear	Steam Turbine	Lube Oil		4281	Lube oil coolers
Nuclear	Steam Turbine	Lube Oil		4282	Lube oil conditioners
Nuclear	Steam Turbine	Lube Oil		4283	Lube oil system valves and piping
Nuclear	Steam Turbine	Lube Oil		4284	Lube oil pump drive
Nuclear	Steam Turbine	Lube Oil		4289	Other lube oil system problems
Notes: 1) For use with Unit Codes 200-299. 2) Do not include bearing failures due to lube oil.					

TABLE B14-63 Steam Turbine: Miscellaneous (Steam Turbine)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Steam Turbine	Miscellaneous (Steam Turbine)		4400	Major turbine overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Nuclear	Steam Turbine	Miscellaneous (Steam Turbine)		4401	Inspection
Nuclear	Steam Turbine	Miscellaneous (Steam Turbine)		4402	Minor turbine overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Nuclear	Steam Turbine	Miscellaneous (Steam Turbine)		4410	Turning gear and motor
Nuclear	Steam Turbine	Miscellaneous (Steam Turbine)		4411	Steam turbine gear box (single shaft configuration)

Nuclear	Steam Turbine	Miscellaneous (Steam Turbine)		4412	Steam turbine clutch (single shaft configuration)
Nuclear	Steam Turbine	Miscellaneous (Steam Turbine)		4415	Shaft coupling mechanism
Nuclear	Steam Turbine	Miscellaneous (Steam Turbine)		4420	Vibration of the turbine generator unit that cannot be attributed to a specific cause such as bearings or blades (use this code for balance moves)
Nuclear	Steam Turbine	Miscellaneous (Steam Turbine)		4430	Gland seal system
Nuclear	Steam Turbine	Miscellaneous (Steam Turbine)		4440	Moisture separator/reheater (nuclear including MSR drains, controls, etc.)
Nuclear	Steam Turbine	Miscellaneous (Steam Turbine)		4445	Steam reheater
Nuclear	Steam Turbine	Miscellaneous (Steam Turbine)		4450	Water induction
Nuclear	Steam Turbine	Miscellaneous (Steam Turbine)		4460	Turbine overspeed trip test
Nuclear	Steam Turbine	Miscellaneous (Steam Turbine)		4470	Differential expansion
Nuclear	Steam Turbine	Miscellaneous (Steam Turbine)		4490	Turbine performance testing (use code 9999 for total unit performance testing)
Nuclear	Steam Turbine	Miscellaneous (Steam Turbine)		4499	Other miscellaneous steam turbine problems
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-64 Steam Turbine: Piping

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Steam Turbine	Piping		4270	Crossover or under piping
Nuclear	Steam Turbine	Piping		4279	Miscellaneous turbine piping
Notes: 1) For use with Unit Codes 200-299.					

TABLE B14-65 Steam Turbine: Valves

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Nuclear	Steam Turbine	Valves		4260	Main stop valves
Nuclear	Steam Turbine	Valves		4261	Control valves
Nuclear	Steam Turbine	Valves		4262	Intercept valves
Nuclear	Steam Turbine	Valves		4263	Reheat stop valves
Nuclear	Steam Turbine	Valves		4264	Combined intercept valves
Nuclear	Steam Turbine	Valves		4265	Miscellaneous drain and vent valves
Nuclear	Steam Turbine	Valves		4266	Main stop valve testing
Nuclear	Steam Turbine	Valves		4267	Control valve testing
Nuclear	Steam Turbine	Valves		4268	Reheat/intercept valve testing
Nuclear	Steam Turbine	Valves		4269	Other turbine valves (including LP steam admission valves)
Notes: 1) For use with Unit Codes 200-299.					

Appendix B15: Index To Pumped Storage/Hydro Unit Cause Codes

PUMPED STORAGE/HYDRO UNITS

INDEX TO SYSTEM/COMPONENT/SUB-COMPONENT CAUSE CODE TABLES			
TABLE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**
B15-1	Balance of Plant	Auxiliary Systems	Auxiliary Steam
B15-2	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems
B15-3	Balance of Plant	Auxiliary Systems	Fire Protection System
B15-4	Balance of Plant	Auxiliary Systems	Instrument Air
B15-5	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)
B15-6	Balance of Plant	Auxiliary Systems	Service Air
B15-7	Balance of Plant	Auxiliary Systems	Service Water (Open System)
B15-8	Balance of Plant	Electrical	
B15-9	Balance of Plant	Miscellaneous (Balance of Plant)	
B15-10	Balance of Plant	Power Station Switchyard	
B15-11	External	Catastrophe	
B15-12	External	Economic	
B15-13	External	Miscellaneous (External)	
B15-14	Generator	Controls	
B15-15	Generator	Cooling System	
B15-16	Generator	Exciter	
B15-17	Generator	Generator	
B15-18	Generator	Miscellaneous (Generator)	
B15-19	Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)	
B15-20	Hydro Turbine/Pump	Turbine	
B15-21	Hydro Turbine/Pump	Water Supply/Discharge	
B15-22	Inactive States	Inactive States	
B15-23	Performance	Performance	
B15-24	Personnel or Procedural Errors	Personnel or Procedural Errors	
B15-25	Regulatory, Safety, Environmental	Other Operating Environmental Limitations	
B15-26	Regulatory, Safety, Environmental	Regulatory	
B15-27	Regulatory, Safety, Environmental	Safety	

BALANCE OF PLANT

TABLE B15-1 Balance of Plant: Auxiliary Systems - Auxiliary Steam					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3830	Auxiliary boiler
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3831	Auxiliary steam piping
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3832	Auxiliary steam valves
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3833	Auxiliary steam controls and instruments

Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3834	Auxiliary boiler tube leaks
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Auxiliary Steam	3839	Other auxiliary steam problems
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

TABLE B15-2 Balance of Plant: Auxiliary Systems - Closed Cooling Water Systems

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3820	Closed cooling water pumps and motors
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3821	Closed cooling water piping
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3822	Closed cooling water valves
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3823	Closed cooling water heat exchangers
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3824	Closed cooling water system fouling
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3829	Other closed cooling water system problems
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

TABLE B15-3 Balance of Plant: Auxiliary Systems - Fire Protection System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Fire Protection System	3860	Fire protection system pumps
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Fire Protection System	3861	Fire protection system piping
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Fire Protection System	3862	Fire protection system valves
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Fire Protection System	3863	Fire protection system fouling
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Fire Protection System	3869	Other fire protection system problems
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

TABLE B15-4 Balance of Plant: Auxiliary Systems - Instrument Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Instrument Air	3850	Instrument air compressors
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Instrument Air	3851	Instrument air piping
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Instrument Air	3852	Instrument air valves
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Instrument Air	3853	Instrument air dryers
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Instrument Air	3854	N2 backup to instrument air
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Instrument Air	3859	Other instrument air problems
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

TABLE B15-5 Balance of Plant: Auxiliary Systems - Miscellaneous (Auxiliary Systems)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3898	Miscellaneous plant auxiliary process and services instrumentation and controls

Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3899	Other miscellaneous auxiliary system problems
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

TABLE B15-6 Balance of Plant: Auxiliary Systems - Service Air

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Service Air	3840	Service air compressors
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Service Air	3841	Service air piping
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Service Air	3842	Service air valves
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Service Air	3843	Service air dryers
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Service Air	3849	Other service air problems
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

TABLE B15-7 Balance of Plant: Auxiliary Systems - Service Water (Open System)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3810	Service water pumps and motors
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3811	Service water piping
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3812	Service water valves
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3813	Service water heat exchangers
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3814	Service water system fouling
Pumped Storage/Hydro	Balance of Plant	Auxiliary Systems	Service Water (Open System)	3819	Other service water problems
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

TABLE B15-8 Balance of Plant: Electrical

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Balance of Plant	Electrical		3600	Switchyard transformers and associated cooling systems - external (OMC)
Pumped Storage/Hydro	Balance of Plant	Electrical		3601	Switchyard transformers and associated cooling systems - external (not OMC)
Pumped Storage/Hydro	Balance of Plant	Electrical		3610	Switchyard circuit breakers - external (not OMC)
Pumped Storage/Hydro	Balance of Plant	Electrical		3611	Switchyard circuit breakers - external (OMC)
Pumped Storage/Hydro	Balance of Plant	Electrical		3612	Switchyard system protection devices - external (OMC)
Pumped Storage/Hydro	Balance of Plant	Electrical		3613	Switchyard system protection devices - external (not OMC)
Pumped Storage/Hydro	Balance of Plant	Electrical		3618	Other switchyard equipment - external (not OMC)
Pumped Storage/Hydro	Balance of Plant	Electrical		3619	Other switchyard equipment - external (OMC)
Pumped Storage/Hydro	Balance of Plant	Electrical		3620	Main transformer

Pumped Storage/Hydro	Balance of Plant	Electrical		3621	Unit auxiliaries transformer
Pumped Storage/Hydro	Balance of Plant	Electrical		3622	Station service startup transformer
Pumped Storage/Hydro	Balance of Plant	Electrical		3623	Auxiliary generators
Pumped Storage/Hydro	Balance of Plant	Electrical		3624	Auxiliary generator voltage supply system
Pumped Storage/Hydro	Balance of Plant	Electrical		3629	Other switchyard or high voltage system problems - external
Pumped Storage/Hydro	Balance of Plant	Electrical		3630	400-700 volt transformers
Pumped Storage/Hydro	Balance of Plant	Electrical		3631	400-700 volt circuit breakers
Pumped Storage/Hydro	Balance of Plant	Electrical		3632	400-700 volt conductors and buses
Pumped Storage/Hydro	Balance of Plant	Electrical		3633	400-700 volt insulators
Pumped Storage/Hydro	Balance of Plant	Electrical		3634	400-700 volt protection devices
Pumped Storage/Hydro	Balance of Plant	Electrical		3639	Other 400-700 volt problems
Pumped Storage/Hydro	Balance of Plant	Electrical		3640	AC instrument power transformers
Pumped Storage/Hydro	Balance of Plant	Electrical		3641	AC Circuit breakers
Pumped Storage/Hydro	Balance of Plant	Electrical		3642	AC Conductors and buses
Pumped Storage/Hydro	Balance of Plant	Electrical		3643	AC Inverters
Pumped Storage/Hydro	Balance of Plant	Electrical		3644	AC Protection devices
Pumped Storage/Hydro	Balance of Plant	Electrical		3649	Other AC instrument power problems
Pumped Storage/Hydro	Balance of Plant	Electrical		3650	DC instrument power battery chargers
Pumped Storage/Hydro	Balance of Plant	Electrical		3651	DC circuit breakers
Pumped Storage/Hydro	Balance of Plant	Electrical		3652	DC conductors and buses
Pumped Storage/Hydro	Balance of Plant	Electrical		3653	DC protection devices
Pumped Storage/Hydro	Balance of Plant	Electrical		3659	Other DC power problems
Pumped Storage/Hydro	Balance of Plant	Electrical		3660	4000-7000 volt transformers
Pumped Storage/Hydro	Balance of Plant	Electrical		3661	4000-7000 volt circuit breakers
Pumped Storage/Hydro	Balance of Plant	Electrical		3662	4000-7000 volt conductors and buses
Pumped Storage/Hydro	Balance of Plant	Electrical		3663	4000-7000 volt insulators
Pumped Storage/Hydro	Balance of Plant	Electrical		3664	4000-7000 volt protection devices
Pumped Storage/Hydro	Balance of Plant	Electrical		3669	Other 4000-7000 volt problems
Pumped Storage/Hydro	Balance of Plant	Electrical		3670	12-15kV transformers
Pumped Storage/Hydro	Balance of Plant	Electrical		3671	12-15kV circuit breakers
Pumped Storage/Hydro	Balance of Plant	Electrical		3672	12-15kV conductors and buses
Pumped Storage/Hydro	Balance of Plant	Electrical		3673	12-15kV insulators
Pumped Storage/Hydro	Balance of Plant	Electrical		3674	12-15kV protection devices
Pumped Storage/Hydro	Balance of Plant	Electrical		3679	Other 12-15kV problems
Pumped Storage/Hydro	Balance of Plant	Electrical		3680	Other voltage transformers
Pumped Storage/Hydro	Balance of Plant	Electrical		3681	Other voltage circuit breakers
Pumped Storage/Hydro	Balance of Plant	Electrical		3682	Other voltage conductors and buses
Pumped Storage/Hydro	Balance of Plant	Electrical		3683	Other voltage insulators
Pumped Storage/Hydro	Balance of Plant	Electrical		3684	Other voltage protection devices
Pumped Storage/Hydro	Balance of Plant	Electrical		3689	Other voltage problems
Pumped Storage/Hydro	Balance of Plant	Electrical		3690	Station Service Power Distribution System, General

Notes: 1) For use with Unit Codes 500-599 and 900-999.

TABLE B15-9 Balance of Plant: Miscellaneous (Balance of Plant)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Balance of Plant	Miscellaneous (Balance of Plant)		3950	Process computer
Pumped Storage/Hydro	Balance of Plant	Miscellaneous (Balance of Plant)		3970	Distributive Control System (DCS) - process computer
Pumped Storage/Hydro	Balance of Plant	Miscellaneous (Balance of Plant)		3971	DCS - data highway
Pumped Storage/Hydro	Balance of Plant	Miscellaneous (Balance of Plant)		3972	DCS - hardware problems (including card failure)
Pumped Storage/Hydro	Balance of Plant	Miscellaneous (Balance of Plant)		3973	DCS - internal and termination wiring
Pumped Storage/Hydro	Balance of Plant	Miscellaneous (Balance of Plant)		3974	DCS - logic problems
Pumped Storage/Hydro	Balance of Plant	Miscellaneous (Balance of Plant)		3975	DCS - upgrades
Pumped Storage/Hydro	Balance of Plant	Miscellaneous (Balance of Plant)		3979	Other DCS problems
Pumped Storage/Hydro	Balance of Plant	Miscellaneous (Balance of Plant)		3980	Programmable Logic Controller (PLC)
Pumped Storage/Hydro	Balance of Plant	Miscellaneous (Balance of Plant)		3981	PLC - data highway
Pumped Storage/Hydro	Balance of Plant	Miscellaneous (Balance of Plant)		3982	PLC - hardware problems (including card failure)
Pumped Storage/Hydro	Balance of Plant	Miscellaneous (Balance of Plant)		3983	PLC - internal and termination wiring
Pumped Storage/Hydro	Balance of Plant	Miscellaneous (Balance of Plant)		3984	PLC - logic problems
Pumped Storage/Hydro	Balance of Plant	Miscellaneous (Balance of Plant)		3985	PLC - upgrades
Pumped Storage/Hydro	Balance of Plant	Miscellaneous (Balance of Plant)		3989	Other PLC problems
Pumped Storage/Hydro	Balance of Plant	Miscellaneous (Balance of Plant)		3999	Other miscellaneous balance of plant problems

Notes: 1) For use with Unit Codes 500-599 and 900-999.

TABLE B15-10 Balance of Plant: Power Station Switchyard

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Balance of Plant	Power Station Switchyard		3700	Power Station switchyard (non generating unit equipment)
Pumped Storage/Hydro	Balance of Plant	Power Station Switchyard		3710	Transmission line (connected to powerhouse switchyard to 1st Substation)
Pumped Storage/Hydro	Balance of Plant	Power Station Switchyard		3720	Transmission equipment at the 1st substation (see code 9300 if applicable)
Pumped Storage/Hydro	Balance of Plant	Power Station Switchyard		3730	Transmission equipment beyond the 1st substation (see code 9300 if applicable)

Notes: 1) For use with Unit Codes 500-599 and 900-999.

EXTERNAL

Use this set of codes to report events caused by external factors (flood, lightning, etc.); economic factors (lack of fuel, labor strikes, etc.); operator training; and transmission system problems external to the plant.

TABLE B15-11 External: Catastrophe					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Pumped Storage/Hydro	External	Catastrophe		9000	Flood
Pumped Storage/Hydro	External	Catastrophe		9001	Drought
Pumped Storage/Hydro	External	Catastrophe		9010	Fire including wildfires, not related to a specific component
Pumped Storage/Hydro	External	Catastrophe		9020	Lightning
Pumped Storage/Hydro	External	Catastrophe		9025	Geomagnetic disturbance
Pumped Storage/Hydro	External	Catastrophe		9030	Earthquake
Pumped Storage/Hydro	External	Catastrophe		9031	Tornado
Pumped Storage/Hydro	External	Catastrophe		9035	Hurricane
Pumped Storage/Hydro	External	Catastrophe		9036	Storms (ice, snow, etc)
Pumped Storage/Hydro	External	Catastrophe		9040	Other catastrophe
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

TABLE B15-12 External: Economic					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Pumped Storage/Hydro	External	Economic		0	Reserve shutdown
Pumped Storage/Hydro	External	Economic		9130	Failure of fuel supplier to fulfill contractual obligations or a pre-arranged deal due to physical fuel disruptions or operational impairments (e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)
Pumped Storage/Hydro	External	Economic		9135	Lack of water
Pumped Storage/Hydro	External	Economic		9137	Ground water or other water supply problems
Pumped Storage/Hydro	External	Economic		9138	High Water Level in Tailrace (too much water)
Pumped Storage/Hydro	External	Economic		9140	Plant modifications to burn different fuel that are not regulatory mandated
Pumped Storage/Hydro	External	Economic		9150	Labor strikes company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.
Pumped Storage/Hydro	External	Economic		9151	Labor strikes direct plant management grievances that result in a walkout or strike are under plant management control.
Pumped Storage/Hydro	External	Economic		9160	Other economic problems
Pumped Storage/Hydro	External	Economic		9180	Economic (for internal use at plants only)
Pumped Storage/Hydro	External	Economic		9181	Economic (for internal use at plants only)
Pumped Storage/Hydro	External	Economic		9182	Economic (for internal use at plants only)
Pumped Storage/Hydro	External	Economic		9183	Economic (for internal use at plants only)

Pumped Storage/Hydro	External	Economic		9184	Economic (for internal use at plants only)
Pumped Storage/Hydro	External	Economic		9185	Economic (for internal use at plants only)
Pumped Storage/Hydro	External	Economic		9186	Economic (for internal use at plants only)
Pumped Storage/Hydro	External	Economic		9187	Economic (for internal use at plants only)
Pumped Storage/Hydro	External	Economic		9188	Economic (for internal use at plants only)
Pumped Storage/Hydro	External	Economic		9189	Economic (for internal use at plants only)
Pumped Storage/Hydro	External	Economic		9190	Economic (for internal use at plants only)
Pumped Storage/Hydro	External	Economic		9191	Economic (for internal use at plants only)
Pumped Storage/Hydro	External	Economic		9192	Economic (for internal use at plants only)
Pumped Storage/Hydro	External	Economic		9193	Economic (for internal use at plants only)
Pumped Storage/Hydro	External	Economic		9194	Economic (for internal use at plants only)
Pumped Storage/Hydro	External	Economic		9195	Economic (for internal use at plants only)
Pumped Storage/Hydro	External	Economic		9196	Economic (for internal use at plants only)
Pumped Storage/Hydro	External	Economic		9197	Economic (for internal use at plants only)
Pumped Storage/Hydro	External	Economic		9198	Economic (for internal use at plants only)
Pumped Storage/Hydro	External	Economic		9199	Economic (for internal use at plants only)
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

TABLE B15-13 External: Miscellaneous (External)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	External	Miscellaneous (External)		9300	Transmission system problems other than catastrophes (do not include switchyard problems in this category; see codes 3600 to 3629, 3720 to 3730)
Pumped Storage/Hydro	External	Miscellaneous (External)		9310	Operator training
Pumped Storage/Hydro	External	Miscellaneous (External)		9320	Other miscellaneous external problems
Pumped Storage/Hydro	External	Miscellaneous (External)		9340	Synchronous Condenser Operation
Pumped Storage/Hydro	External	Miscellaneous (External)		9345	Pumping Operations
Pumped Storage/Hydro	External	Miscellaneous (External)		9350	Public Safety (water hazard or river rescue)
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

GENERATOR

This set of codes contains the generator, exciter, generator cooling systems, and generator controls. Note the main leads up to and includes the generator output breaker in this set of codes.

TABLE B15-14 Generator: Controls

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Generator	Controls		4700	Generator voltage control
Pumped Storage/Hydro	Generator	Controls		4710	Generator metering devices
Pumped Storage/Hydro	Generator	Controls		4720	Generator synchronization equipment
Pumped Storage/Hydro	Generator	Controls		4730	Generator current and potential transformers

Pumped Storage/Hydro	Generator	Controls		4740	Emergency generator trip devices
Pumped Storage/Hydro	Generator	Controls		4750	Other generator controls and metering problems
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

TABLE B15-15 Generator: Cooling System

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Generator	Cooling System		4610	Hydrogen cooling system piping and valves
Pumped Storage/Hydro	Generator	Cooling System		4611	Hydrogen coolers
Pumped Storage/Hydro	Generator	Cooling System		4612	Hydrogen storage system
Pumped Storage/Hydro	Generator	Cooling System		4613	Hydrogen seals
Pumped Storage/Hydro	Generator	Cooling System		4619	Other hydrogen system problems
Pumped Storage/Hydro	Generator	Cooling System		4620	Air cooling system
Pumped Storage/Hydro	Generator	Cooling System		4630	Liquid cooling system
Pumped Storage/Hydro	Generator	Cooling System		4640	Seal oil system and seals
Pumped Storage/Hydro	Generator	Cooling System		4650	Other cooling system problems
Notes: 1) For use with Unit Codes 500-599 and 900-999. 2) Report failures caused by water leaks into generator as codes 4500, 4510, etc.					

TABLE B15-16 Generator: Exciter

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Generator	Exciter		4600	Exciter drive - motor
Pumped Storage/Hydro	Generator	Exciter		4601	Exciter field rheostat
Pumped Storage/Hydro	Generator	Exciter		4602	Exciter commutator and brushes
Pumped Storage/Hydro	Generator	Exciter		4603	Solid state exciter element
Pumped Storage/Hydro	Generator	Exciter		4604	Exciter drive - shaft
Pumped Storage/Hydro	Generator	Exciter		4605	Exciter transformer
Pumped Storage/Hydro	Generator	Exciter		4609	Other exciter problems
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

TABLE B15-17 Generator: Generator

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Generator	Generator		4500	Rotor windings (including damper windings and fan blades on hydro units)
Pumped Storage/Hydro	Generator	Generator		4510	Rotor collector rings
Pumped Storage/Hydro	Generator	Generator		4511	Rotor, General
Pumped Storage/Hydro	Generator	Generator		4512	Retaining Rings
Pumped Storage/Hydro	Generator	Generator		4520	Stator windings, bushings, and terminals
Pumped Storage/Hydro	Generator	Generator		4530	Stator core iron
Pumped Storage/Hydro	Generator	Generator		4535	Stator, General
Pumped Storage/Hydro	Generator	Generator		4536	Generator Heaters
Pumped Storage/Hydro	Generator	Generator		4540	Brushes and brush rigging

Pumped Storage/Hydro	Generator	Generator		4550	Generator bearings and lube oil system (including thrust bearings on hydro units)
Pumped Storage/Hydro	Generator	Generator		4551	Generator bearings
Pumped Storage/Hydro	Generator	Generator		4552	Generator lube oil system
Pumped Storage/Hydro	Generator	Generator		4555	Bearing cooling system
Pumped Storage/Hydro	Generator	Generator		4560	Generator vibration (excluding vibration due to failed bearing and other components)
Pumped Storage/Hydro	Generator	Generator		4570	Generator casing
Pumped Storage/Hydro	Generator	Generator		4580	Generator end bells and bolting
Pumped Storage/Hydro	Generator	Generator		4590	Generator brakes
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

TABLE B15-18 Generator: Miscellaneous (Generator)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Generator	Miscellaneous (Generator)		4800	Generator main leads
Pumped Storage/Hydro	Generator	Miscellaneous (Generator)		4805	Generator Bus Duct Cooling System
Pumped Storage/Hydro	Generator	Miscellaneous (Generator)		4810	Generator output breaker
Pumped Storage/Hydro	Generator	Miscellaneous (Generator)		4830	Major generator overhaul (720 hours or longer) (use for non-specific overhaul only; see page B-CCGT-2)
Pumped Storage/Hydro	Generator	Miscellaneous (Generator)		4831	Minor generator overhaul (less than 720 hours) (use for non-specific overhaul only; see page B-CCGT-2)
Pumped Storage/Hydro	Generator	Miscellaneous (Generator)		4840	Inspection
Pumped Storage/Hydro	Generator	Miscellaneous (Generator)		4841	Generator doble testing
Pumped Storage/Hydro	Generator	Miscellaneous (Generator)		4842	Reactive and capability testing
Pumped Storage/Hydro	Generator	Miscellaneous (Generator)		4850	Core monitor alarm
Pumped Storage/Hydro	Generator	Miscellaneous (Generator)		4860	Generator neutral grounding equipment
Pumped Storage/Hydro	Generator	Miscellaneous (Generator)		4899	Other miscellaneous generator problems
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

HYDRO TURBINE/PUMP

TABLE B15-19 Hydro Turbine/Pump: Miscellaneous (Hydro Turbine/Pump)

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)		7200	Major overhaul (use for non-specific overhaul only; see page B-CCGT-2)
Pumped Storage/Hydro	Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)		7201	Inspection
Pumped Storage/Hydro	Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)		7210	Canals (including siphons, radial gates, and spills)
Pumped Storage/Hydro	Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)		7220	Unit out of service due to common penstock with unit under repair
Pumped Storage/Hydro	Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)		7230	Pony motor (pumped storage units only)
Pumped Storage/Hydro	Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)		7240	Powerhouse substructure

Pumped Storage/Hydro	Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)		7299	Other miscellaneous hydro turbine/pump problems (use generator codes and balance of plant electrical and auxiliary codes as appropriate)
Pumped Storage/Hydro	Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)		7300	Routine Hydro Planned Outage (reoccurring schedule) (Use 4840 or 7201 for specific inspections.)
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

TABLE B15-20 Hydro Turbine/Pump: Turbine

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Hydro Turbine/Pump	Turbine		7000	Shaft
Pumped Storage/Hydro	Hydro Turbine/Pump	Turbine		7001	Shaft packing
Pumped Storage/Hydro	Hydro Turbine/Pump	Turbine		7003	Lube oil system (use code 7007 to report bearing failures due to lube oil problems)
Pumped Storage/Hydro	Hydro Turbine/Pump	Turbine		7007	Bearings
Pumped Storage/Hydro	Hydro Turbine/Pump	Turbine		7008	Bearing cooling system
Pumped Storage/Hydro	Hydro Turbine/Pump	Turbine		7009	Bearing oil system
Pumped Storage/Hydro	Hydro Turbine/Pump	Turbine		7010	Runner cavitation damage
Pumped Storage/Hydro	Hydro Turbine/Pump	Turbine		7011	Other runner problems
Pumped Storage/Hydro	Hydro Turbine/Pump	Turbine		7012	Casing, wear ring, or liner cavitation damage
Pumped Storage/Hydro	Hydro Turbine/Pump	Turbine		7014	Blade or bucket cracking
Pumped Storage/Hydro	Hydro Turbine/Pump	Turbine		7020	Nozzle assembly
Pumped Storage/Hydro	Hydro Turbine/Pump	Turbine		7030	Vibration (Only for unbalance, report bearing failure, etc., in appropriate category)
Pumped Storage/Hydro	Hydro Turbine/Pump	Turbine		7040	Turbine overhaul
Pumped Storage/Hydro	Hydro Turbine/Pump	Turbine		7050	Turbine governor
Pumped Storage/Hydro	Hydro Turbine/Pump	Turbine		7052	Other turbine control problems (Report specific wicket gate controls, etc., using the code for the appropriate equipment item.)
Pumped Storage/Hydro	Hydro Turbine/Pump	Turbine		7053	Governor oil system
Pumped Storage/Hydro	Hydro Turbine/Pump	Turbine		7070	Speed Increaser
Pumped Storage/Hydro	Hydro Turbine/Pump	Turbine		7099	Other turbine problems
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

TABLE B15-21 Hydro Turbine/Pump: Water Supply/Discharge

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7100	Upper reservoir dams and dikes
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7101	Lower reservoir dams and dikes
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7102	Auxiliary reservoir dams and dikes

Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7110	Intake channel or flume (including trash racks)
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7111	Intake tunnel
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7112	Ice blockages at intake structures including frazil ice, sheets, blocks of ice, etc.
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7120	Headgates
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7121	Shutoff valves
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7123	Shutoff valve bypass line and valve
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7124	Penstock
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7130	Spiral case
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7140	Wicket gate assembly
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7141	Wicket gate operating mechanism or positioner
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7142	Wicket gate shear pin
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7150	Stay vanes
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7160	Pressure regulating valve
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7161	Pressure regulating valve operator or positioner
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7162	Relief valve and vacuum breakers
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7170	Draft tube
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7180	Tailrace
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7181	Tail water depressing equipment
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7190	Dewatering and rewatering equipment
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7191	Equalizing line
Pumped Storage/Hydro	Hydro Turbine/Pump	Water Supply/Discharge		7199	Other water supply/discharge problems (use for equipment related problems; use codes 9135 or 9320 for lack of water or discharge limit related problems)
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

INACTIVE STATES

TABLE B15-22 Inactive States: Inactive States

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Inactive States	Inactive States		2	Inactive Reserve Shutdown
Pumped Storage/Hydro	Inactive States	Inactive States		9990	Retired unit
Pumped Storage/Hydro	Inactive States	Inactive States		9991	Mothballed unit
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

PERFORMANCE

TABLE B15-23 Performance: Performance

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Performance	Performance		9997	NERC Reliability Standard Requirement
Pumped Storage/Hydro	Performance	Performance		9998	Black start testing
Pumped Storage/Hydro	Performance	Performance		9999	Total unit performance testing (use appropriate codes for individual component testing)
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

PERSONNEL OR PROCEDURAL ERRORS

TABLE B15-24 Personnel or Procedural Errors: Personnel or Procedural Errors

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Personnel or Procedural Errors	Personnel or Procedural Errors		9900	Operator error
Pumped Storage/Hydro	Personnel or Procedural Errors	Personnel or Procedural Errors		9910	Maintenance personnel error
Pumped Storage/Hydro	Personnel or Procedural Errors	Personnel or Procedural Errors		9920	Contractor error
Pumped Storage/Hydro	Personnel or Procedural Errors	Personnel or Procedural Errors		9930	Operating procedure error
Pumped Storage/Hydro	Personnel or Procedural Errors	Personnel or Procedural Errors		9940	Maintenance procedure error
Pumped Storage/Hydro	Personnel or Procedural Errors	Personnel or Procedural Errors		9950	Contractor procedure error
Pumped Storage/Hydro	Personnel or Procedural Errors	Personnel or Procedural Errors		9960	Staff shortage
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

REGULATORY, SAFETY, ENVIRONMENTAL

Use these codes only for events not directly attributable to equipment failures. Inspections or testing of certain equipment due to regulation are reported using the appropriate equipment cause codes, and the fact that it was a regulatory requirement noted in the verbal description section.

TABLE B15-25 Regulatory, Safety, Environmental: Other Operating Environmental Limitations

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Pumped Storage/Hydro	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9676	Noise limits (not for personnel safety) - hydro and pumped storage
Pumped Storage/Hydro	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9686	Fish kill - hydro and pumped storage
Pumped Storage/Hydro	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9696	Other miscellaneous operational environmental limits - hydro and pumped storage
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

TABLE B15-26 Regulatory, Safety, Environmental: Regulatory					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Pumped Storage/Hydro	Regulatory, Safety, Environmental	Regulatory		9504	Regulatory (environmental) proceedings and hearings - regulatory agency initiated
Pumped Storage/Hydro	Regulatory, Safety, Environmental	Regulatory		9506	Regulatory (environmental) proceedings and hearings - intervenor initiated
Pumped Storage/Hydro	Regulatory, Safety, Environmental	Regulatory		9510	Plant modifications strictly for compliance with new or changed regulatory requirements (scrubbers, cooling towers, etc.)
Pumped Storage/Hydro	Regulatory, Safety, Environmental	Regulatory		9520	Oil spill in Gulf of Mexico (OMC)
Pumped Storage/Hydro	Regulatory, Safety, Environmental	Regulatory		9590	Miscellaneous regulatory (this code is primarily intended for use with event contribution code 2 to indicate that a regulatory-related factor contributed to the primary cause of the event)
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

TABLE B15-27 Regulatory, Safety, Environmental: Safety					
UNIT TYPE	**SYSTEM**	**COMPONENT**	**SUB-COMPONENT**	**CAUSE CODE**	**DESCRIPTION**
Pumped Storage/Hydro	Regulatory, Safety, Environmental	Safety		9700	OSHA-related retrofit or inspection
Pumped Storage/Hydro	Regulatory, Safety, Environmental	Safety		9720	Other safety problems
Notes: 1) For use with Unit Codes 500-599 and 900-999.					

Appendix C: Utility and Unit Identification Codes

Utility Identification Code

NERC assigns each utility participating in the Generating Availability Data System (GADS) a unique identification code. This three digit code allows each system's data to be uniquely catalogued and filed in the database. This appendix contains a list of the codes for each utility system presently participating or assigned a NERC-GADS utility code.

Unit Identification Code

Each utility participating in GADS assigns unique identification codes to its units. This three digit code allows each unit's data to be uniquely catalogued and filed in the database.

Note that each utility must assign identification codes for individual units based on the following criteria:

Table 1: Unit Identification Codes

Unit Type	Coding Series
Fossil (Steam) (Use 600-649 if additional numbers are needed)	**100 - 199**
Nuclear	**200 - 299**
Combustion Turbines (Gas Turbines or Jet Engines) (Use 700-799 if additional numbers are needed)	**300 - 399**
Diesel Engines	**400 - 499**
Hydro/Pumped Storage (Use 900-999 if additional numbers are needed)	**500 - 599**
Fluidized Bed Combustion	**650 - 699**
Miscellaneous (Multi-Boiler/Multi-Turbine, Geothermal, Combined Cycle Block)	**800 - 899**

Northeast Power Coordinating Council (NPCC)

Northeast Power Coordinating Council
1040 Avenue of the Americas (6th Avenue)
10th Floor
New York, New York 10018-3703

212-840-1070; 212-921-1040

NPCC	
Utility Code	**Utility Name**
003	Ontario Power Generation, Inc.
004	NB Power
008	Emera Energy Inc.
043	Nova Scotia Power
098	Dynegy Generation
100	Brookfield Power
102	Constellation Energy
105	Central Maine Power Company
107	Connecticut Light And Power Co.
108	Consolidated Edison Co. Of New York, Inc.
108	Astoria Energy, LLC
108	Astoria Energy II LLC
109	Glenwood Energy Center
110	Port Jefferson Energy Center
111	Connecticut Light And Power Co.
113	National Grid
115	Transcanada
117	Upstate New York Power Producers, Inc.
117	Somerset Operating Company
118	NRG Energy
119	Dominion Energy
120	New York Power Authority
121	Public Service Of New Hampshire
122	Rochester Gas & Electric Corp.
126	Mass. Municipal Wholesale Elec. Co.
127	Dominion Nuclear Connecticut
127	Brayton Point Energy
130	Covanta SEMASS
131	Exelon New England Holding, LLC
132	Hawkeye Energy Greenport
133	NextEra Energy Resources
136	Mirant New England
137	Ocean State Power
141	NRG Energy - New England
144	Entergy Nuclear Northeast
145	Berkshire Power Company
147	Braintree Electric Light Department

NPCC	
Utility Code	**Utility Name**
149	Milford Power Company
150	Connecticut Municipal Electric Energy Coop.
151	US Power Generating Company
152	NRG Energy - New York
153	Broome Energy Resources
155	Calpine Corporation
161	PPL Generation Co.
161	Wallingford Energy, LLC
164	EP Energy Massachusetts LLC
164	EP Newington Energy
167	Taunton Municipal Light
170	Masspower
173	NextEra Energy Seabrook
175	Wheelabrator Millbury, Inc.
176	Wheelabrator Technologies, Inc.
190	FirstLight Hydro Generating Company
191	PS&H Ipps
192	ReEnergy Stratton Lp
194	NextEra Energy Resources
197	Peabody Municipal Light
1A0	Brookfield Power (NYISO)
1A1	Brookfield Power
1A2	Morris Energy
1A3	Rensselaer Cogeneration LLC
1A4	NAES Corporation-Kleen Energy Systems
1A6	Cogen Technologies
1A7	Selkirk Cogen Partners, L.P.
1A9	Bayonne Energy Center
1B3	Allegany Generating Station
1B4	Wheelabrator Bridgeport, L.P.
1B6	Velco 182
1B8	Dartmouth Power Associates
1B9	Lockport Energy Associates
1C1	Tiverton Power Inc.
1C5	Fortistar North Tonawanda
1C8	AP (Curtis Palmer)
1D1	Waterside Power, LLC
1D2	Indeck – Silver Springs
1D3	Entergy Wholesale Commodities
1D8	Lakeside Energy
1D9	ReEnergy Black River
1E1	Dighton Power, LLC
1E2	Indeck-Corinth LP
1E3	Capital District Energy Center
1E4	ReEnergy Lyonsdale
1E5	CCI Roseton LLC

NPCC	
Utility Code	**Utility Name**
1E7	Astoria II LLC
1E8	Plainfield Renewable Energy
1E9	New Athens
1F2	Indeck-Olean LP
1F3	Nassau Energy Corp
1F4	Niagara Generation
1F5	Kendall Green Energy
1F6	Danskammer Energy
1F7	Binghamton BOP
1F8	Bucksport Generation
1F9	SBF New York
1G1	Verso Maine Energy LLC
1G2	Indeck-Oswego LP
1G3	L'Energia Energy Center
1G6	Milford Power LLC
1G7	Helix Ravenswood
1H1	Penobscot Energy Recovery Company
1H2	Indeck-Yerkes LP
1H3	Pittsfield Generating Company LP
1J2	Jamestown Board of Utilites
1L2	Carthage Energy LLC
1L3	Lake Road Generating Company, LP
1M3	Burlington Electric Department
1N1	Saranac Energy
1N2	Seneca Power Partners, L.P.
1N3	Firstlight Hydro Generating Company
1P3	Rumford Power Inc.
1Q1	CLI Energy Center
1Q2	Dynegy Generation
1R2	Sterling Power Partners, L.P.
1R3	Millennium Power Partners L.P.
1S1	Empire Generating Co, LLC
1S3	Waterbury Generation
1T1	Bridgeport Energy LLC
1T2	Wheelabrator Westchester Inc
1U1	Nextera Energy Resources
1U2	PSEG Power New York
1V2	PSEG Power Connecticut
1W2	Shoreham Energy LL
1X2	Edgewood Energy LLC
1Y2	Equus Power LP 1
1Z1	Castleton Power, LLC
1Z2	Pinelawn Power LLC

ReliabilityFirst (RF)

ReliabilityFirst
3 Summit Park Drive, Suite 600
Cleveland, Ohio 44131

216-503-0660

RF	
Utility Code	**Utility Name**
200	Safe Harbor Water Corporation – Brookfield Utility
201	Conectiv (AE)
201	Chambers Cogeneration
202	Constellation Energy
202	Constellation Maryland Peaker Fleet
203	Delaware Municipal Utilities
205	Jersey Central Power & Light Company
206	Easton Utilites Commission
207	Forked River Power
208	First Energy (Metropolitan Edison Company)
209	Vineland Municipal Electric Utilities
210	Panda Brandywine LP
211	First Energy (Pennnsylvania Electric Company)
212	PPL Generation Co
212	Schuylkill Energy
213	Exelon Generation Co., LLC (Philadelphia Electric Company)
215	Public Service Electric And Gas Co.
216	UGI Corporation
218	Horthampton
220	EME Homer City Generation
222	PEI Power Corp.
223	Nextera Energy Resources
223	Wisconsin Electric Power Co.
230	Integrys Energy Services
231	Pedricktown Cogen
232	Amergen - MAAC
234	Commonwealth Chesapeake
235	GenOn Energy
236	Genon Energy (East)
237	Genon Energy (Central)
238	Genon Energy (West)
242	NRG Energy - Mid Atlantic
244	Convanta Energy
248	Old Dominion Electric Cooperative
249	AES Energy
250	Calpine Corporation
251	Delaware City Refining Company
253	Dominion Energy

RF	
Utility Code	**Utility Name**
254	East Coast Power
256	Newmarket Power Company, LLC
257	Liberty Electric Power, LLC.
260	Ontelaunee Power Operating Co.
261	Allegheny Energy Supply
262	Brookfield Power
263	Sunbury Generation LP
265	Cape May Holdings
267	Elmwood Park Power, LLC
270	EFS Parlin
271	Wheelabrator Frackville
275	Monmouth Energy
280	Eagle Point Power Generation, LLC
281	Covanta Essex
282	Scrubgrass Generating Company
284	USACE – Detroit District
287	US Operating Services Company – Logan
288	Northeast Maryland
290	Brandon Shores LLC
291	C.P. Crane LLC
292	H.A. Wagner LLC
294	Wheelabrator Baltimore, L.P.
297	Seneca Generation, LLC (LS Power)
298	West Deptford Energy
2A2	Invenergy Nelson
2A3	Newark Energy Center
2A4	CPV Shore
2A7	Panda Liberty
2A8	Wabash Valley Power Association
2A9	Panda Patriot LLC
2B1	CPV Maryland,
2B2	Lightstone Generation
2B4	Oregon Clean Energy, LLC
2B5	Troy Energy, LLC
2B6	Armstrong Power
2B7	Helix Ironwood
2B8	Carroll County Energy
2C3	Buchanan Generation
2C4	Essential Power
2C5	Lakewood Generation
2C8	Red Oak Power
2D1	Hunterstown Combined Cycle Generating Station
2D3	Rock Springs
2D6	Walleye Power
325	Warrick
394	Wheelabrator Portsmouth

RF	
Utility Code	**Utility Name**
400	Duke Energy Commercial Asset Management
401	Appalachian Power Co. (AEP)
404	First Energy
406	Consumers Energy
407	Dayton Power And Light Company
408	Detroit Edison Co.
411	Indiana Michigan Power Company (AEP)
412	Indiana-Kentucky Electric Corp. (OVEC)
413	Indianapolis Power & Light Company
414	Kentucky Power Company (AEP)
417	FirstEnergy – Regulated NUG's
418	Northern Indiana Public Service Co.
419	First Energy
421	Ohio Valley Electric Corp. (OVEC)
422	First Energy (Pennsylvania Power Co)
425	Vectren Power Supply
426	First Energy (Toledo Edison Co.)
427	Allegheny Energy Supply
430	Cinergy
431	Genon Energy (Reliant Energy Midwest)
437	Duke Energy Trading
440	DPL Energy LLC
441	American Municipal Power-Ohio, Inc
442	Indiana Municipal Power Agency (IMPA)
445	LS Power
447	Hoosier Energy
449	Tenaska
449	Rolling Hills Generating, L.L.C
449	Wolf Hills Energy, LLC
450	Buckeye Power
452	Entergy Nuclear Northeast
453	New Covert Generating Company, LLC
454	Midland Cogeneration Venture, L.P.
456	Michigan South Central Power Agency
458	CMS Enterprise
458	Dearborn Industrial Generation, L.L.C
458	Consumers Energy
459	Whiting Clean Energy
464	Michigan Public Power Agency
470	City of Lansing Board Of Water & Light
472	GenPower Services LLC/Longview Power
476	Richland Stryker Generation
498	Birchwood
499	AEP Generation Resources Inc
501	University Park Energy, LLC
502	Cordova Energy Company

RF	
Utility Code	**Utility Name**
504	Ameran (CIPS)
505	Wheelabrator Falls
506	Exelon Generation , LLC
509	Elwood Energy LLC
510	Edison Mission Energy
518	LS Power (University Park North)
521	Wisconsin Electric Power Company
524	Calpine
526	Genon Energy (RRI Energy)
527	Duke Energy Trading
528	Kincaid Generation, LLC
529	Lincoln Generating Facility, LLC
531	Tenaska (Crete)
532	Exelon Generation , Llc
534	LS Power (Kendall)
535	NRG Energy
537	Morris Cogeneration LLC
539	Fox Energy Company LLC
552	LSP-Whitewater L.P.
556	Rocky Road Power, LLC
631	Wolverine Power Supply Cooperative, Inc

SERC Reliability Corporation (SERC)

SERC Reliability Corporation
3701 Arco Corporate Drive, Suite 300
Charlotte, NC 28273

704-357-SERC(7372)

SERC	
Utility Code	**Utility Name**
301	Powersouth Energy Cooperative
302	Alabama Power Co. (SOCO)
303	Progress Energy Carolina
304	Southern Power
307	Duke Energy
311	Old Dominion Electric Cooperative
312	Georgia Power Co. (SOCO)
313	Gulf Power Co. (SOCO)
315	Mississippi Power Co. (SOCO)
316	Municipal Electric Authority Of Georgia
318	Georgia Power Co. (SOCO)
319	South Carolina Electric & Gas Co.
320	So. Carolina Public Service Authority
321	So. Mississippi Electric Power Assoc.
323	Southern Electric Gen. Co. (SOCO)
325	Yadkin
326	Tennessee Valley Authority
328	Dominion Virginia Power
328	Covanta Fairfax
328	Edgecombe Genco LLC
328	Roanoke Valley Energy Facility
328	Spruane Genco
329	Constellation Energy
331	Oglethorpe Power Coop.
332	Calpine Corporation
340	Tenaska
349	Batesville Generating Facility (LSP Energy Lp)
354	Plum Point Energy
356	Owensboro Municipal Utilities
357	Sowega Power, LLC
358	Baconton Power, LLC
359	Hot Spring Power Company, LLC
361	Choctaw Generation Limited Partnership
365	Portsmouth Genco LLC
366	Occidental Chemical Corporation
369	Effingham County Power
370	Calhoun Power Company, LLC
371	Doswell Limited Partnership

SERC	
Utility Code	**Utility Name**
372	Cherokee County Cogeneration Partners, LLC
373	Alabama Municipal Electric-Authority
374	CPI USA North Carolina LLC (Southport)
375	CPI USA North Carolina LLC (Southport)
376	Craven County Wood Energy Ltd Partnership
377	AL Sandersonville Power Plant
378	MPC Generating
379	Walton County Power
380	Washington County Power
381	South Eastern Generating Corporation
382	Lee County
385	Dow Chemical Company Louisiana
386	Eagle US 2, LLC
387	GenOn Energy
388	Union Power Partners
410	East Kentucky Power Cooperative
415	Kentucky Utilities Company
416	Louisville Gas And Electric Co.
423	ExxonMobil Oil Corporation – Beaumont Refinery
428	North Carolina Electric Membership Corporation
429	ExxonMobil – Baton Rouge
467	Big Rivers Electric Corporation
475	East Texas Electric Cooperative
479	Mid Georgia Cogen L.P.
481	USACE Charleston District
482	USACE Fort Worth District
483	USACE Mobile District
484	USACE Nashville District
485	USACE Savannah District
486	USACE Wilmington District
488	Brookfield Smoky Mountain LLC
489	Broad River Energy LLC
490	Nelson Industrial Steam Company
491	Carville Energy
492	Decatur Energy Center
493	Santa Rosa Energy Center
494	Mobile Energy
495	Piedmont Green Power
496	Columbia Energy
497	Entergy Texas, Inc
498	Birchwood
4A2	Lumberton
4A3	Panda Stonewall, LLC
4A4	City Point Energy
503	Ameren - Cilco
504	Ameren - CIPS

SERC	
Utility Code	**Utility Name**
507	Electric Energy, Inc.
508	Dynegy Midwest Generation
514	Southern Illinois Power Coop.
516	City Water, Light & Power (Springfield)
517	Ameren - UE
526	GenOn Energy (RELIANT ENERGY)
545	Prairie Power, Inc
556	LS Power (Rocky Road)
700	Rain II Carbon
701	Arkansas Electric Cooperative Corporation
702	Lafayette Utilities System
703	Arkansas Power & Light Co. (Entergy)
704	Associated Electric Cooperative
708	Central Louisiana Electric Co.
711	Prairie State Generating Company
717	Gulf States Utilities Co. (Entergy)
717	E.I. du Pont de Nemours and Company
722	Louisiana Power & Light Co. (Entergy)
723	Mississippi Power & Light Co. (Entergy)
728	New Orleans Public Service, Inc. (Entergy)
738	USACE – St. Louis District
739	System Energy Resources, Inc. (Entergy)
740	NRG - Louisiana Generating, LLC
741	USACE – Vickburg District
742	Clarksdale Public Utilities
743	LEPA
746	City Water & Light – Jonesboro Arkansas
756	Brookfield Power
870	Coastal Carolina Clean Power (CCCP)

Florida Reliability Coordinating Council (FRCC)

Florida Reliability Coordinating Council
Bayport Plaza
3000 Bayport Drive, Suite 600
Tampa, Florida 33607-8407

813-289-5644

FRCC	
Utility Code	**Utility Name**
300	Gainesville Renewable Energy Center
304	Southern Power
305	Tallahassee Electric Dept.
308	Florida Power & Light Company
309	Progress Energy Florida
310	Shady Hills Power Company LLC
314	Jacksonville Electic Authority
317	Orlando Utilities Commission GenOn Energy
324	Tampa Electric Company
330	Seminole Electric Coop., Inc.
338	Hardee Power Partners Limited
343	Florida Municipal Power Agency
347	Lakeland Electric
355	Vandolah Power Company
360	Florida Power Development
367	Indiantown Cogeneration, L.P.
368	Covanta Pasco
383	Gainesville Regional Utilities (GRU)
387	GenOn Energy (NRG Florida LP)
391	Wheelabrator South Broward
392	City of Lake Worth Florida Utilities
395	Calpine

Midwest Reliability Organization (MRO)

Midwest Reliability Organization
380 St. Peter St, Suite 800
St. Paul, Minnesota 55102

651-855-1760

MRO	
Utility Code	**Utility Name**
005	Manitoba Hydro-Electric Board
044	Saskpower
431	GenOnPower Midwest
520	Madison Electric And Gas Co.
522	Alliant Energy
523	Wisconsin Public Service
528	Kincaid Generation, LLC
533	Wisconsic Public Power Inc.
537	Morris Cogeneration LLC
539	Fox Energy Company LLC
540	Upper Peninsula Power Company
541	Wisconsin River Power Company
557	Marshfield Utilities
560	City Utilities of Springfield, MO
601	Basin Electric Power Coop., Inc.
602	Integrys Energy
605	Dairyland Power Coop.
607	Alliant Energy (Interstate Power)
608	Alliant Energy (IES Utilities)
609	Mid American Energy Co.
610	Mid American Energy Co.
611	Mid American Energy Co.
612	Alliant Energy (IES Utilities)
614	Lincoln Electric System
615	Otter Tail Power Company
616	Minnesota Power
617	Minnkota Power Coop., Inc.
618	Montana-Dakota Utilities Co.
619	Muscatine Power & Water
620	Nebraska Public Power District
621	Xcel Energy
622	Northwestern Energy
623	Omaha Public Power District
624	Great River Energy
625	U.S. Army Corp. Of Engineers – Omaha District
626	Missouri Basin / Missouri River Energy Services
627	Minnkota Power Coop., Inc.
630	Minnesota Municipal Power Agency

MRO	
Utility Code	**Utility Name**
636	NextEra Energy Resources
637	Invenergy Cannon Falls Energy Center
639	New Ulm Public Utilities
652	Marshall Municipal Utilities
656	Brookfield Power
658	Hastings Utilities
659	City of Grand Island, NE
661	Rochester Public Utilities
662	NRG Energy
664	Southern Power Company
706	Green County Energy LLC
707	Hobbs Generating Station
709	Denver City Energy Associates
712	PowerSmith Cogeneration
714	Blackhawk Station
715	Empire District Electric Co.
716	Grand River Dam Authority
718	Kansas City Power & Light Co.
719	Westar Energy (KGE)
720	Westar Energy (KPL)
724	USACE – Little Rock District
725	AES Shady Point
726	PIC Group, Inc
729	Oklahoma Gas and Electric Co.
730	Public Service Co of Oklahoma (American Electric Power West)
731	Yoakum Electric Generating Cooperative
732	Southwestern Electric Generating Coop. (American Electric Power West)
733	Southwestern Power Administration
734	Xcel Energy
735	Sunflower Electric Coop., Inc.
736	USACE – Kansas City District
737	Western Farmers Electric Cooperative
744	Independence Power & Light
745	LCEC Generation
747	Oneta Power
748	Oklahoma Municipal Power Authority
749	Board of Public Utilities, City of McPherson, Kansas
757	Dogwood Energy LLC
759	Northeast Texas Electric Cooperative HCPP
859	Eastman Cogeneration
995	Heartland Consumers Power District

Texas Regional Entity (Texas RE)

Texas Regional Entity
805 Las Cimas Pkwy,
Austin, TX 78746

512-583-4900

Texas RE	
Utility Code	**Utility Name**
800	CCO (Equistar Chemical, LP)
801	Austin Energy
802	Exelon Generation, LLC
803	Constellation Energy
806	Tenaska
806	Kiowa Power Partners
808	Brazos Electric Power Coop., Inc.
809	Wolf Hollow LP
810	Calpine Corporation
812	Topaz Power Group
813	The Dow Chemical Co.
815	Channelview Cogeneration
818	Odessa Ector Power Partners
819	Luminant Power
820	Guadalupe Power Partners
821	Power Resources Limited
825	Gregory Power Partners, L.P
826	Sweeny Cogen Limited Partnership
827	NextEra Energy Resources
828	Garland Power & Light Co.
829	Oxy Vinyls LP
830	Ingleside Cogeneration LP
831	Victoria Power Station
832	Air Liquide Large Industries U.S. LP
833	South Houston Green Power
835	ExxonMobil Refining and Supply Company
836	South Texas Electric Cooperative, Inc.
837	Bryan Texas Utilities
840	NRG Texas, LLC
842	NRG Cedar Bayou Development LLC
843	Bastrop Energy Partners, LP
845	Paris Generation, LP
846	Formosa Utility Venture, Ltd
847	Sandy Creek Energy Station
848	Silas Ray
849	Petra Nova Parish Holdings LLC
850	OptimaEnergy Altura Cogen LLC
851	Optim Energy Twin Oaks LP

Texas RE	
Utility Code	**Utility Name**
853	Panda Sherman Power
854	Lower Colorado River Authority
855	Panda Temple
856	Quail Run Energy Center
857	Ector County Energy
858	Nacogdoches Power LLC
861	Dynegy
862	Texas Medical Center Central Heating and Cooling Services Corp
863	Port Comfort Power
864	Chamon Power
868	CPS Energy
879	Exelon Generation, LLC
880	Luminant Power
884	American Electric Power West
887	Luminant Power
888	Texas Municipal Power Agency
889	San Miguel Electric Coop., Inc.
891	Signal Hill Llc

Western Electricity Coordinating Council (WECC)

Western Electricity Coordinating Council
155 North 400 West, Suite 200
Salt Lake City, Utah 84103

801-582-0353

WECC	
Utility Code	**Utility Name**
001	B.C. Hydro
007	Trans Alta Utilities
015	Constellation Energy – Canada
601	Basin Electric Power Coop, Inc
901	Brookfield Power
902	Arizona Electric Power Coop., Inc.
903	Sycamore Cogeneration Company
904	Arizona Public Service Company
905	Calpine Corporation
907	Constellation Energy
908	Oxy Elk Hills Power, LLC
909	Tri-State G & T Association, Inc.
90G	Colorado Springs Utilities
90H	Clark Public Utility District
90J	Frederickson Power LP
90L	Avista Corp
90M	City of Farmington, New Mexico
90P	Termoelectrica de Mexicali (TDM)
90Q	South Feather Water & Power Agency
90R	Blythe Energy, LLC
90T	Crockett Cogeneration
90U	Tri Center Naniwa Energy
911	Burbank Water & Power
912	Black Hills Power, Inc.
913	El Paso Electric Company
914	Eugene Water & Electric Board
915	Black Hill Wyoming
916	Kern River Cogeneration Company
917	Idaho Power Company
918	Southwest Generation
918	SWG Colorado
918	Valencia Power
920	L.A. Dept. Of Water And Power
921	La Paloma Generating
922	PPL-Montana
924	Nevada Power Co.
925	Pacific Gas And Electric Co.
926	PacifiCorp Energy - Pacific Power

WECC	
Utility Code	**Utility Name**
928	NRG Marsh Landing
930	Platte River Power Authority
931	Portland General Electric Co.
932	Xcel Energy
933	Public Service Co. Of New Mexico
936	PUD #1 Of Chelan County
938	PUD #1 Of Douglas County
940	Genon Energy (Reliant Energy)
942	Sacramento Municipal Utility Dist.
943	TransCanada
944	Salt River Project
945	San Diego Gas & Electric Co.
946	City Of Roseville (California)
947	Seattle City Light
948	Sierra Pacific Power Company
949	Southern California Edison Co.
950	Cheyenne Light Fuel & Power
952	Black Hills/Colorado Electric Utility Company
954	PacifiCorp Energy - (Utah Power & Light Co)
955	Grays Harbor Energy LLC
956	Energy Northwest
958	Tucson Electric Power Company
959	US Army Corp. Of Engineers - Portland District
960	US Army Corp Of Engineers - Walla Walla District
961	US Army Corp. Of Engineers - Seattle District
962	Inland Empire Energy Center
963	Spindle Hill Energy Center
964	Black Hills Colorado Independent Power Producer (Bhcipp)
965	Deseret Generation & Transmission Coop.
966	Imperial Irrigation District
967	AES - Redondo Beach
968	US Bureau Of Reclamation
969	NRG Energy – Western
970	High Desert Power Project, LLC
971	AES - Alamitos LLC
972	NRG Energy – Western
976	Wildflower Energy LLP
976	Indigo Generation, LLC
977	Wellhead Electric Co. Inc.
978	Griffith Energy
979	Sunrise Power Company
981	Calpeak Power - Border LLC
983	Calpeak Power - Enterprise LLC
984	Calpeak Power - Panoche LLC
985	Calpeak Power - Vaca Dixon LLC
986	NextEra Energy Resources

WECC	
Utility Code	**Utility Name**
987	Dynegy Power
989	California Power Holdings LLC (Chowchilla)
989	California Power Holdings LLC (Red Bluff)
990	CalPeak Power - Starwood Power-Midway LLC
991	Arlington Valley
993	Watson Cogeneration, LLC
994	Northwestern Energy
995	Orange Grove Energy, L.P.
996	Puget Sound Energy
997	Panoche Energy Center
9A1	Rathdrum Power LLC
9A2	Nevada Cogeneration Associates #1
9A3	Yuma Cogeneration Associates
9A5	Colstrip Energy Limited Partnership
9A6	Midway Sunset Cogeneration Company
9A7	Hetch Hetchy Water and Power
9A8	Colorado Energy Management – BCP
9A9	Colorado Energy Management – CPP
9B1	Colorado Energy Management – BIV
9B2	Colorado Energy Management – MPC
9B3	Colorado Energy Management – RMP
9B5	Gila River Power
9B6	New Harquahala
9B7	Turlock Irrigation District
9B8	Utah Associated Municipal Power Systems
9B9	Mesquite Power
9C1	City of Redding
9C2	Donnells Powerhouse
9C3	Coso Finance Partners
9C4	Coso Power Developers
9C5	Coso Energy Developers
9C6	Terra-Gen Dixie Valley
9C7	AES Huntington Beach
9C8	Hermiston Generating Co., L.P.
9C9	Modesto Irrigation District
9D1	Kings River Conservation District
9D3	Grand Coulee Project Hydro Authority
9D4	Boise-Kuna Irrigation District
9D6	Burney Forest Products
9D7	POPD (Pend Oreille County Public Utility)
9D9	PPME (Iberdrola Renewables)
9E1	City of Tacoma
9E4	Thermal Energy Development Partnership
9E6	Sierra Pacific Industries
9E7	Public Utility District No. 1 of Snohomish County
9F1	Swift

WECC	
Utility Code	**Utility Name**
9F3	Mariposa GT
9F4	KES Kingsburg L.P.
9F5	Ripon GT1
9F6	NRG Marsh Landing, LLC
9F7	CPV Sentinal, LLC
9G2	RockTenn
9G3	Spokane Regional
9G4	West Valley Power
9G5	Silicon Valley Power
9G6	Public Utility District No. 2 of Grant County, Washington
9G7	Greenleaf Energy
9G8	Calpeak Malaga Power
9G9	SPI Anderson 2
9H2	Energy Keepers
9H3	AltaGas San Joaquin Energy
9H4	Yuba County Water Agency
9H5	Pio Pico Energy Center
9H6	Merced Irrigation District
9H7	Pacific Ultrapower Chinese Station
9H8	Rio Bravo Fresno
9H9	Rio Bravo Rocklin
9J1	Gila Bend Operations Company
9J2	Sunnyside Generation

Appendix D: Cause Code Cross Reference

This appendix contains a high level cross reference for cause codes. Table D-1 is a cross reference between System, Component, Sub-Component and Unit Type of the applicable Cause Code ranges. Changes for 2020 are hi-lited in green in Table D-1.

In order to fit within a reasonable amount of space the unit types have been abbreviated. Use the table below to find your unit type.

UNIT TYPE NAME ABBREVIATIONS	
Unit Type	**Abbreviation**
CC GT units	CCGT
CC steam units	CCST
Co-Generator GT units	CoGT
Co-Generator steam units	CoST
Co-Generator Block	CoB
Combined Cycle Block	CCB
Fluidized Bed	FBC
Fossil-Steam	FS
Gas Turbine/Jet Engine (Simple Cycle Operation)	GT/JE
Geothermal	GEO
Internal Combustion/Reciprocating Engines	IC/RE
Miscellaneous	MISC
Multi-boiler/Multi-turbine	MB/MT
Nuclear	NU
Pumped Storage/Hydro	PS/H

TABLE D-1: CROSS REFERENCE OF CAUSE CODE RANGES BETWEEN SYSTEM, COMPONENT,SUB-COMPONENT AND UNIT TYPE

System Name	Component Name	Sub-Component Name	CCGT	CCST	CoGT	CoST	CoB	CCB	FBC	FS	GT/JE	GEO	IC/RE	MISC	MB/MT	NU	PS/H
Balance of Plant	Auxiliary Systems	Auxiliary Steam	3830-3839	3830-3839	3830-3839	3830-3839	3830-3839	3830-3839	3830-3839	3830-3839	3830-3839	3830-3839		3830-3839	3830-3839	3830-3839	3830-3839
Balance of Plant	Auxiliary Systems	Closed Cooling Water Systems	3820-3829	3820-3829	3820-3829	3820-3829	3820-3829	3820-3829	3820-3829	3820-3829	3820-3829	3820-3829		3820-3829	3820-3829	3820-3829	3820-3829
Balance of Plant	Auxiliary Systems	Fire Protection System	3860-3869	3860-3869	3860-3869	3860-3869	3860-3869	3860-3869	3860-3869	3860-3869	3860-3869	3860-3869		3860-3869	3860-3869	3860-3869	3860-3869
Balance of Plant	Auxiliary Systems	Instrument Air	3850-3859	3850-3859	3850-3859	3850-3859	3850-3859	3850-3859	3850-3859	3850-3859	3850-3859	3850-3859		3850-3859	3850-3859	3850-3859	3850-3859
Balance of Plant	Auxiliary Systems	Low-pressure Gas Compression System	3870-3879	3870-3879	3870-3879	3870-3879	3870-3879	3870-3879	3870-3879	3870-3879	3870-3879			3870-3871	3870-3879		
Balance of Plant	Auxiliary Systems	Miscellaneous (Auxiliary Systems)	3898-6399	3898-6399	3898-6399	3898-6399	3898-6399	3898-6399	3898-3899	3898-3899	3898-3899	3898-3899		3898-6399	3898-6399	3898-3899	3898-3899
Balance of Plant	Auxiliary Systems	Open Cooling Water System	3800-3809	3800-3809	3800-3809	3800-3809	3800-3809	3800-3809	3800-3809	3800-3809		3800-3809		3800-3809	3800-3809	3800-3809	
Balance of Plant	Auxiliary Systems	Seal Air Fans	3880-3889	3880-3889	3880-3889	3880-3889	3880-3889	3880-3889	3880-3889	3880-3889		3880-3889		3880-3889	3880-3889	3880-3889	
Balance of Plant	Auxiliary Systems	Service Air	3840-3849	3840-3849	3840-3849	3840-3849	3840-3849	3840-3849	3840-3849	3840-3849	3840-3849	3840-3849		3840-3849	3840-3849	3840-3849	3840-3849
Balance of Plant	Auxiliary Systems	Service Water (Open System)	3810-3819	3810-3819	3810-3819	3810-3819	3810-3819	3810-3819	3810-3819	3810-3819	3810-3819	3810-3819		3810-3819	3810-3819	3810-3819	3810-3819
Balance of Plant	Auxiliary Systems												3850-3998				
Balance of Plant	Circulating Water Systems		3210-3299	3210-3299	3210-3299	3210-3299	3210-3299	3210-3299	3210-3299	3210-3299		3210-3299		3210-3299	3210-3299	3210-3299	
Balance of Plant	Condensate System	Low/Intermediate Pressure Heater and Deaerators	3339-3345	3339-3345	3339-3345	3339-3345	3339-3345	3339-3345	3339-3345	3339-3345				3339-3345	3339-3345	3339-3345	
Balance of Plant	Condensate System	Miscellaneous (Condensate System)	3360-3399	3360-3399	3360-3399	3360-3399	3360-3399	3360-3399	3360-3399	3360-3399		3360-3399		3360-3399	3360-3399	3360-3399	
Balance of Plant	Condensate System	Polishers/Chemical Addition	3350-3352	3350-3352	3350-3352	3350-3352	3350-3352	3350-3352	3350-3352	3350-3352				3350-3352	3350-3352	3350-3352	
Balance of Plant	Condensate System	Pumps, Piping, and Valves	3300-3330	3300-3330	3300-3330	3300-3330	3300-3330	3300-3330	3300-3330	3300-3330		3300-3330		3300-3330	3300-3330	3300-3330	
Balance of Plant	Condensing System	Condenser Casing or Shell and Internals	3120-3129	3120-3129	3120-3129	3120-3129	3120-3129	3120-3129	3120-3129	3120-3129		3120-3129		3120-3129	3120-3129	3120-3129	
Balance of Plant	Condensing System	Condenser Controls	3150-3159	3150-3159	3150-3159	3150-3159	3150-3159	3150-3159	3150-3159	3150-3159		3150-3159		3150-3159	3150-3159	3150-3159	
Balance of Plant	Condensing System	Condenser Tubes and Support Equipment	3110-3119	3110-3119	3110-3119	3110-3119	3110-3119	3110-3119	3110-3119	3110-3119		3110-3119		3110-3119	3110-3119	3110-3119	

System Name	Component Name	Sub-Component Name	CCGT	CCST	CoGT	CoST	CoB	CCB	FBC	FS	GT/JE	GEO	IC/RE	MISC	MB/MT	NU	PS/H
Balance of Plant	Condensing System	Miscellaneous (Condensing System)	3170-3199	3170-3199	3170-3199	3170-3199	3170-3199	3170-3199	3170-3199	3170-3199		3170-3199		3170-3199	3170-3199	3170-3199	
Balance of Plant	Condensing System	Vacuum Equipment	3130-3149	3130-3149	3130-3149	3130-3149	3130-3149	3130-3149	3130-3149	3130-3149		3130-3149		3130-3149	3130-3149	3130-3149	
Balance of Plant	Electrical		3600-3690	3600-3690	3600-3690	3600-3690	3600-3690	3600-3690	3600-3690	3600-3690	3600-3690	3600-3690	3600-3690	3600-3690	3600-3690	3600-3690	3600-3690
Balance of Plant	Extraction Steam		3520-3549	3520-3549	3520-3549	3520-3549	3520-3549	3520-3549	3520-3549	3520-3549				3520-3549	3520-3549	3520-3549	
Balance of Plant	Feedwater System		3401-3499	3401-3499	3401-3499	3401-3499	3401-3499	3401-3499	3401-3499	3401-3499				3401-3499	3401-3499	3401-3499	
Balance of Plant	Heater Drain Systems		3501-3509	3501-3509	3501-3509	3501-3509	3501-3509	3501-3509	3501-3509	3501-3509				3501-3509	3501-3509	3501-3509	
Balance of Plant	Miscellaneous (Balance of Plant)		3950-3999	3950-3999	3950-3999	3950-3999	3950-3999	3950-3999	3950-3999	3950-3999	3950-3999	3950-3999	3970-3989	3950-3999	3950-3999	3950-3999	3950-3999
Balance of Plant	Power Station Switchyard		3700-3730	3700-3730	3700-3730	3700-3730	3700-3730	3700-3730	3700-3730	3700-3730	3700-3730	3700-3730	3700-3730	3700-3730	3700-3730	3700-3730	3700-3730
Balance of Plant	Waste Water (zero discharge) Systems		3290-3295	3290-3295	3290-3295	3290-3295	3290-3295	3290-3295	3290-3295	3290-3295		3290-3295		3290-3295	3290-3295	3290-3295	
Boiler	Bed Material Preparation System (FBC only)								160-174					160-174	160-174		
Boiler	Bed Material Removal System								930-950					930-950	930-950		
Boiler	Bed Solids Recirculation								951-989					951-989	951-989		
Boiler	Boiler Air and Gas Systems	Air Supply							1400-1451	1400-1450				1400-1451	1400-1451		
Boiler	Boiler Air and Gas Systems	Flue Gas							1455-1530	1455-1530				1455-1530	1455-1530		
Boiler	Boiler Air and Gas Systems	Flue Gas Recirculation							1535-1580	1535-1580				1535-1580	1535-1580		
Boiler	Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)							1590-1599	1590-1599				1590-1599	1590-1599		
Boiler	Boiler Control Systems								1700-1799	1700-1799				1700-1799	1700-1799		
Boiler	Boiler Design Limitations								1900-1910	1900-1910				1900-1910	1900-1910		
Boiler	Boiler Fuel Supply from Bunkers to Boiler	Burners							358-410	358-410				358-410	358-410		

System Name	Component Name	Sub-Component Name	CCGT	CCST	CoGT	CoST	CoB	CCB	FBC	FS	GT/JE	GEO	IC/RE	MISC	MB/MT	NU	PS/H
Boiler	Boiler Fuel Supply from Bunkers to Boiler	Cyclone							415-435	415-435				415-435	415-435		
Boiler	Boiler Fuel Supply from Bunkers to Boiler	Oil and Gas Systems (except light off)							440-480	440-480				440-480	440-480		
Boiler	Boiler Fuel Supply from Bunkers to Boiler	Pulverizers, Primary Air Fans, and Associated Ducts							200-350	200-350				200-350	200-350		
Boiler	Boiler Fuel Supply to Bunker	Coal Handling Equipment up Through Bunkers							10-127	10-129				10-127	10-129		
Boiler	Boiler Fuel Supply to Bunker	Solid Fuel Feed Equipment from Bunkers to Boiler (FBC only)							111-129					111-121	111-121		
Boiler	Boiler Internals and Structures								800-859	800-859				800-859	800-859		
Boiler	Boiler Overhaul and Inspections								1800-1820	1800-1820				1800-1820	1800-1820		
Boiler	Boiler Piping System	Boiler Recirculation							740-770	740-770				740-770	740-770		
Boiler	Boiler Piping System	Cold and Hot Reheat Steam							540-570	540-570				540-570	540-570		
Boiler	Boiler Piping System	Desuperheaters/Attemperators							580-620	580-620		580-620		580-620	580-620		
Boiler	Boiler Piping System	Feedwater and Blowdown							670-730	670-730				670-730	670-730		
Boiler	Boiler Piping System	Main Steam							500-530	500-530		500-530		500-530	500-530		
Boiler	Boiler Piping System	Miscellaneous (Piping)							775-799	775-799				775-799	775-799		
Boiler	Boiler Piping System	Startup Bypass							630-660	630-660				630-660	630-660		
Boiler	Boiler Tube Fireside Slagging or Fouling								1100-1200	1100-1210				1100-1200	1100-1200		
Boiler	Boiler Tube Leaks								1000-1090	1000-1090				1000-1090	1000-1090		
Boiler	Boiler Water Condition								1850-1850	1850-1850				1850-1850	1850-1850		
Boiler	External Fluidized Bed Heat Exchanger								990-999					990-999	990-999		

System Name	Component Name	Sub-Component Name	CCGT	CCST	CoGT	CoST	CoB	CCB	FBC	FS	GT/JE	GEO	IC/RE	MISC	MB/MT	NU	PS/H
Boiler	Miscellaneous (Boiler)								1980-1999	1980-1999				1980-1999	1980-1999		
Boiler	Miscellaneous Boiler Tube Problems								1300-1360	1300-1360				1300-1360	1300-1360		
Boiler	Slag and Ash Removal								860-920	860-920				860-920	860-920		
Boiler	Sorbent Supply (FBC only)	Sorbent Feed Equipment from Bunkers to Boiler (FBC only)							150-156					150-156	150-156		
Boiler	Sorbent Supply (FBC only)	Sorbent Handling System up Through Bunkers (FBC only)							130-141					130-141	130-141		
Expander Turbine	Expander Turbine		7800-7960	7800-7960	7800-7960	7800-7960	7800-7960	7800-7960			7800-7960			7800-7960	7800-7960		
External	Catastrophe		9000-9040	9000-9040	9000-9040	9000-9040	9000-9040	9000-9040	9000-9040	9000-9040	9000-9040	9000-9040	9000-9040	9000-9040	9000-9040	9000-9040	9000-9040
External	Economic		0-9199	0-9199	0-9199	0-9199	0-9199	0-9199	0-9199	0-9199	0-9199	0-9199	0-9199	0-9199	0-9199	0-9199	0-9199
External	Fuel Quality		9200-9291	9200-9291	9200-9291	9200-9291	9200-9291	9200-9291	9200-9291	9200-9291	9200-9291		9200-9291	9200-9291	9200-9291		
External	Miscellaneous (External)		9300-9340	9300-9340	9300-9340	9300-9340	9300-9340	9300-9340	9300-9340	9300-9340	9300-9340	9300-9340	9300-9340	9300-9340	9300-9340	9300-9320	9300-9350
Gas Turbine	Auxiliary Systems		5110-5190	5110-5190	5110-5190	5110-5190	5110-5190	5110-5190			5110-5190			5110-5190	5110-5190		
Gas Turbine	Exhaust Systems		5100-5109	5100-5109	5100-5109	5100-5109	5100-5109	5100-5109			5100-5109			5100-5109	5100-5109		
Gas Turbine	Fuel, Ignition, and Combustion Systems		5040-5079	5040-5079	5040-5079	5040-5079	5040-5079	5040-5079			5040-5079			5040-5079	5040-5079		
Gas Turbine	Inlet Air System and Compressors	Compressors	5010-5039	5010-5039	5010-5039	5010-5039	5010-5039	5010-5039			5010-5039			5010-5037	5010-5039		
Gas Turbine	Inlet Air System and Compressors	Ducts and Filters	5000-5009	5000-5009	5000-5009	5000-5009	5000-5009	5000-5009			5000-5009			5000-5009	5000-5009		
Gas Turbine	Miscellaneous (Gas Turbine)		5200-5299	5200-5299	5200-5299	5200-5299	5200-5299	5200-5299			4460-5299			5200-5299	5200-5299		
Gas Turbine	Turbine		5080-5099	5080-5099	5080-5099	5080-5099	5080-5099	5080-5099			5080-5099			5080-5099	5080-5099		
Generator	Controls		4700-4750	4700-4750	4700-4750	4700-4750	4700-4750	4700-4750	4700-4750	4700-4750	4700-4750	4700-4750	4700-4750	4700-4750	4700-4750	4700-4750	4700-4750

System Name	Component Name	Sub-Component Name	CCGT	CCST	CoGT	CoST	CoB	CCB	FBC	FS	GT/JE	GEO	IC/RE	MISC	MB/MT	NU	PS/H
Generator	Cooling System		4610-4650	4610-4650	4610-4650	4610-4650	4610-4650	4610-4650	4610-4650	4610-4650	4610-4650	4610-4650	4610-4650	4610-4650	4610-4650	4610-4650	4610-4650
Generator	Exciter		4600-4609	4600-4609	4600-4609	4600-4609	4600-4609	4600-4609	4600-4609	4600-4609	4600-4609	4600-4609	4600-4609	4600-4609	4600-4609	4600-4609	4600-4609
Generator	Generator		4500-4580	4500-4580	4500-4580	4500-4580	4500-4580	4500-4580	4500-4580	4500-4580	4500-4590	4500-4580	4500-4580	4500-4590	4500-4580	4500-4580	4500-4590
Generator	Miscellaneous (Generator)		4800-4899	4800-4899	4800-4899	4800-4899	4800-4899	4800-4899	4800-4899	4800-4899	4800-4899	4800-4899	4800-4899	4800-4899	4800-4899	4800-4899	4800-4899
Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Air Supply	1400-1456	1400-1456	1400-1456	1400-1456	1400-1536	1400-1536									
Heat Recovery Steam Generator (HRSG)	HRSG Boiler Air and Gas Systems	Miscellaneous (Boiler Air and Gas Systems)	1590-1599	1590-1599	1590-1599	1590-1599	1590-1599	1590-1599									
Heat Recovery Steam Generator (HRSG)	HRSG Boiler Control Systems		1700-1799	1700-1799	1700-1799	1700-1799	1700-1799	1700-1799									
Heat Recovery Steam Generator (HRSG)	HRSG Boiler Design Limitations		1900-1910	1900-1910	1900-1910	1900-1910	1900-1910	1900-1910									
Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Burners (Duct Burners)	358-410	358-410	358-410	358-410	358-410	358-410									
Heat Recovery Steam Generator (HRSG)	HRSG Boiler Fuel Supply	Oil and Gas Systems (except light off)	440-480	440-480	440-480	440-480	440-480	440-480									
Heat Recovery Steam Generator (HRSG)	HRSG Boiler Internals and Structures		800-859	800-859	800-859	800-859	800-859	800-859						801-858			
Heat Recovery Steam Generator (HRSG)	HRSG Boiler Overhaul and Inspections		1800-1820	1800-1820	1800-1820	1800-1820	1800-1820	1800-1820									

System Name	Component Name	Sub-Component Name	CCGT	CCST	CoGT	CoST	CoB	CCB	FBC	FS	GT/JE	GEO	IC/RE	MISC	MB/MT	NU	PS/H
Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Boiler Recirculation	740-770	740-770	740-770	740-770	740-770	740-770									
Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Feedwater and Blowdown	670-730	670-730	670-730	670-730	670-730	670-730									
Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Cold and Hot Reheat Steam	540-570	540-570	540-570	540-570	540-570	540-570									
Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Desuperheaters/Attemperators	6140-6154	6140-6154	6140-6154	6140-6154	6140-6154	6140-6154						6140-6154			
Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Main Steam	500-6135	500-6135	500-6135	500-6135	500-6135	500-6135						6110-6135			
Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	HRSG Startup Bypass	6160-6184	6160-6184	6160-6184	6160-6184	6160-6184	6160-6184						6160-6184			
Heat Recovery Steam Generator (HRSG)	HRSG Boiler Piping System	Miscellaneous (Piping)	775-799	775-799	775-799	775-799	775-799	775-799									
Heat Recovery Steam Generator (HRSG)	HRSG Boiler Tube Leaks		6005-6090	6005-6090	6005-6090	6005-6090	6005-6090	6005-6090						6005-6090			
Heat Recovery Steam Generator (HRSG)	HRSG Boiler Water Condition		1850-1850	1850-1850	1850-1850	1850-1850	1850-1850	1850-1850									
Heat Recovery Steam Generator (HRSG)	Miscellaneous (HRSG Boiler)		1980-6100	1980-6100	1980-6100	1980-6100	1980-6100	1980-6100						6000-6100	6000-6100		

System Name	Component Name	Sub-Component Name	CCGT	CCST	CoGT	CoST	CoB	CCB	FBC	FS	GT/JE	GEO	IC/RE	MISC	MB/MT	NU	PS/H
Heat Recovery Steam Generator (HRSG)	Miscellaneous HRSG Boiler Tube Problems		1300-1360	1300-1360	1300-1360	1300-1360	1300-1360	1300-1360									
Hydro Turbine/Pump	Miscellaneous (Hydro Turbine/Pump)													7200-7300			7200-7300
Hydro Turbine/Pump	Turbine													7000-7099			7000-7099
Hydro Turbine/Pump	Water Supply/Discharge													7100-7199			7100-7199
Inactive States	Inactive States		2-9991	2-9991	2-9991	2-9991	2-9991	2-9991	2-9991	2-9991	2-9991	2-9991	2-9991	2-9991	2-9991	2-9991	2-9991
Internal Combustion/Reciprocating Engines	Engine												5700-5799	5700-5799			
Internal Combustion/Reciprocating Engines	Engine Auxiliaries												5114-5849	5800-5849			
Internal Combustion/Reciprocating Engines	Engine Controls												5850-5880	5850-5880			
Internal Combustion/Reciprocating Engines	Miscellaneous (Internal Combustion/Reciprocating Engines)												4460-5999	5890-5999			
Jet Engine	Auxiliary Systems		5510-5590	5510-5590	5510-5590	5510-5590	5510-5590	5510-5590			5510-5590			5510-5590	5510-5590		
Jet Engine	Exhaust Systems		5500-5509	5500-5509	5500-5509	5500-5509	5500-5509	5500-5509			5500-5509			5500-5509	5500-5509		
Jet Engine	Fuel, Ignition, and Combustion Systems		5440-5479	5440-5479	5440-5479	5440-5479	5440-5479	5440-5479			5440-5479			5440-5479	5440-5479		
Jet Engine	Inlet Air System and Compressors	Compressors	5410-5439	5410-5439	5410-5439	5410-5439	5410-5439	5410-5439			5410-5439			5410-5430	5410-5430		
Jet Engine	Inlet Air System and Compressors	Ducts and Filters	5400-5409	5400-5409	5400-5409	5400-5409	5400-5409	5400-5409			5400-5409			5400-5409	5400-5409		

System Name	Component Name	Sub-Component Name	CCGT	CCST	CoGT	CoST	CoB	CCB	FBC	FS	GT/JE	GEO	IC/RE	MISC	MB/MT	NU	PS/H
Jet Engine	Miscellaneous (Jet Engine)		5600-5699	5600-5699	5600-5699	5600-5699	5600-5699	5600-5699			5600-5699			5600-5699	5600-5699		
Jet Engine	Turbine		5480-5499	5480-5499	5480-5499	5480-5499	5480-5499	5480-5499			5480-5499			5480-5499	5480-5499		
Miscellaneous	Instruments and Controls		6200-6200	6200-6200	6200-6200	6200-6200	6200-6200	6200-6200						6200-6200	6200-6200		
Miscellaneous	Plant and Auxiliaries											6410-6499		6410-6499			
Nuclear Reactor	Auxiliary Systems															2840-2890	
Nuclear Reactor	Chemical and Volume Control/Reactor Water Cleanup															2805-2819	
Nuclear Reactor	Containment System															2700-2799	
Nuclear Reactor	Control Rods and Drives															2110-2160	
Nuclear Reactor	Core Cooling/Safety Injection															2600-2649	
Nuclear Reactor	Core/Fuel															2010-2090	
Nuclear Reactor	Electrical Safety Systems															2650-2699	
Nuclear Reactor	Miscellaneous (Reactor)															2900-2999	
Nuclear Reactor	Nuclear Cooling Water Systems															2820-2839	
Nuclear Reactor	Reactor Coolant System	Instruments and Controls														2330-2390	
Nuclear Reactor	Reactor Coolant System	Miscellaneous (Reactor Coolant System)														2399-2399	
Nuclear Reactor	Reactor Coolant System	Piping														2230-2260	
Nuclear Reactor	Reactor Coolant System	Pressurizer														2265-2265	
Nuclear Reactor	Reactor Coolant System	Pumps														2200-2220	
Nuclear Reactor	Reactor Coolant System	Valves														2270-2320	

System Name	Component Name	Sub-Component Name	CCGT	CCST	CoGT	CoST	CoB	CCB	FBC	FS	GT/JE	GEO	IC/RE	MISC	MB/MT	NU	PS/H
Nuclear Reactor	Reactor Vessel and Internals															2170-2199	
Nuclear Reactor	Steam Generators and Steam System															2400-2599	
Performance	Performance		9997-9999	9997-9999	9997-9999	9997-9999	9997-9999	9997-9999	9997-9999	9997-9999	9997-9999	9997-9999	9997-9999	9998-9999	9997-9999	9997-9999	9997-9999
Personnel or Procedural Errors	Personnel or Procedural Errors		9900-9960	9900-9960	9900-9960	9900-9960	9900-9960	9900-9960	9900-9960	9900-9960	9900-9960	9900-9960	9900-9960	9900-9960	9900-9960	9900-9960	9900-9960
Pollution Control Equipment	CO Reduction		8840-8845	8840-8845	8840-8845	8840-8845	8840-8845	8840-8845	8840-8845	8840-8845	8840-8845			8840-8845			
Pollution Control Equipment	Continuous Emissions Monitoring Systems (CEMS)		8700-8790	8700-8790	8700-8790	8700-8790	8700-8790	8700-8790	8700-8790	8700-8790	8700-8790	8700-8790		8700-8790	8700-8790		
Pollution Control Equipment	Dry Scrubbers	Dry Scrubber							8528-8534	8528-8534				8528-8534	8529-8534		
Pollution Control Equipment	Dry Scrubbers	Miscellaneous (Dry Scrubber)							8544-8549	8544-8549				8544-8549	8544-8549		
Pollution Control Equipment	Dry Scrubbers	Piping, Ducting, and Dampers							8522-8527	8522-8527				8522-8527	8522-8527		
Pollution Control Equipment	Dry Scrubbers	Reagent\Slurry Supply							8500-8521	8500-8521				8500-8521	8500-8521		
Pollution Control Equipment	Dry Scrubbers	Waste Disposal and Recovery							8535-8543	8535-8543				8535-8543	8535-8543		
Pollution Control Equipment	Miscellaneous (Pollution Control Equipment)								8565-8699	8565-8699	8656-8656			8565-8699	8565-8699		
Pollution Control Equipment	NOx Reduction Systems	Catalytic Air Heaters	8830-8835	8830-8835	8830-8835	8830-8835	8830-8835	8830-8835	8830-8835	8830-8835	8830-8835			8830-8835	8830-8835		
Pollution Control Equipment	NOx Reduction Systems	Selective Catalytic Reduction Systems	8810-8825	8810-8825	8810-8825	8810-8825	8810-8825	8810-8825	8810-8825	8810-8825	8810-8825			8810-8825	8810-8825		
Pollution Control Equipment	NOx Reduction Systems	Selective Non-Catalytic Reduction Systems	8800-8809	8800-8809	8800-8809	8800-8809	8800-8809	8800-8809	8800-8809	8800-8809	8800-8809			8800-8809	8800-8809		
Pollution Control Equipment	Precipitators								8550-8590	8550-8590				8550-8590	8550-8590		
Pollution Control Equipment	Wet Scrubbers	Chemical Supply							8000-8099	8000-8099		8000-8099		8000-8099	8000-8099		
Pollution Control Equipment	Wet Scrubbers	Miscellaneous (Wet Scrubber)							8400-8499	8400-8499		8400-8499		8400-8499	8400-8499		

System Name	Component Name	Sub-Component Name	CCGT	CCST	CoGT	CoST	CoB	CCB	FBC	FS	GT/JE	GEO	IC/RE	MISC	MB/MT	NU	PS/H
Pollution Control Equipment	Wet Scrubbers	Piping, Ducting, Dampers, and Fans							8200-8299	8200-8299		8200-8299		8200-8299	8200-8299		
Pollution Control Equipment	Wet Scrubbers	Waste Disposal and Recovery							8300-8399	8300-8399				8300-8399	8300-8399		
Pollution Control Equipment	Wet Scrubbers	Wet Scrubber							8100-8199	8100-8199		8100-8199		8100-8199	8100-8199		
Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9660-9694	9660-9694	9660-9694	9660-9694	9660-9694	9660-9694	9660-9690	9660-9690	9663-9694		9665-9695	9660-9696	9660-9696	9660-9690	9676-9696
Regulatory, Safety, Environmental	Regulatory		9504-9590	9504-9590	9504-9590	9504-9590	9504-9590	9504-9590	9504-9590	9504-9590	9504-9590	9504-9590	9504-9590	9504-9590	9504-9590	9500-9590	9504-9590
Regulatory, Safety, Environmental	Safety		9700-9720	9700-9720	9700-9720	9700-9720	9700-9720	9700-9720	9700-9720	9700-9720	9700-9720	9700-9720	9700-9720	9700-9720	9700-9720	9700-9720	9700-9720
Regulatory, Safety, Environmental	Stack Emission		9600-9658	9600-9658	9600-9658	9600-9658	9600-9658	9600-9658	9600-9656	9600-9656	9603-9658		9605-9655	9600-9658	9600-9656		
Steam Turbine	Controls		4290-4314	4290-4314	4290-4314	4290-4314	4290-4314	4290-4314	4290-4314	4290-4314		4290-4314		4290-4314	4290-4314	4290-4314	
Steam Turbine	High Pressure Turbine		4000-4099	4000-4099	4000-4099	4000-4099	4000-4099	4000-4099	4000-4099	4000-4099				4000-4099	4000-4099	4000-4099	
Steam Turbine	Intermediate Pressure Turbine		4100-4199	4100-4199	4100-4199	4100-4199	4100-4199	4100-4199	4100-4199	4100-4199				4100-4199	4100-4199	4100-4199	
Steam Turbine	Low Pressure Turbine		4200-4250	4200-4250	4200-4250	4200-4250	4200-4250	4200-4250	4200-4250	4200-4250		4200-4250		4200-4250	4200-4250	4200-4250	
Steam Turbine	Lube Oil		4280-4289	4280-4289	4280-4289	4280-4289	4280-4289	4280-4289	4280-4289	4280-4289		4280-4289		4280-4289	4280-4289	4280-4289	
Steam Turbine	Miscellaneous (Steam Turbine)		4400-4499	4400-4499	4400-4499	4400-4499	4400-4499	4400-4499	4400-4499	4400-4499		4400-4499		4400-4499	4400-4499	4400-4499	
Steam Turbine	Piping		4270-4279	4270-4279	4270-4279	4270-4279	4270-4279	4270-4279	4270-4279	4270-4279		4270-4279		4270-4279	4270-4279	4270-4279	
Steam Turbine	Valves		4260-4269	4260-4269	4260-4269	4260-4269	4260-4269	4260-4269	4260-4269	4260-4269		4260-4269		4260-4269	4260-4269	4260-4269	

Appendix E1: Unit Design Data – Fossil Steam (Voluntary Reporting)

Note: The NERC Board of Trustees approved the *GADS Task Force Report* (dated July 20, 2011)[1], which states that design data collection outside the required nine fields is solely voluntary. However, the GADS staff encourages reporters to report and update GADS design data frequently. This action can be completed by sending in this form to gads@nerc.net. GADS staff encourages using the software for design entry and updating.

Instructions

Use these forms to report design and installed equipment information for FOSSIL (steam) units. FOSSIL units are units with a single steam generator connected to a single or cross-compound turbine generator drive train. Report units that have multiple steam generators and/or multiple turbine generators connected by headers using the forms found under the heading "MISCELLANEOUS."

Data reported on these forms should reflect the current condition and design of the unit. Do not report data for start-up equipment or equipment that is not used to carry normal load unless specifically requested.

Some data fields are designated as M1 and M2. These fields indicate that the equipment being reported may have been supplied by more than one manufacturer. Use fields designated as M1 to report all the data associated with one manufacturer's equipment and M2 for the other.

Unit name: _____

Energy Information Administration (EIA) Number: _____

Subregion: _____

Telephone number: _____

Location of unit (State): _____

Regional Entity: _____

Data reporter: _____

Date: _____

General Unit Data

1. Identification

A series of codes uniquely identifies your utility and units. NERC assigned a unique code to identify your utility. You must assign the unique code that will identify the FOSSIL unit being reported. This code may be any number from 100 to 199 or 600 to 649. Enter the unique utility and unit code and the full name of the unit below.

Utility Codes: _____ Unit Codes: _____

Name of Unit: _____

[1] http://www.nerc.com/pa/RAPA/gads/MandatoryGADS/Revised_Final_Draft_GADSTF_Recommendation_Report.pdf

2. Date the Unit Entered Service

The in–service date establishes the starting point for review of historical performance of each unit. Using the criteria described below, report the date the unit entered service:

_____ _____ _____

Year Month Day

Criteria:

a. The date the unit was first declared available for dispatch at some level of its capability, OR

b. The date the unit first operated at 50% of its generator nameplate megawatt capability (product of the megavolt amperes (MVA) and the rated power factor as stamped on the generator nameplate(s)).

3. Unit Loading Characteristics at Time of Unit's Design

_____ Enter the number from the list below that best describes the mode of operation the unit *was originally designed for*

1 – Base loaded with minor load following at night and on weekends

2 – Periodic startups with daily load-following and reduced load nightly

3 – Weekly startup with daily load-following and reduced load nightly

4 – Daily startup with daily load-following and taken off-line nightly

5 – Startup chiefly to meet daily peaks

6 – Other, describe _____

7 – Seasonal Operation

4. Design and Construction Contractors

Identify both the architect/engineer and the general construction contractor responsible for the design and construction of the unit. If your utility was the principal designer or general constructor, enter "SELF."

_____ Architect/Engineer

_____ Constructor

5. Boiler – Manufacturer

Enter the name of the manufacturer and the model or series name or number of the boiler:

_____ Boiler manufacturer

_____ Manufacturers' model, series name, or number

6. Boiler – Enclosure

Is 50% or more of the boiler outdoors (not enclosed in building framing and siding)?

_____ 1 – Yes 2 – No

7. Boiler – Nameplate Conditions

Enter the following steam conditions for the MAIN STEAM LINES at the full-load, valves-wide-open design point:

_____ Steam flow rate (in lbs/hr)

_____ Design temperature (°F)

_____ Design pressure (psig)

8. Boiler – Fuel Firing System

_____ Enter the type of fuel firing system the unit *was designed for:*

A – *Front OR Back* – wall-mounted burners on either the front OR the back of the furnace.

B – *Opposed* – wall-mounted burners on BOTH the front and back of the furnace.

C – *Vertical* – burners are mounted on the ceiling of the furnace.

D – *Tangential* – firing from the corners of the furnace with burners capable of directing the fireball up or down.

E – *Cyclone* – horizontal (burner) cylinders connected to furnace walls wherein fuel and air are combusted in a controlled environment. Combustion gases exit through re-entrant throat into furnace, and slag drains to slag tanks. Cyclone burners may be installed in either single walls or opposed walls.

F – *Concentric* – staged combustion system, designed primarily for NO_2 control, in which the walls are blanketed with air.

G – *Circulating fluidized bed* – upward flow of air holds the fuel and sorbent particles (e.g., limestone) in suspension in the combustion zone. Partially burned fuel passes into a collector and is routed back into the combustion zone.

H – *Bubbling fluidized bed* – similar to circulating fluidized bed except the partially burned fuel is not recirculated.

I – *Stoker* – overfeed method combined with suspension firing.

9. Boiler – Type of Circulation

_____ Enter the type of circulation the boiler *was originally designed for:*

1 – *Natural* (thermal) – water flows through furnace wall tubes unaided by circulating pumps. Primarily used with subcritical units.

2 – *Controlled* (forced or pump assisted thermal) – water flows through furnace wall tubes aided by boiler recirculation pumps located in the downcomers or lower headers of the boiler. Used on some subcritical units

3 – *Once through* – no recirculation of water through the furnace wall tubes and no steam drum. Used on supercritical and some subcritical units.

10. Boiler – Circulation System

Enter the following information on the pumps used to recirculate water through the boiler:

_____ Boiler recirculation pump(s) manufacturer(s)

_____ TOTAL number of boiler recirculation pumps; include installed spares

_____ MINIMUM number of boiler recirculation pumps required to obtain maximum capacity from the unit

M1 M2 Enter the type of circulation the boiler *was originally designed for:*

1 – *Injection* (or injection seal) – controlled-leakage boiler recirculation pumps mounted vertically with a rigid shaft designed to carry its own thrust.

2 – *Leakless* (or canned, canned-motor, or zero-leakage) – pump and its motor are an integral pressurized sealed unit.

9 – *Other, describe* _____

11. Boiler – Type of Furnace Bottom

_____ Enter the type of furnace bottom the boiler *was originally designed for:*

1 – *Dry bottom* – no slag tanks at furnace throat area (throat area is clear). Bottom ash drops through throat to bottom ash water hoppers. Design used when ash-melting temperature is greater than temperature on furnace wall, allowing for relatively dry furnace wall conditions

2 – *Wet Bottom* – slag tanks installed at furnace throat to contain and remove molten ash from the furnace

12. Boiler – Furnace (Surface) Release Rate

Enter the furnace (surface) release rate of the PRIMARY FUEL. This rate is specified in the boiler contract as the heat available per hour, in Btu's per square foot of heat-absorbing surface in the furnace. The absorbing surface includes the furnace tube walls and the first convection superheater and reheater tubes. If the furnace contains superheater and reheater platens which extend into the furnace, these absorbing surfaces should be included also.

_____ Furnace (surface) release rate (in Btu's/SqFt/Hr)

13. Boiler – Furnace Volumetric Heat Release Rate

Enter the furnace volumetric heat release rate. This rate is the total quantity of thermal energy released into the furnace by the PRIMARY FUEL at its higher heating value (HHV). The volumetric heat-release rate is expressed in Btu's per cubic foot of furnace volume per hour. It does not include the heat added by the preheated air or the heat unavailable due to the evaporation of moisture in the fuel and the combustion of hydrogen.

_____ Furnace volumetric heat release rate (in Btu's/CuFt/Hr)

14. Boiler – Primary and Secondary Design Fuels

Enter information on the characteristics of the primary and secondary fuels considered in the DESIGN of the unit. These fuels are used to sustain load on the unit. PRIMARY is the first fuel of choice for economic or control reasons, or that fuel contributing 50% or more of the load-carrying Btu's. Fuel characteristics are based on design specifications. Additional notes are provided where appropriate.

Primary Fuel	**Secondary Fuel**

Fuel Codes

BM	Biomass	OO	Oil
CC	Coal	OS	Other-Solid (Tons)
DI	Distillate Oil (No. 2)	PC	Petroleum Coke

GE	Geothermal	PE	Peat
GG	Gas	PR	Propane
JP	JP4 or JP5	SL	Sludge Gas
KE	Kerosene	SO	Solar
LI	Lignite	WA	Water
NU	Nuclear	WD	Wood
OG	Other-Gas (Cu. Ft.)	WH	Waste Heat
OL	Other-Liquid (BBL)	WM	Wind

Fuel Characteristics

Primary Fuel	Secondary Fuel	
_____	_____	Average Heat Content in Fuel (Btu/lb, Btu/bbl, Btu/CuFt)
_____	_____	% Ash Content (to one decimal place) (Btu/lb,Btu/bbl,Btu/CuF)
_____	_____	% Sulfur Content (to one decimal place) (Btu/lb,Btu/bbl,Btu/CuF)
_____	_____	% Moisture Content (to one decimal place) (Btu/lb,Btu/bbl,Btu/CuF)
_____	_____	Ash Softening Temp (°F) (in a reducing atmosphere) (ASTM STD D-1857, Part 26) (coal units only)
_____	_____	Grindability Hardgrove Index (ASTM STD D-409, Part 26) (coal units only)
_____	_____	% Vanadium & Phosphorous (to one decimal place) (oil units only)

15. Boiler – Fuel Oil Forwarding System

Some units are equipped with a fuel oil forwarding system that transfers oil from the main storage tanks to smaller tanks closer to the unit. (Complete Item 18, below, if interim storage tanks are not used.) Enter the following data on the fuel oil forwarding system:

_____ Fuel forwarding/transfer pump(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the fuel forwarding/ transfer pump(s)

_____ TOTAL number of fuel forwarding/transfer pumps; include installed spares

_____ MINIMUM number of pumps required to obtain maximum capacity from the unit

16. Boiler – Burner System (General)

Enter the following information on the burner systems installed at the unit (this includes the nozzles, igniter, air registers, and the wind box arrangements):

Conventional Burners

_____ Primary fuel burner(s) manufacturer(s)

_____ TOTAL number of primary fuel burners

Low No_x Burners

_____ Manufacturer(s)

_____ TOTAL number of Low No_x Burners; include installed spares

_____ MINIMUM number of Low No_x Burners required to obtain maximum capacity from the unit

Installation Date: _____ Year _____ Month _____ Day

17. Boiler – Burner Management System

Enter the name of the manufacturer of each of the following burner management systems:

_____ Manufacturer of the combustion control system that coordinates the feedwater, air, and fuel subsystems for continuous unit operation

_____ Manufacturer of the burner management system that monitors only the fuel and air mixture during all phases of operation to prevent the formation of an explosive mixture

18. Boiler – Fuel Oil Burner Supply System (In-plant)

Enter the following information on the pumps used to forward fuel oil from the main storage tanks or the interim storage tanks (if the unit is so equipped) to the burners:

_____ Fuel oil burner supply pump(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the fuel oil burner supply pump(s)

_____ TOTAL number of fuel oil burner supply pumps; include installed spares

_____ MINIMUM number of fuel oil burner supply pumps required to obtain maximum capacity from the unit

19. Boiler – Igniter System

Enter the following information on the igniter system installed at the unit:

_____ Igniter manufacturer

_____ Enter the type of fuel the igniter(s) *were originally designed for:*

A – Light (distillate) oil
B – Heavy oil
C – Gas
D – Coal
E – Oil and Gas
F – Propane
M – More than one

_____ Enter igniter type*:*

1 – *Pilot torch lighter* – an oil or gas igniter that uses an electric spark to ignite the fuel

2 – *Carbon arc* – a carbon or graphite electrode that is energized and used to ignite the fuel

3 – *High energy arc* – a low voltage, high energy pulse arc that is used to ignite the fuel

4 – *Plasma arc* – a high dc voltage current used to ionize the air resulting in a high energy arc that ignites the fuel

9 – *Other, describe* _____

20. Boiler – Coal Handling Systems – Yard Area

Enter the following information on the equipment installed in the coal yard:

_____ Coal crusher(s) manufacturer(s)

_____ Stacker/reclaimer system(s) manufacturer(s)

_____ Number of critical path coal conveyor systems available to the unit

21. Boiler – Coal Feeders for Pulverizers or Coal Mills

Enter the following information on the coal feeder equipment used to supply coal from the in-plant coal holding bunkers to the pulverizers or coal mills:

_____ Feeder(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the feeder(s)

_____ TOTAL number of feeders PER pulverizer or coal mill

_____ (M1) _____ (M2) Enter the type of pulverizer or coal mill feeder(s) at the unit:

1 – *Gravimetric belt* – system that weighs the coal as it is fed to the pulverizer or coal mill

2 – *Volumetric belt* – system that measures the volume of coal fed to the pulverizer or coal mill.

3 – *Star roll* – a multi-blade rotor that turns about a fixed, hollow, cylindrical core feeding a fixed measure of coal

4 – *Rotating table* – system that operates by piling coal on a rotating table, and, as the table rotates, a stationary blade diverts the coal to a feed chute to the mill

9 – *Other, describe* _____

22. Boiler – Pulverizer or Coal Mill Capability

Enter the following information on the capability of the pulverizer(s) or coal mill(s):

_____ Pulverizer(s) or coal mill(s) manufacturer(s)

_____ Manufacturers' model number(s) for the pulverizer(s) or coal mill(s)

_____ Design coal flow rate in lb/hr (per pulverizer or coal mill) using design fuel

_____ TOTAL number of pulverizers or coal mills; include installed spares

_____ MINIMUM number of pulverizers or coal mills required to obtain maximum capacity from the unit

_____ _____ Enter the type of pulverizer(s) or coal mill(s) at the unit:
M1 M2

1 – *Ball* – grinding elements are balls that operate freely in a race on a rotating grinding table
2 – *Roll race* – rotating grinding table that moves coal through a series of rollers or wheels supported within the pulverizer or coal mill
3 – *Ball tube* (Hardinge) – horizontal, rotating, grinding cylinder containing steel balls that move within the cylinder and grind or crush the coal
4 – *Impact* (Attrition) – series of fixed or hinged hammers that rotate within a closed chamber impacting and crushing the coal
9 – *Other, describe* _____

23. Boiler – Primary Air System

Enter the following information on the primary air system that provides the air needed to transport the coal from the pulverizers or coal mills to the furnace (note: exhausters for pulverizers or coal mills covered in item 24):

_____ Primary air fan(s) manufacturer(s)
_____ Manufacturer(s) of the motor(s) that drives the primary air fan(s)
_____ TOTAL number of primary air fans; include installed spares
_____ MINIMUM number of primary air fans required to obtain maximum capacity from the unit

_____ _____ Enter the type of primary air fan(s) at the unit:
M1 M2

Centrifugal – blades mounted on an impeller (or rotor) that rotates within a spiral or volute housing. Mark the type of blades used on this type of fan:

1 – Forward curved
2 – Straight (radial or radial tipped)
3 – Backward curved (air foil or flat)
4 – Axial (fixed or variable pitch) – blades attached to central hub parallel to air flow
9 – *Other, describe* _____

24. Boiler – Exhausters for Pulverizers or Coal Mills

Enter the following information on the exhausters used to transport the pulverized coal from the pulverizer(s) or coal mill(s) to the burner front:

_____ Exhauster fan(s) manufacturer(s)
_____ Manufacturer(s) of the motor(s) that drives the exhauster fan(s)
_____ TOTAL number of exhauster fans; include installed spares
_____ MINIMUM number of exhauster fans required to obtain maximum capacity from the unit

_____ _____ Enter the type of exhauster fan(s) at the unit:
M1 M2

Centrifugal – blades mounted on an impeller (or rotor) which rotates within a spiral or volute housing. Mark the type of blades used on this type of fan:

1 – Forward curved

2 – Straight (radial or radial tipped)

3 – Backward curved (air foil or flat)

4 – Axial (fixed or variable pitch) – blades attached to central hub parallel to air flow

9 – *Other, describe* _____

25. Boiler – Balanced Draft or Pressurized Draft

_____ Enter the type of draft the boiler *was designed for:*

1 – *Balanced draft* – equipped with both induced draft and forced draft fans. The furnace operates at positive pressure at air entry and negative pressure at flue gas exit

2 – *Pressurized draft* – equipped with forced draft fans only. The furnace and draft system operate at positive pressure

_____	_____	_____
Year	Month	Day

26. Boiler – Forced Draft Fan System

Enter the following information on the forced draft fans installed at the unit:

_____ Forced draft fan(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s)/steam turbine(s) that drives the forced draft fan(s)

_____ TOTAL number of forced draft fans; include installed spares

_____ MINIMUM number of forced draft fans required to obtain maximum capacity from the unit

_____	_____	Enter the type of forced draft fan(s) at the unit:
M1	M2	

Centrifugal – blades mounted on an impeller (or rotor) which rotates within a spiral or volute housing. Mark the type of blades used on this type of fan:

1 – Forward curved

2 – Straight (radial or radial tipped)

3 – Backward curved (air foil or flat)

4 – Axial (fixed or variable pitch) – blades attached to central hub parallel to air flow

9 – *Other, describe* _____

_____	_____	Enter the type of forced draft fan drives(s) at the unit:
M1	M2	

1 – Single speed motor

2 – Two speed motor

3 – Variable speed motor

4 – Steam turbine

9 – *Other, describe* _____

27. Boiler – Induced Draft Fan System

Enter the following information on the induced draft fans installed at the unit:

_____ Induced draft fan(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s)/steam turbine(s) that drives the induced draft fan(s)

_____ TOTAL number of induced draft fans; include installed spares

_____ MINIMUM number of induced draft fans required to obtain maximum capacity from the unit

_____ (M1) _____ (M2) Enter the type of induced draft fan(s) at the unit:

Centrifugal – blades mounted on an impeller (or rotor) which rotates within a spiral or volute housing. Mark the type of blades used on this type of fan:

1 – Forward curved

2 – Straight (radial or radial tipped)

3 – Backward curved (air foil or flat)

4 – Axial (fixed or variable pitch) – blades attached to central hub parallel to air flow

9 – *Other, describe* _____

_____ (M1) _____ (M2) Enter the type of induced draft fan drive(s) at the unit:

1 – Single speed motor

2 – Two speed motor

3 – Variable speed motor

4 – Steam turbine

9 – *Other, describe* _____

28. Boiler – Gas Recirculating Fan System

Enter the following information on the gas recirculating fans installed at the unit:

_____ Gas recirculating fan(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s)/steam turbine(s) that drives the gas recirculating fan(s)

_____ TOTAL number of gas recirculating fans; include installed spares

_____ MINIMUM number of gas recirculating fans required to obtain maximum capacity from the unit

_____ _____ Enter the type of gas recirculating fan(s) at the unit:
M1 M2

Centrifugal – blades mounted on an impeller (or rotor) which rotates within a spiral or volute housing. Mark the type of blades used on this type of fan:

1 – Forward curved
2 – Straight (radial or radial tipped)
3 – Backward curved (air foil or flat)
4 – Axial (fixed or variable pitch) – blades attached to central hub parallel to air flow
9 – *Other, describe* _____

_____ _____ Enter the type of gas recirculating fan drive(s) at the unit:
M1 M2

1 – Single speed motor
2 – Two speed motor
3 – Variable speed motor
4 – Steam turbine
9 – *Other, describe* _____

29. Boiler – Primary Air Heating System

Enter information about the air heaters used to transfer the excess heat from the flue gases to the incoming primary air for the furnace:

_____ Primary air heater(s) manufacturer(s)
_____ TOTAL number of primary air heaters

_____ _____ Enter the type of primary air heater(s) at the unit:
M1 M2

1 – *Regenerative* (Ljungstrom) – rotating heat exchanger that continuously rotates sections (baskets) composed of metal plates from the hot flue gas furnace exit plenum to the furnace intake air plenums
2 – *Tubular* – hot flue gas from the furnace is channeled through tubes (vertical or horizontal) where the heat is transferred to the furnace intake air passing across the outside of the tubes
3 – *Steam Coil* – similar to tubular except steam is used to preheat the intake air
4 – *Regenerative* (Rothemule)
9 – *Other, describe* _____

30. Boiler – Secondary Air Heating System

Enter information about the secondary (or backup) air heaters used to transfer the excess heat from the flue gases to the incoming primary air for the furnace:

_____ Secondary air heater(s) manufacturer(s)
_____ TOTAL number of secondary air heaters

_____ _____ Enter the type of secondary air heater(s) at the unit:
M1 M2

1 – *Regenerative* (Ljungstrom) – rotating heat exchanger that continuously rotates sections (baskets) composed of metal plates from the hot flue gas furnace exit plenum to the furnace intake air plenums thus heating the intake air

2 – *Tubular* – hot flue gas from the furnace is channeled through tubes (vertical or horizontal) where the heat is transferred to the furnace intake air passing across the outside of the tubes

3 – *Steam Coil* – similar to tubular except steam is used to preheat the intake air

4 – *Regenerative* (Rothemule)

9 – *Other, describe* _____

31. Boiler – Soot Blowers

Enter the following information on the soot blower system installed on the furnace:

_____ Soot blower(s) manufacturer(s)

_____ TOTAL number of soot blowers installed on the furnace

Enter the type(s) of medium(s) used to blow the soot. If a variety of soot blowers are used at the unit, note the number of each type used.

M1		M2		M3	
Type	Number	Type	Number	Type	Number

1 – Steam

2 – Air

3 – Water

4 – Sonic

5 – Steam/Air

9 – *Other, describe* _____

32. Boiler – Bottom Ash Handling System

_____ Bottom ash handling system manufacturer

33. Boiler – Mechanical Fly Ash Precipitator System

Fly ash contained in the furnace exit flue gases can be removed by various types of mechanical precipitators including cyclone collectors, and wet or venturi scrubbers (note: SO_2 scrubbers covered in items 37–48). Enter the following information on the mechanical precipitator equipment:

_____ Mechanical precipitator manufacturer

_____ Enter the location of the mechanical precipitator with respect to the air heaters:

1 – Before air heaters

2 – After air heaters

3 – Both – precipitators installed both before and after the air heaters

9 – Other, describe _____

34. Boiler – Electrostatic Precipitator

Fly ash contained in the furnace exit flue gases can be removed by using an electrostatic precipitator. Enter the following information on the electrostatic precipitator:

_____ Electrostatic precipitator manufacturer

_____ Enter the location of the electrostatic precipitator with respect to the air heaters:

1 – Before air heaters

2 – After air heaters

3 – Both – Flue gas is extracted both before and after the air heaters

9 – Other, describe _____

35. Boiler – Baghouse Fly Ash System

Fly ash contained in the furnace exit flue gas may be removed using fabric or fabric bag filters. Enter the following information on the baghouse fly ash system:

_____ Baghouse system manufacturer

_____ Manufacturer of the baghouse exhauster booster fans

_____ Manufacturer of the motor that drives the baghouse booster fans

_____ TOTAL number of baghouse booster fans installed on the unit

_____ Enter the baghouse type:

1 – *Reverse* – clean flue gas is blown in the direction counter to normal operation to remove fly ash from the bag

2 – *Pulse* (or pulse set) – short bursts of compressed air are blown into the bag to cause a momentary expansion of the bag to dislodge the entrapped fly ash

3 – *Shaker* – the bag is literally shaken to remove the fly ash collected on its surface

9 – Other, describe _____

_____ Enter the type of baghouse booster fan(s) at the unit:

Centrifugal – blades mounted on an impeller (or rotor) which rotates within a spiral or volute housing. Mark the type of blades used on this type of fan:

1 – Forward curved

2 – Straight (radial or radial tipped)

3 – Backward curved (air foil or flat)

4 – *Axial* (fixed or variable pitch) – blades attached to central hub parallel to air flow

9 – Other, describe _____

36. Boiler – Fly Ash Transport System

Enter the following information on the fly ash removal system:

_____ Fly ash removal system manufacturer

_____ Enter the type of fly ash removal system:

1 – *Vacuum* – ash conveying system operates at a vacuum relative to the fly ash collection hoppers.
2 – *Pressure* – ash conveying system operates at a pressure greater than the pressure in the fly ash collection hoppers
3 – *Vacuum-pressure* – employs the best features of both the vacuum and pressure systems
4 – *Water* (sluice) – employs water to sluice the ash away from the hoppers
5 – *Vacuum and water slurry*
9 – Other, describe _____

37. FGD Manufacturer

Enter the following information on the FGD system (venturi scrubbers covered in Item 33):

_____ FGD system manufacturer

38. FGD Installation Date

Enter the date the FGD system was initially operated:

_____ _____ _____
Year Month Day

Was the FGD system a part of the original design of the unit? A "no" answer means the FGD system was a retrofit after the unit entered service.

_____ 1 – Yes 2 – No

39. FGD Cycle Type

_____ Enter the type of FGD cycle used by the unit:

1 – *Single loop* – single recirculation loop for controlling the reagent
2 – *Dual loop* – two separate and distinct recirculation loops for controlling the reagent (same reagent used in both loops)
3 – *Dual alkali* – two separate and distinct reagents controlled through the use of separate recirculation loops operated in series
9 – Other, describe _____

40. FGD Absorbing Reagents

The "reagent" is the substance that reacts chemically with the flue gas to remove the resident sulfur dioxide. Name the reagent(s) used in the unit's FGD system:

_____ Reagent #1

_____ Reagent #2 (if dual alkali system)

41. FGD Flow Rates

Enter the following information regarding the flue gas flow rates into the FGD system:

_____ Maximum design flue gas flow rate at the exit of the boiler in actual cubic feet per minute (ACFM).

_____ Maximum design flue gas flow rate capable of passing through the FGD system in ACFM

42. FGD Bypass Capacity

The flue gas bypass capacity is the percent of the total flue gas flow (maximum design condition) that can be bypassed around the FGD while permitting the unit to operate within compliance. Enter the following information:

_____ Percent of scrubber bypass capacity at compliance levels. (Enter 0% if no bypass capacity exists.)

43. FGD Modules

Several towers may work together in series or in parallel to form a single FGD module with one or more modules installed at a single unit. Enter the following information:

_____ TOTAL number of FGD modules on the unit

_____ TOTAL number of FGD towers per module

_____ MINIMUM number of FGD modules required to obtain maximum capacity from the unit

_____ Are the FGD modules shared with another unit? 1 – Yes 2 – No

44. Scrubber/Absorber Tower Type

The scrubber/absorber tower type identifies the interaction methods used between the flue gas and the reagent.

_____ Enter the type combination of types of scrubber/absorber used on the unit:

1 – *Venturi* – a conveying throat to accelerate the inlet flue gas to a higher velocity

2 – *Spray* – an open gas absorption vessel in which scrubbing slurry is introduced into the gas stream from atomizing nozzles

3 – *Tray* – tray(s) internal to the scrubber/absorber consists of a horizontal metal surface perforated with holes or slots mounted transversely across the vessel

4 – *Packed* – a bed of stationary (static) or mobile (moving bed) packing, mounted transversely across the vessel

5 – *Combination* – two or more of the above-noted designs used in the same tower

9 – Other, describe _____

45. FGD Fans

FGD fans are those USED EXCLUSIVELY to induce or force flue gases through the FGD towers. These fans help overcome the pressure drop through the FGD and are IN ADDITION to the boiler I.D. and F.D. fans. Enter the following information:

_____ FGD fan(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the FGD fan(s)

_____ TOTAL number of FGD fans; include installed spares

_____ MINIMUM number of FGD fans required to obtain maximum capacity from the unit

_____ _____ Enter the type of FGD fan(s) at the unit:
M1 M2

Centrifugal – blades mounted on a impeller (or rotor) which rotates within a spiral or volute housing. Mark the type of blades used on this type of fan:

1 – Forward curved

2 – Straight (radial or radial tipped)

3 – Backward curved (air foil or flat)

4 – Axial (fixed or variable pitch) – blades attached to central hub parallel to air flow

9 – *Other, describe* _____

_____ _____ Enter the location of the FGD fan(s) with respect to the FGD:
M1 M2

1 – Before

2 – After

9 – *Other, describe* _____

46. Scrubber Recycle (Liquid) Pumps

Recycle (liquid) pumps circulate reagent through the FGD towers. Enter the following information on the scrubber recycle pumps at the unit:

_____ Recycle pump(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the recycle pump(s)

_____ TOTAL number of recycle pumps PER tower; include installed spares

_____ MINIMUM number of recycle pumps required to obtain maximum capacity from the unit

47. Stack Gas Reheater Methods

After the flue gases leave the FGD system, the exit gases may be heated before discharge through the stack. Two methods commonly used to reheat the flue gases are: direct (injection of hot gases) or indirect (passing through a heat exchanger).

_____ Enter the type of stack gas reheating method used at the unit:

1 – *In-line* – installation of a heat exchanger in the flue gas duct downstream of the mist eliminators

2 – *Direct combustion* – firing of gas or oil burners and mixing product gases with the cooler scrubbed flue gas

3 – *Indirect hot air* – heating of ambient air in an external heat exchanger (using steam) and injecting this heated air into scrubbed flue gas discharge

4 – *Waste heat recovery* – use of unscrubbed flue gas in a heat exchanger to reheat the scrubbed stack gas

5 – *Exit gas recirculation* – a portion of the scrubbed gas is diverted from the exit stream, reheated by a heat exchanger and then injected into the scrubbed flue gas before entering the stacks

6 – *Bypass reheater* – bypass of a portion of the hot unscrubbed flue gas around the FGD system for injection into the cooler scrubbed flue gas

9 – Other, describe _____

48. FGD Primary Mist Eliminator

Enter the following information on the FGD primary mist eliminators:

_____ Enter the type of mist eliminator(s) used in the FGD towers:

1 – *Impingement* (or inertial impaction) – open or chevron vanes placed in the gas stream divert and collect the mist on their surfaces and direct the droplets away

2 – *Electrostatic* – mist removal through the use of an electrostatic field

3 – *Centrifugal* – uses baffles that impart a centrifugal force on the gas

4 – *Cyclonic* – uses tangential inlets which impart a swirl or cyclonic action to the gas as it passes through the separator chamber

9 – Other, describe _____

A "mist eliminator stage" is a single set of separate and distinct elements through which the flue gas must pass.

_____ Enter the type of mist eliminator(s) used in the FGD towers:

49. Steam Turbine – Manufacturer

Enter the name of the manufacturer of the steam turbine:

_____ Steam turbine manufacturer

50. Steam Turbine – Enclosure

Is 50% or more of the steam turbine outdoors (not enclosed in building framing and siding)?

_____ 1 – Yes 2 – No

51. Steam Turbine – Nameplate Rating in MW

"Nameplate" is the design capacity stamped on the steam turbine's nameplate or published on the turbine guarantee flow diagram. In cases where the steam turbine's nameplate rating cannot be determined, approximate the rating by multiplying the MVA (megavoltamperes) by the rated power factor found on the nameplate affixed to the unit's generator (or nameplates in the case of cross compound units).

_____ Steam turbine's nameplate rating (MW)

52. Steam Turbine – Type of Steam Turbine

Identify the steam turbine's casing or shaft arrangement.

_____ Enter the type of steam turbine at the unit:

1 – *Single casing* – single (simple) turbine having one pressure casing (cylinder)
2 – *Tandem compound* – two or more casings coupled together in line
3 – *Cross compound* – two cross-connected single casing or tandem compound turbine sets where the shafts are not in line
4 – *Triple compound* – three cross-connected single casing or tandem compound turbine sets
9 – Other, describe _____

53. Steam Turbine – Manufacturer's Building Block or Design Codes

Steam turbine building blocks or manufacturer's design codes are assigned by the manufacturer to designate a series of turbine designs, LM5000 or W501 for example. Enter the following information:

_____ Manufacturer's code, first shaft
_____ Manufacturer's code, second shaft (cross or triple compound
_____ Turbine configuration and number of exhaust flows (e.g., tandem compound, four flow)

54. Steam Turbine – Steam Conditions

Enter the following information on the Main, First Reheat, and Second Reheat Steam design conditions:

	Main Stream	**First Reheat**	**Second Reheat**
Temperature (°F)			
Pressure (psig)			

55. Steam Turbine – High, Intermediate, and Low Pressure Sections

Enter the following information describing various sections of the steam turbine:

High Pressure Casings

_____ TOTAL number of high pressure casings, cylinders or shell
_____ Back pressure of the high pressure condenser (if applicable) to the nearest one-tenth inch of mercury at the nameplate capacity and design water temperature

Combined High Pressure/Intermediate Pressure Casings

_____ TOTAL number of high/intermediate pressure casings, cylinders or shells

Intermediate Pressure Casings

_____ TOTAL number of intermediate pressure casings, cylinders or shells

Combined Intermediate/Low Pressure Casings

_____ TOTAL number of intermediate/low pressure casings, cylinders or shell

Low Pressure Casings

_____ TOTAL number of low pressure casings, cylinders or shells

_____ Back pressure of the low pressure condenser to the nearest one-tenth inch of mercury at nameplate capacity and design water temperature

_____ The last stage blade length (inches) of the low pressure turbine, measured from hub to end of top of blade

56. Steam Turbine – Governing System

Enter the following information for the steam turbine governing system:

_____ Enter the type of governing system used at the unit:

1 – *Partial arc* – main steam flow is restricted to one sector of the turbine's first stage at startup
2 – *Full arc* – main steam is admitted to all sectors of the turbine's first stage at startup
3 – *Either* – capable of admitting steam using either partial or full arc techniqu
9 – Other, describe _____

_____ Enter the type of turbine governing system used at the unit:

1 – *Mechanical hydraulic control (MHC)* – turbine speed monitored and adjusted through mechanical and hydraulic linkage
2 – *Analog electro-hydraulic control (EHC)* – analog signals control electro-hydraulic linkages to monitor and adjust turbine speed
3 – *Digital electro-hydraulic control (DHC)* – same as EHC except signals are digital rather than analog
9 – Other, describe _____

57. Steam Turbine – Lube Oil System

Enter the following information for the steam turbine main lube oil system:

_____ Main lube oil system manufacturer

_____ Main lube oil pump(s) manufacturer

_____ Manufacturer of the motor(s)/steam turbine(s) that drives the main lube oil pump(s)

_____ TOTAL number of steam turbine main lube oil pumps; include installed spares

_____ Enter the type of driver on the main lube oil pump:

1 – Motor
2 – Shaft
3 – Steam turbine
9 – Other, describe _____

58. Generator – Manufacturer

Enter the name of the manufacturer of the electric generator:

_____ Generator manufacturer

59. Generator – Enclosure

Is 50% or more of the generator outdoors (not enclosed in building framing and siding)?

_____ 1 – Yes 2 – No

60. Generator – Ratings and Power Factor

Enter the following information about the generator:

Design (Nameplate) Item	Main Generator	Second* Shaft	Third* Shaft
Voltage to nearest one-tenth kV			
Megavoltamperes (MVA) Capability			
RPM			
Power Factor (enter as %)			

*Cross compound units.

61. Generator – Cooling System

Two types of cooling methods are typically used. First is the "innercooled" method, where the cooling medium is in direct contact with the conductor copper or is separated by materials having little thermal resistance. The other is the "conventional" cooling method where the heat generated within the windings must flow through the major ground insulation before reaching the cooling medium.

_____ Enter the type of cooling method used by the generator:

1 – Stator innercooled and rotor innercooled
2 – Stator conventionally cooled and rotor conventionally cooled
3 – Stator innercooled and rotor conventionally cooled
9 – Other, describe _____

Enter the mediums used to cool the generator's stator and rotor:

_____ Stator _____ Rotor

Medium
A – Air H – Hydrogen O – Oil W – Water

62. Generator – Hydrogen Pressure

_____ Enter the generator hydrogen pressure IN PSIG at nameplate MVA

63. Exciter – Configuration

Enter the following information about the main exciter:

_____ Exciter manufacturer
_____ TOTAL number of exciters; include installed spares

_____ MINIMUM number of exciters required to obtain maximum capacity from the unit

_____ Enter the type of main exciter used at the unit:

1 – *Static* – static excitation where D.C. is obtained by rectifying A.C. from generator terminals and D.C. is fed into rotor by collector rings
2 – *Rotating D.C. generator* – exciter supplies D.C. from a commutator into the main rotor by means of collector rings
3 – *Brushless* – an A.C. exciter (rotating armature type) whose output is rectified by a semiconductor device to provide excitation to an electric machine. The semiconductor device would be mounted on and rotate with the A.C. exciter armature
4 – *Alternator rectifier*
9 – Other, describe _____

_____ Enter the type(s) of exciter drive(s) used by the main exciter IF it is rotating:

1 – Shaft direct
2 – Shaft gear
3 – Motor
9 – Other, describe _____

64. Auxiliary Systems – Main Condenser

Enter the following information for the main condenser and its auxiliaries:

_____ Main condenser manufacturer
_____ TOTAL number of passes made by the circulating water as it passes through the condenser
_____ TOTAL number of condenser shells
_____ Condenser tube materials used in the majority (50% or more) of the condenser tubes
_____ Air ejector(s) or vacuum pump(s) manufacturer

_____ Enter the type of air removal equipment used on the condenser:

1 – Vacuum pump
2 – Steam jet air ejector
3 – Both
9 – Other, describe _____

_____ Enter the type of cooling water used in the condenser:

1 – *Fresh* – salinity values less than 0.50 parts per thousand
2 – *Brackish* – salinity value ranging from approximately 0.50 to 17 parts per thousand
3 – *Salt* – salinity values greater than 17 parts per thousand

9 – Other, describe _____

_____ Enter the origin of the circulating water used in the condenser:

1 – River
2 – Lake
3 – Ocean or Bay
4 – Cooling Tower
9 – Other, describe _____

65. Auxiliary Systems – Condenser Cleaning System

Enter the following information about the ON-LINE main condenser cleaning system (leave blank if cleaning is manual):

_____ On-line main condenser cleaning system manufacturer

_____ Enter the type of on-line main condenser cleaning system used at the unit:

1 – Ball sponge rubber
2 – Brushes
9 – Other, describe _____

66. Auxiliary Systems – Condensate Polishing System

A "condensate polisher" is an in-line demineralizer located in the condensate water system to treat water coming from the condenser to the boiler. It is not the demineralizer that prepares raw or untreated water for eventual use in the steam production process.

Enter the following information about the condensate polishing system at the unit:

_____ Condensate polishing system manufacturer

Enter the % of the condensate flow at maximum unit capacity that can be treated:

_____ % Treated

67. Auxiliary Systems – Condensate Pumps

Enter the following information for the main condensate pumps (those at the discharge of the condenser):

_____ Condensate pump(s) manufacturer(s)
_____ Manufacturer(s) of the motor(s) that drives the condensate pump(s)
_____ TOTAL number of condensate pumps; include installed spares
_____ MINIMUM number of condensate pumps required to obtain maximum capacity from the unit

68. Auxiliary Systems – Condensate Booster Pumps

Condensate booster pumps increase the pressure of the condensate water between the low pressure and the intermediate or high pressure feedwater heaters. Enter the following information for the condensate booster pumps:

_____ Condensate booster pump(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the condensate booster pump(s)

_____ TOTAL number of condensate booster pumps; include installed spares

_____ MINIMUM number of condensate booster pumps required for maximum capacity from the unit

69. Auxiliary Systems – Feedwater (Boiler Feed) Pumps

The feedwater (boiler feed) pumps move the feedwater through the feedwater system into the boiler. Enter the following information on the feedwater pumps installed at the unit:

_____ Feedwater (boiler feed) pump(s) manufacturer(s)

_____ Normal operating speed (RPM) of the feedwater pumps

_____ TOTAL number of feedwater pumps; include installed spares

_____ MINIMUM number of feedwater pumps required to obtain maximum capacity from the unit

_____ PERCENT (%) of the unit's maximum capacity that can be achieved with a single feedwater pump

70. Auxiliary Systems – Feedwater (Boiler Feed) Pump Drives

Enter the following information for the feedwater (boiler feed) pump drives:

_____ Manufacturer(s) of motor(s) or steam turbine(s) that drives the feedwater pump(s)

_____ (M1) _____ (M2) Enter the type of equipment used to drive the feedwater (boiler feed)

1 –	Motor – single speed	5 –	Shaft
2 –	Motor – two speed	6 –	Motor gear
3 –	Motor – variable speed	7 –	Steam gear
4 –	Steam turbine	8 –	Shaft gear
9 –	*Other, describe* _____		

_____ (M1) _____ (M2) Specify coupling type used for feedwater (boiler feed) pump

1 –	Hydraulic
2 –	Mechanical
9 –	*Other, describe* _____

71. Auxiliary Systems – Startup Feedwater (Boiler Feed) Pumps

Enter the following information for the startup feedwater pump(s) at the unit:

_____ Startup feedwater pump(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the startup feedwater pump(s)

_____ PERCENT (%) of the unit's maximum capacity that can be achieved with a single startup feedwater pump

_____ _____ Indicate the additional capabilities of the startup feedwater pump:
M1 M2

1 – ADDITIVE: operated in conjunction with the feedwater (boiler feed) pumps
2 – REPLACEMENT: can carry load when the feedwater pumps are inoperative
3 – STARTUP only: cannot be used in lieu of the feedwater pumps
9 – *Other, describe* _____

72. Auxiliary Systems – High Pressure Feedwater Heaters

High pressure feedwater heaters are heat exchangers between the feedwater (boiler feed) pumps discharge and the economizer inlet. Enter the following information for the HIGH pressure feedwater heaters at the unit:

_____ High pressure feedwater heater(s) manufacturer(s)

_____ TOTAL number of high pressure feedwater heaters

_____ Feedwater heater tube materials used in 50% or more of the tubes

_____ _____ Enter the type of HIGH pressure feedwater heater(s):
M1 M2

1 – Horizontal – longitudinal axis of the heater shell is horizontal
2 – After
9 – *Other, describe* _____

_____ _____ Enter the type of HIGH pressure feedwater heater(s)
M1 M2

1 – Horizontal – longitudinal axis of the heater shell is horizontal
2 – Vertical – longitudinal axis of the heater shell is vertical
3 – Both
9 – *Other, describe* _____

73. Auxiliary Systems – Intermediate Pressure Feedwater Heaters

Intermediate pressure feedwater heaters are heat exchangers between the condensate booster pump discharge and the deaerator. Enter the following information for the INTERMEDIATE pressure feedwater heaters at the unit:

_____ Intermediate pressure feedwater heater(s) manufacturer(s)

_____ TOTAL number of intermediate pressure feedwater heaters

_____ Feedwater heater tube materials used in 50% or more of the tubes

_____ _____ Enter the type of INTERMEDIATE pressure feedwater heater(s):
M1 M2

1 – Horizontal – longitudinal axis of the heater shell is horizontal
2 – Vertical – longitudinal axis of the heater shell is vertical
3 – Both
9 – *Other, describe* _____

74. Auxiliary Systems – Low Pressure Feedwater Heaters

Low pressure feedwater heaters are heat exchangers between the condensate pump discharge and the condensate booster pump inlet. If the unit does not have condensate booster pumps, the low pressure feedwater heaters are located between the condensate pumps and the deaerator. Enter the following information for the LOW pressure feedwater heaters at the unit:

_____ Low pressure feedwater heater(s) manufacturer(s)
_____ TOTAL number of low pressure feedwater heaters
_____ Feedwater heater tube materials used in 50% or more of the tubes

_____ _____ Enter the type of LOW pressure feedwater heater(s):
M1 M2

1 – Horizontal – longitudinal axis of the heater shell is horizontal
2 – Vertical – longitudinal axis of the heater shell is vertical
3 – Both
9 – *Other, describe* _____

75. Auxiliary Systems – Deaerator Heater

Enter the following information on the deaerator heater at the unit:

_____ Deaerator manufacturer(s)

_____ _____ Enter the type of deaerator heater(s):
M1 M2

1 – Spray – high-velocity stream jet atomizes and scrubs the condensate
2 – Tray – series of trays over which the condensate passes and is deaerated
3 – Vacuum – a vacuum condition inside the shell for deaeration
4 – Combination
9 – *Other, describe* _____

76. Auxiliary Systems – Heater Drain Pumps

Enter the following information for the heater drain pumps at the unit:

_____ Heater drain pump(s) manufacturer(s)
_____ Manufacturer(s) of the motor(s) that drives the heater drain pump(s)

77. Auxiliary Systems – Circulating Water Pumps

Enter the following information for the circulating water pumps:

_____ Circulating water pump(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the circulating water pump(s)

_____ TOTAL number of circulating water pumps; include installed spares

_____ MINIMUM number of circulating water pumps required to obtain maximum capacity from the unit DURING WINTER SEASON

78. Auxiliary Systems – Cooling Tower and Auxiliaries

Enter the following information for the cooling towers and all related auxiliary equipment at the unit:

_____ Cooling tower manufacturer(s)

_____ Cooling tower fan(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the cooling tower fan(s)

_____ (M1) _____ (M2) Enter the type of cooling tower(s) used:

1 – *Mechanical draft* (induced, forced, cross-flow and counterflow) – fan(s) used to move ambient air through the tower

2 – *Atmospheric spray* – air movement is dependent on atmospheric conditions and the aspirating effect of the spray nozzles

3 – *Hyperbolic* (natural draft) – temperature difference between condenser circulating water and ambient air conditions, aided by hyperbolic tower shape, creates natural draft of air through the tower to cool the water

4 – *Deck-filled* – wetted surfaces such as tiers of splash bars or decks aid in the breakup and retention of water drops to increase the evaporation rate

5 – *Coil shed* – a combination structure of a cooling tower installed over a substructure that houses atmospheric coils or sections

9 – *Other, describe* _____

The cooling tower booster pumps increase the pressure of the circulating water and force the water to the top of the cooling tower.

_____ Cooling tower booster pump(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the cooling tower booster pump(s)

_____ TOTAL number of cooling tower booster pumps; include installed spares

_____ MINIMUM number of cooling tower booster pumps required to obtain maximum capacity from the unit

79. Balance of Plant – Main Transformer

The "main transformer" is the unit step-up transformer connecting the generator (or multiple generators if unit is cross compound) to the transmission system. Enter the following information for the MAIN transformer(s) at the unit:

_____ Main transformer(s) manufacturer(s)

_____ TOTAL number of main transformers; include installed spares

_____ Megavoltampere (MVA) size of the main transformer(s)

_____ HIGH SIDE voltage in kilovolts (kV) of the main transformer(s) at 55 ºF

_____ _____ Enter the type of MAIN transformer at the unit
M1 M2

1 – Single Phase

2 – Three Phase

9 – *Other, describe* _____

80. Balance of Plant – Unit Auxiliary Transformer

The "unit auxiliary transformer" supplies the auxiliaries when the unit is synchronized. Enter the following information for this transformer:

_____ Unit auxiliary transformer(s) manufacturer(s)

_____ TOTAL number of unit auxiliary transformer(s)

_____ LOW SIDE voltage in kilovolts (kV) of the unit auxiliary transformer(s) at 55 ºF

81. Balance of Plant – Station Service Transformer

The "station service (start-up) transformer" supplies power from a station high voltage bus to the station auxiliaries and also to the unit auxiliaries during unit start-up and shutdown. It also may be used when the unit auxiliary transformer is not available or nonexistent.

_____ Station service transformer(s) manufacturer(s)

_____ TOTAL number of station service transformer(s)

_____ HIGH SIDE voltage in kilovolts (kV) of the station service transformer(s) at 55 ºF

_____ LOW SIDE voltage in kilovolts (kV) of the station service transformer(s) at 55 ºF

82. Balance of Plant – Auxiliary (Start-up) Boiler

Enter the following information on the auxiliary boiler at the unit:

_____ Auxiliary boiler manufacturer(s)

83. Balance of Plant – Auxiliary Generator

Enter the following information on the auxiliary generator at the unit:

_____ Auxiliary generator manufacturer(s)

Is the auxiliary generator shaft driven?

_____ _____ 1 – Yes 2 – No
M1 M2

84. Balance of Plant – Plant Process Computer

Enter the following information for the plant process computer(s):

_____ Plant process computer manufacturer(s)

_____ _____ Enter the number of plant process computers available to the unit:
M1 M2

1 – One computer for this unit only
2 – Two computers for this unit only
3 – One computer shared by one or more units
4 – Two computers shared by one or more units
9 – *Other, describe* _____

_____ _____ Describe how the plant process computers are linked within the plant:
M1 M2

1 – Centralized
2 – Distributive
3 – Stand alone
9 – *Other, describe* _____

_____ _____ Enter the system capability of the plant process computer:
M1 M2

1 – Monitor only
2 – Monitor and control
9 – *Other, describe* _____

85. CEMS – General

_____ System vendor

First-certified date:

_____ _____ _____
Year Month Day

_____ Monitoring technique

1 – Extractive
2 – Dilution
3 – In Situ

_____ Analysis Method

1 – Wet
2 – Dry
9 – Other, describe _____

86. CEMS – Pollutant Gas and Diluent Gas Analyzers/Monitors

Sulfur Dioxide (SO_2) Analyzers

_____ Manufacturer(s)
_____ Model number(s)

_____ _____ Number of installed analyzers
M1 M2

_____ _____ Number of installed spare analyzers
M1 M2

_____ _____ Type(s)
M1 M2

1 – Ultraviolet
2 – Infrared
3 – Flourescence
9 – *Other, describe* _____

_____ _____ Instrument range (parts per million)
M1 M2

1 – 0-50
2 – 0-150
3 – 0-500
9 – *Other, describe* _____

_____ _____ Shared? (1 – Yes 2 – No)
M1 M2

Oxides of Nitrogen (NO_x) Analyzers

_____ Manufacturer(s)
_____ Model number(s)

_____ _____ Number of installed analyzers
M1 M2

_____ _____ Number of installed spare analyzers
M1 M2

_____ _____ Type(s)
M1 M2

1 – Infrared
2 – Chemiluminescent
9 – *Other, describe* _____

_____ _____ Instrument range (parts per million)
M1 M2

1 – 0-50
2 – 0-150
3 – 0-500
9 – *Other, describe* _____

_____ _____ Shared? (1 – Yes 2 – No)
M1 M2

Carbon Monoxide (CO) Analyzers

_____ Manufacturer(s)
_____ Model number(s)

_____ _____ Number of installed analyzers
M1 M2

_____ _____ Number of installed spare analyzers
M1 M2

_____ _____ Type(s)
M1 M2

1 – Infrared solid state
2 – Infrared luft
3 – Gas filter correlation
9 – *Other, describe* _____

_____ _____ Instrument range (parts per million)
M1 M2

1 – 0-50
2 – 0-150
3 – 0-500

9 – *Other, describe* _____

_____ _____ Shared? (1 – Yes 2 – No)
M1 M2

Carbon Dioxide (CO_2) Analyzers

_____ Manufacturer(s)

_____ Model number(s)

_____ _____ Number of installed analyzers
M1 M2

_____ _____ Number of installed spare analyzers
M1 M2

_____ _____ Instrument range (parts per million)
M1 M2

1 – 0-50
2 – 0-150
3 – 0-500
9 – *Other, describe* _____

_____ _____ Shared? (1 – Yes 2 – No)
M1 M2

Oxygen (O_2) Analyzers

_____ Manufacturer(s)

_____ Model number(s)

_____ _____ Number of installed analyzers
M1 M2

_____ _____ Number of installed spare analyzers
M1 M2

_____ _____ Type(s)
M1 M2

1 – Zirconia oxide
2 – Paramagnetic
3 – Fuel cell
9 – *Other, describe* _____

_____ _____ Instrument range (parts per million)

_____ _____
M1 M2

1 – 0-50
2 – 0-150
3 – 0-500
9 – *Other, describe* _____

_____ _____ Shared? (1 – Yes 2 – No)
M1 M2

Opacity Monitors

_____ Manufacturer(s)
_____ Model number(s)

_____ _____ Number of installed analyzers
M1 M2

_____ _____ Number of installed spare analyzers
M1 M2

_____ _____ Probe placement (if unit is equipped with a FGD system)
M1 M2

1 – Before scrubber
2 – After scrubber

87. CEMS – Flue Gas Flow Monitors

_____ Manufacturer(s)
_____ Model number(s)

_____ _____ Number of installed monitors
M1 M2

_____ _____ Number of installed spare monitors
M1 M2

_____ _____ Volumetric Flow Rate (ACFM)
M1 M2

_____ _____ Flow rate measurement technique:
M1 M2

1 – Thermal sensing (hot-wire anemometer or dispersion)
2 – Differential pressure array

3 – Acoustic velocimetry (ulrasonic transducers)
4 – Combination
9 – *Other, describe* _____

88. CEMS – Data Acquisition and Reporting System

_____ Hardware Manufacturer

_____ Hardware architecture

1 – Vendor-supplied dedicated system
2 – Modified existing plant computer
3 – Stand alone, pc-based system not supplied by CEMS system vendor
9 – Other, describe _____

_____ Software supplier

_____ Shared (1 – Yes 2 – No)

NO_X REDUCTION SYSTEMS

These systems include Selective Non-catalytic Reduction, Selective Catalytic Reduction, Catalytic Air Heaters, and Staged NO_X Reduction, which is a combination of the three methods. Excluded from this category are Low NO_X burners (see Item 16, Page E-6), combustion modifications, and flue gas recirculation.

Please complete the following information for the NO_X Reduction Systems installed on your unit. (The appropriate items under each method should be completed for a Staged NO_X Reduction System).

89. Selective Non-Catalytic Reduction System (SNCR)

_____ Reagent

1 – Ammonia
2 – Urea
9 – Other, describe _____

_____ Injector Type

1 – Wall nozzles
2 – Lance
9 – Other, describe _____

_____ Injection Equipment Location

1 – Furnace
2 – Superheater

3 – Economizer
9 – Other, describe _____

_____ Number of injectors

_____ Carrier Gas Type

1 – Steam
2 – Air
9 – Other, describe _____

_____ Total Flow rate (lb./hr.)
_____ Pressure at nozzle (psi)
_____ Nozzle exit velocity (ft./sec.)

90. Selective Catalytic Reduction System (SCR)

_____ Reactor

1 – Separate
2 – In Duct

_____ Flue gas take-off location

_____ Reagent

1 – Ammonia
2 – Urea
9 – Other, describe _____

_____ Ammonia Injection Grid Location

1 – Furnace
2 – Superheater
3 – Econimizer
4 – Zoned

_____ Duct Configuration

1 – Flowing straighteners
2 – Turning vanes
3 – Dampers

_____ Catalyst Element Type

1 – Plate
2 – Honeycomb
9 – Other, describe _____

_____ Catalyst Support Material

1 – Stainless steel
2 – Carbon steel
9 – Other, describe _____

_____ Catalytic Material Configuration

1 – Vertical
2 – Horizontal
9 – Other, describe _____

_____ Surface face area (sq. ft.)
_____ Catalyst volume (cu. ft.)
_____ Number of layers
_____ Layer thickness (inches)

_____ Sootblowers (if applicable)

1 – Air
2 – Steam
3 – Both air and steam

_____ Manufacturer(s)
_____ Number of sootblowers

91. Catalytic Air Heaters

_____ Element Type

1 – Laminar surface
2 – Turbulent surface
9 – Other, describe _____

_____ Support material, if any

1 – Stainless steel
2 – Carbon steel
9 – Other, describe _____

_____ Catalytic Material Configuration

1 – Horizontal air shaft
2 – Carbon steel
9 – Other, describe _____

_____ Total face area (sq. ft.)
_____ Open face area (sq. ft.)
_____ Layer thickness (inches)

Appendix E2: Unit Design Data – Fluidized Bed Combustion

Note: The NERC Board of Trustees approved the *GADS Task Force Report* (dated July 20, 2011)[1], which states that design data collection outside the required nine fields is solely voluntary. However, the GADS staff encourages that reporters report and update GADS design data frequently. This action can be completed by sending in this form to gads@nerc.net. GADS staff encourages using the software for design entry and updating.

Instructions

Use these forms to report design and installed equipment information for FLUIDIZED BED COMBUSTION (FBC) units. These units include atmospheric (circulating (CFB) and bubbling (BFB)) fluidized bed only.

Data reported on these forms should reflect the current condition and design of the unit (installed equipment, etc.). Do not report data for start-up equipment or for equipment that is not used to carry normal load unless specifically requested.

Some data fields are designated as M1 and M2. These indicate that the equipment being reported may have been supplied by more than one manufacturer. Use fields designated as M1 to report all the data associated with one manufacturer's equipment and M2 for the other.

Unit Name _____

Location of Unit (State) _____

Energy Information Administration (EIA) Number _____

Regional Entity _____

Subregion _____

Date Reporter _____

Telephone Number _____

Date _____

GENERAL UNIT DATA

1. Identification

A series of codes uniquely identifies your utility and units. NERC assigned a unique code to identify your utility. You must assign the unique code that will identify the FBC unit being reported. This code may be any number from 650 to 699. Enter the unique utility and unit code and the full name of the unit below:

Utility Codes: _____ Unit Codes: _____

Name of Unit: _____

[1] http://www.nerc.com/pa/RAPA/gads/MandatoryGADS/Revised_Final_Draft_GADSTF_Recommendation_Report.pdf

2. Date the Unit Entered Service

The in–service date establishes the starting point for review of historical performance of each unit. Using the criteria described below, report the date the unit entered service:

_____ Year _____ Month _____ Day

Criteria:

a. The date the unit was first declared available for dispatch at some level of its capability, OR

b. The date the unit first operated at 50% of its generator nameplate megawatt capability (product of the megavolt amperes (MVA) and the rated power factor as stamped on the generator nameplate(s)).

3. Unit Loading Characteristics at Time of Unit's Design

_____ Enter the number from the list below that best describes the mode of operation the unit *was originally designed for*

1 – Base loaded with minor load following at night and on weekends

2 – Periodic startups with daily load-following and reduced load nightly

3 – Weekly startup with daily load-following and reduced load nightly

4 – Daily startup with daily load-following and taken off-line nightly

5 – Startup chiefly to meet daily peaks

6 – Other, describe _____

7 – Seasonal Operation

4. Design and Construction Contractors

Identify both the architect/engineer and the general construction contractor responsible for the design and construction of the unit. If your utility was the principal designer or general constructor, enter "SELF."

_____ Architect/Engineer

_____ Constructor

5. Boiler – Manufacturer

Enter the name of the manufacturer and the model or series name or number of the boiler:

_____ Boiler manufacturer (original)

_____ Boiler manufacturer (FBC portion) - retrofit

_____ Manufacturers' model, series name, or number (original)

_____ Manufacturers' model, series name, or number (retrofit)

6. Boiler – Enclosure

Is 50% or more of the boiler outdoors (not enclosed in building framing and siding)?

_____ 1 – Yes 2 – No

7. Boiler – Nameplate Conditions

Enter the following steam conditions for the MAIN STEAM LINES at the full-load, valves-wide-open design point:

_____ Steam flow rate (in lbs/hr)

_____ Design temperature (°F)

_____ Design pressure (psig)

8. Boiler – Fuel Firing System

_____ Enter the type of fuel firing system found in the furnace:*:*

1 – *Circulating fluidized bed (CFB)* - an FBC with no clear region between the relatively dense bed and lean phase. A circulating bed usually has a superficial velocity greater than 13 ft./sec. and has a reinjection/recycle ratio greater than 5. Compared to a bubbling bed, a circulating bed has significantly higher solids concentration throughout the combustor.

2 – *Bubbling fluidized bed (BFB)* - an FBC with a definite region between the relatively dense bed and lean phase. A bubbling bed usually has a superficial velocity of less than 13 ft./sec. and a reinjection/recycle ratio of less than 5. In addition, the fuel and sorbent are usually fed either over-bed or under-bed.

9. Boiler – Method of Solid Feed to the Boiler

Enter the method of feeding solid fuel, bed material and sorbent into the boiler.

_____ For fuel:

1 – *Over-bed feed (BFB)* – injection of solids above the fluidized bed into a slightly negative pressure environment where the solids then fall into the fluidized bed.

2 – *Under-bed feed (BFB)* – injection of solids through multiple points to the bottom of the fluidized bed into a positive pressure environment.

3 – *Both over–bed and under-bed feed (BFB)* - combination of the two above.

4 – *Within-bed feed (CFB)* - injection of solids through a few feed points to the fluidized bed into a positive pressure environment. (This refers to the method of fuel feed in a circulating bed.)

_____ For sorbent:

1 – *Over-bed feed (BFB)* – injection of solids above the fluidized bed into a slightly negative pressure environment where the solids then fall into the fluidized bed.

2 – *Under-bed feed (BFB)* – injection of solids through multiple points to the bottom of the fluidized bed into a positive pressure environment.

3 – *Both over–bed and under-bed feed (BFB)* - combination of the two above.

4 – *Within-bed feed (CFB)* - injection of solids through a few feed points to the fluidized bed into a positive pressure environment. (This refers to the method of fuel feed in a circulating bed.)

_____ Feed with fuel:

1 – Yes

2 – No

_____ For bed material

1 – *Over-bed feed (BFB)* – injection of solids above the fluidized bed into a slightly negative pressure environment where the solids then fall into the fluidized bed.

2 – *Under-bed feed (BFB)* – injection of solids through multiple points to the bottom of the fluidized bed into a positive pressure environment.

3 – *Both over–bed and under-bed feed (BFB)* - combination of the two above.

4 – *Within-bed feed (CFB)* - injection of solids through a few feed points to the fluidized bed into a positive pressure environment. (This refers to the method of fuel feed in a circulating bed.)

10. Boiler – Type of Circulation

_____ Enter the type of circulation

1 – *Natural (thermal)* – water flows through furnace wall tubes unaided by circulating pumps (primarily used with subcritical units).

2 – *Controlled (forced or pump-assisted thermal)* – water flows through furnace wall and/or in-bed evaporator tubes aided by boiler recirculation pumps located in the down comers or lower headers of the boiler (used on some subcritical units).

3 – *Once through* – no recirculation of water through the furnace wall tubes and no steam drum (used on super and subcritical units).

4 – *Combination natural and controlled*

11. Boiler – Circulation System

Enter the following information on the pump(s) used to recirculate water through the boiler:

_____ Boiler recirculation pump(s) manufacturer(s)

_____ Number of boiler recirculation pumps per manufacturer; include installed spares

_____ TOTAL number of boiler recirculation pumps for the unit

_____ MINIMUM number of boiler recirculation pumps required to obtain maximum capacity from the unit

_____ _____ Enter the type of boiler recirculation pump(s) used

M1 M2

1 – *Injection (or injection seal)* – controlled-leakage boiler recirculation pumps mounted vertically with a rigid shaft designed to carry its own thrust.

2 – *Leak-less (canned, canned-motor or zero-leakage)* – leak-less pump and its motor designed as an integral pressurized sealed unit.

9 – *Other, describe* _____

12. Boiler – Heat Excahnge

In bed:	**Reheat**	**Supht**	**Evap**	**Preheat**
Type of heat exchanger				
Tube materials*				

Manufacturer				
Total number of exchangers including spares				
Minimum number of exchangers for full load operation				
Location of exchangers (external/internal)				
Square feet of surface				

Convective:	**Reheat**	**Supht**	**Evap**	**Preheat**
Type of heat exchanger				
Tube materials*				
Manufacturer				
Total number of exchangers including spares				
Minimum number of exchangers for full load operation				
Location of exchangers (external/internal)				
Square feet of surface				

Radiant	**Reheat**	**Supht**	**Evap**	**Preheat**
Type of heat exchanger				
Tube materials*				
Manufacturer				
Total number of exchangers including spares				
Minimum number of exchangers for full load operation				
Location of exchangers (external/internal)				
Square feet of surface				

*If more than one material is used, indicate each type with the predominant one mentioned first.

13. Boiler – Char Reinjection System

Char (unburned fuel, sorbent, and ash) is captured by the separator and transferred to disposal and/or reinjected into the fluidized bed. Enter the following information on the char reinjection system.

_____ Separator manufacturer(s)

_____ Number of separators including spares

_____ Minimum number of separators for full load operation

_____ Type of separator (cyclone, multi-clone, u-beam, horizontal)

_____ Separator recirculation temperature

_____ Liner (refractory or water cooled)

_____ Type of pressure seal (lock hoppers, rotary valve, gravimetric pump, loop seal)

_____ Number of char reinjection systems including installed spares

_____ High pressure loop seal air fan(s)/blower(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the high pressure loop seal fan(s)/blower(s)

_____ Number of high pressure loop seal fans/blowers per manufacturer; include installed spares

_____ TOTAL number of high pressure loop seal fans/blowers for the unit

_____ MINIMUM number of high pressure loop seal fans/blowers required to obtain maximum capacity from the unit

_____ _____ Enter the type of high pressure loop seal fan(s)/blower(s) at the unit
M1 M2

1 – *Injection (or injection seal)* – controlled-leakage boiler recirculation pumps mounted vertically with a rigid shaft designed to carry its own thrust.

2 – *Leak-less (canned, canned-motor or zero-leakage)* – leak-less pump and its motor designed as an integral pressurized sealed unit.

9 – *Other, describe* _____

14. Boiler – Design Parameters

_____ Percent SO_2 removal

_____ *Calcium-to-sulfur molar ratio* – moles of calcium in the sorbent divided by the moles of sulfur in the fuel. (This is an indicator of the amount of sorbent required to reduce SO_2 to desired limit.)

_____ *Reinjection/recycle ratio* – mass flow rate of char material that is reinjected to the combustor divided by the mass flow rate of fuel feed

_____ *Average superficial air velocity (ft/sec)* – velocity of air through a fluidized bed. The superficial velocity is based on the cross sectional area of the bed and the total air flow rate. The density used to calculate superficial velocity is based on the average bed temperature and pressure.

_____ *Fuel feed rate*

_____ *Sorbent feed rate*

15. Boiler – Furnace (Surface) Release Rate

Enter the furnace (surface) release rate of the PRIMARY FUEL. This rate is specified in the boiler contract as the heat available per hour, in Btu per square foot of heat absorbing surface in the furnace. The absorbing surface includes all heat exchange surfaces (waterwall, super heater, external, etc.).

_____ Furnace (surface) release rate at maximum continuous rating (in Btu's/SqFt/Hr)

16. Boiler – Furnace Volumetric Heat Release Rate

Enter the furnace volumetric heat release rate of the PRIMARY FUEL. This rate is the total quantity of thermal energy released into the furnace by the fuel at its higher heating value (HHV). The volumetric heat release rate is expressed in Btu per cubic foot of total heat exchanger volume per hour. It does not include the heat added by preheated air or the heat unavailable due to evaporation of moisture in the fuel and combustion of hydrogen.

_____ Furnace volumetric heat release rate at maximum continuous rating (in Btu/CuFt/Hr)

17. Boiler – Primary and Secondary Design Fuel, Sorbents, and Non-sorbent

The PRIMARY fuel is defined as that fuel primarily used to sustain load on the unit, (i.e., the first fuel of choice for either economic or control reasons) or that fuel contributing 50% or more of the load-carrying Btu. The SECONDARY fuel is that normally used to sustain load if the PRIMARY fuel is unavailable or uneconomical. Do NOT report ignition or warm-up fuel.

Sorbent is a material (usually a limestone or dolomite) that is fed into the combustor with the solid fuel (coal) thereby reducing the SO_2 that is released during the combustion process.

Non-sorbent is a material other than sorbent that is used to build the bed. All characteristics are based on an ultimate analysis of the as-received fuel using appropriate ASTM testing methods. Additional notes are provided where appropriate.

Primary Fuel	**Secondary Fuel**

Fuel Codes

BM	Biomass	OO	Oil
CC	Coal	OS	Other-Solid (Tons)
DI	Distillate Oil (No. 2)	PC	Petroleum Coke
GE	Geothermal	PE	Peat
GG	Gas	PR	Propane
JP	JP4 or JP5	SL	Sludge Gas
KE	Kerosene	SO	Solar
LI	Lignite	WA	Water
NU	Nuclear	WD	Wood
OG	Other-Gas (Cu. Ft.)	WH	Waste Heat
OL	Other-Liquid (BBL)	WM	Wind

Fuel Characteristics

Primary Fuel	**Secondary Fuel**	**Type**
		Average Heat Content in Fuel (Btu/lb, Btu/bbl, Btu/CuFt)
		% Ash Content (to one decimal place) (Btu/lb,Btu/bbl,Btu/CuF)
		% Sulfur Content (to one decimal place) (Btu/lb,Btu/bbl,Btu/CuF)
		% Moisture Content (to one decimal place) (Btu/lb,Btu/bbl,Btu/CuF)
		Ash Softening Temp (°F) (in a reducing atmosphere)

		(ASTM STD D-1857, Part 26) (coal units only)
		Grindability Hardgrove Index (ASTM STD D-409, Part 26) (coal units only)
		% Vanadium & Phosphorous (to one decimal place) (oil units only)
		Fuel Top (largest particle) size

Sorbent:

Primary Fuel	Secondary Fuel	Type
		Abrasion Index (identify index used)
		% by Mass Magnesium Content (to one decimal place)
		% by Mass Calcium Content (to one decimal place) (Btu/lb, Btu/bbl, Btu/Cuf)
		% by Mass Carbon Dioxide Content (to one decimal place)
		Sorbent top (largest particle size)

Non-Sorbent:

Primary Fuel	Secondary Fuel	Type
		Initial Ash Fusion Temperature (ºF)
		Non-sorbent Top (largest particle size)

18. Boiler – Fuel Oil Forwarding System

The fuel oil forwarding system transfers oil from the main storage tanks to smaller tanks closer to the unit. (See Item 20 for pumps that feed oil directly to the burners.) Enter the following data for this system:

	Fuel forwarding/transfer pump(s) manufacturer(s)
	Manufacturer(s) of the motor(s) that drives the fuel forwarding/transfer pump(s)
	Number of fuel forwarding/transfer pumps per manufacturer; include installed spares
	TOTAL number of fuel forwarding/transfer pumps for the unit
	MINIMUM number of pumps required to obtain maximum capacity from the unit

19. Boiler – Burner Management Systems

Enter the name of the manufacturers for the following burner management systems:

	Manufacturer of the combustion control system that coordinates the feed water, air, and fuel subsystems for continuous unit operation.
	Manufacturer of the burner management system that monitors only the fuel and air mixture during all phases of operation to prevent the formation of an explosive mixture.

20. Boiler – Fuel Oil Burner Supply System (In-plant)

These are secondary, high pressure pumps within the area of the boiler used to feed fuel oil directly to the burners.

	Fuel oil burner supply pump(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the fuel oil burner supply pump(s)

_____ Number of fuel oil burner supply pumps per manufacturer; include installed spares

_____ TOTAL number of fuel oil burner supply pumps for the unit

_____ MINIMUM number of fuel oil burner supply pumps required to obtain maximum capacity from the unit

21. Boiler – Burner Systems

Enter the following information on the installed burner systems used for the preliminary heat up of the boiler:

Duct burner:

_____ Duct burner manufacturer

_____ Btu rating

_____ Enter the type of duct burner fuel used:

A – Light (distillate) oil
B – Heavy oil
C – Gas
D – Coal
E – Oil and Gas
F – Propane
M – More than one

_____ Enter the type of duct burner used:

1 – *Pilot torch lighter* – an oil or gas igniter that uses an electric spark to ignite the fuel
2 – *Carbon arc* – a carbon or graphite electrode that is energized and used to ignite the fuel
3 – *High energy arc* – a low voltage, high energy pulse arc that is used to ignite the fuel
4 – *Plasma arc* – a high dc voltage current used to ionize the air resulting in a high energy arc that ignites the fuel
5 – *Manual* – Ignition torch or lance inserted into boiler by operating personnel.
6 – *Combination* of any burner types above
9 – *Other, describe* _____

Warmup burner:

_____ Warmup burner manufacturer

_____ Btu rating

_____ Enter the type of warmup burner fuel used:

A – Light (distillate) oil
B – Heavy oil

C – Gas
D – Coal
E – Oil and Gas
F – Propane
M – More than one

_____ Enter the type of warmup burner used:

1 – *Pilot torch lighter* – an oil or gas igniter that uses an electric spark to ignite the fuel
2 – *Carbon arc* – a carbon or graphite electrode that is energized and used to ignite the fuel
3 – *High energy arc* – a low voltage, high energy pulse arc that is used to ignite the fuel
4 – *Plasma arc* – a high dc voltage current used to ionize the air resulting in a high energy arc that ignites the fuel
5 – *Manual* – Ignition torch or lance inserted into boiler by operating personnel.
6 – *Combination* of any burner types above
9 – *Other, describe* _____

Lance injection burner:

_____ Lance injection burner manufacturer
_____ Btu rating

_____ Enter the type of Lance injection burner fuel used:

A – Light (distillate) oil
B – Heavy oil
C – Gas
D – Coal
E – Oil and Gas
F – Propane
M – More than one

_____ Enter the type of duct burner used:

1 – *Pilot torch lighter* – an oil or gas igniter that uses an electric spark to ignite the fuel
2 – *Carbon arc* – a carbon or graphite electrode that is energized and used to ignite the fuel
3 – *High energy arc* – a low voltage, high energy pulse arc that is used to ignite the fuel
4 – *Plasma arc* – a high dc voltage current used to ionize the air resulting in a high energy arc that ignites the fuel
5 – *Manual* – Ignition torch or lance inserted into boiler by operating personnel.
6 – *Combination* of any burner types above
9 – *Other, describe* _____

22. Boiler – Solid Fuel Handling Systems – Yard Area

Enter the following information on the equipment installed in the solid fuel yard:

_____ Stacker/re-claimer system manufacturer

_____ Number of critical path solid fuel conveyor systems available to the UNIT

23. Boiler – Solid Fuel Crushers

Enter the following information on the solid fuel crushing equipment used to supply solid fuel to the in-plant solid fuel-holding bunkers for burning in the boiler:

_____ Crusher(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the crusher(s)

_____ Type of crusher(s)

_____ TOTAL number of crushers

24. Boiler – Solid Fuel Feed to Boiler

Enter the following information on the solid fuel feed equipment used to supply solid fuel from the in-plant solid fuel-holding bunkers to the over-bed, under-bed, or within-bed entrance of the boiler:

_____ Crusher(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the crusher(s)

_____ Type of crusher(s)

_____ TOTAL number of crushers

_____ Gravimetric feeder manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the gravimetric feeder(s)

_____ TOTAL number of gravimetric feeders

_____ Volumetric feeder manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the volumetric feeder(s)

_____ TOTAL number of volumetric feeders

_____ Pneumatic feeder manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the pneumatic feeder(s)

_____ TOTAL number of pneumatic feeders

_____ Type of pressure seal (lock hoppers, rotary valve, gravimetric pump, loop seal)

_____ Number of solid fuel trains including installed spares

25. Boiler – Secondary Fuel Feed (other than coal)

_____ Type of secondary boiler fuel feed system:

1 – *Lance*

2 – *Nozzle*

9 – *Other, describe* _____

_____ Percent (%) load carrying capability

Enter the type of solid fuel feed(s):

_____ Gravimetric feeder manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the gravimetric feeder(s)

_____ TOTAL number of gravimetric feeders

_____ Volumetric feeder manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the volumetric feeder(s)

_____ TOTAL number of volumetric feeders

_____ Pneumatic feeder manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the pneumatic feeder(s)

_____ TOTAL number of pneumatic feeders

_____ Type of pressure seal (lock hoppers, rotary valve, gravimetric pump, loop seal)

_____ Number of secondary solid fuel trains including installed spares

26. Boiler – Sorbent Crusher or Pulverizer Capability

Enter the following information on the capability of the installed crusher(s) or pulverizer(s):

_____ Sorbent crusher(s) or pulverizer(s) manufacturer(s)

_____ Manufacturers' model number for the sorbent crusher(s) or pulverizer(s)

_____ Design sorbent flow rate in lb/hr PER sorbent crusher or pulverizer using design fuel specifications

_____ Number of sorbent crushers or pulverizers per manufacturer; include installed spares

_____ TOTAL number of sorbent crushers or pulverizers for the unit

_____ MINIMUM number of sorbent crushers or pulverizers required to obtain maximum capacity from the unit

_____ Sorbent stacker/re-claimer manufacturer

_____ _____ Enter the type of sorbent crusher(s) or pulverizer(s) at the unit:
M1 M2

1 – *Ball* – grinding elements are balls that operate freely in a race on a rotating grinding table

2 – *Roll race* – rotating grinding table that moves sorbent through a series of rollers or wheels supported within the pulverizer.

3 – *Ball tube (Hardinge)* – horizontal, rotating, grinding cylinder containing steel balls that move within the cylinder and grind or crush the sorbent.

4 – *Impact (Attrition)* – series of fixed or hinged hammers that rotate within a closed chamber impacting and crushing the sorbent.

9 – *Other, describe* _____

27. Boiler – Sorbent Feed System to Boiler

Enter the following information on the sorbent feeder equipment used to supply sorbent from the in-plant sorbent-holding bunkers to the boiler:

_____ Gravimetric feeder manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the gravimetric feeder(s)

_____
_____ TOTAL number of gravimetric feeders
_____ Volumetric feeder manufacturer(s)
_____ Manufacturer(s) of the motor(s) that drives the volumetric feeder(s)
_____ TOTAL number of volumetric feeders
_____ Pneumatic feeder manufacturer(s)
_____ Manufacturer(s) of the motor(s) that drives the pneumatic feeder(s)
_____ TOTAL number of pneumatic feeders
_____ Type of pressure seal (lock hoppers, rotary valve, gravimetric pump, loop seal)
_____ Number of secondary solid fuel trains including installed spares

28. Boiler – Bed Material Injection Feed System

Bed materials are the solids in the bed or dense phase of the combustor. Enter the following information on the bed material feed equipment used to supply bed material from the in-plant bed material-holding bunkers to the boiler:

_____ Gravimetric feeder manufacturer(s)
_____ Manufacturer(s) of the motor(s) that drives the gravimetric feeder(s)
_____ TOTAL number of gravimetric feeders
_____ Volumetric feeder manufacturer(s)
_____ Manufacturer(s) of the motor(s) that drives the volumetric feeder(s)
_____ TOTAL number of volumetric feeders
_____ Pneumatic feeder manufacturer(s)
_____ Manufacturer(s) of the motor(s) that drives the pneumatic feeder(s)
_____ TOTAL number of pneumatic feeders
_____ Type of pressure seal (lock hoppers, rotary valve, gravimetric pump, loop seal)
_____ Number of secondary solid fuel trains including installed spares

29. Boiler – Balanced Draft or Pressurized Draft

_____ Enter the type of boiler draft*:*

1 – *Balanced draft* – equipped with both induced draft and forced draft fans. The furnace operates at positive pressure at air entry and negative pressure at flue gas exit
2 – *Pressurized draft* – equipped with forced draft fans only. The furnace and draft system operate at positive pressure

IF the unit was originally designed as a pressurized draft unit and converted to a balanced draft design, indicate the date the conversion was completed:

_____ _____ _____
Year Month Day

30. Boiler – Primary Air (Forced Draft) Fan System

Primary air is used for combustion and/or fluidization processes. Enter the following information on the installed primary air (forced draft) fans:

_____ Primary air (forced draft) fan(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s)/steam turbine(s) that drives the primary air (forced draft) fan(s)

_____ Number of primary air (forced draft) fans per manufacturer; include installed spares

_____ TOTAL number of primary air (forced draft) fans for the unit

_____ MINIMUM number of primary air (forced draft) fans required to obtain maximum capacity from the unit

_____ Horsepower of fan(s)

_____ _____ Enter the type of primary air (forced draft) fan(s) at the unit:
M1 M2

Centrifugal – blades mounted on an impeller (or rotor) which rotates within a spiral or volute housing. Mark the type of blades used on this type of fan:

1 – Forward curved
2 – Straight (radial or radial tipped)
3 – Backward curved (air foil or flat)
4 – Axial (fixed or variable pitch) – blades attached to central hub parallel to air flow
9 – *Other, describe* _____

_____ _____ Enter the type of primary air (forced draft) fan drives(s) at the unit:
M1 M2

1 – Single speed motor
2 – Two speed motor
3 – Variable speed motor
4 – Steam turbine
5 – Fluid drive
9 – *Other, describe* _____

31. Boiler – Induced Draft Fan System

Enter the following information on the induced draft fans installed at the unit:

_____ Induced draft fan(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s)/steam turbine(s) that drives the induced draft fan(s)

_____ Number of induced draft fans per manufacturer; include installed spares

_____ TOTAL number of induced draft fans for the unit

_____ MINIMUM number of induced draft fans required to obtain maximum capacity from the unit

_____ Horsepower of fan(s)

_____ _____ Enter the type of induced draft fan(s) at the unit:
M1 M2

Centrifugal – blades mounted on an impeller (or rotor) which rotates within a spiral or volute housing. Mark the type of blades used on this type of fan:

1 – Forward curved
2 – Straight (radial or radial tipped)
3 – Backward curved (air foil or flat)
4 – Axial (fixed or variable pitch) – blades attached to central hub parallel to air flow
9 – *Other, describe* _____

_____ _____ Enter the type of induced draft fan drives(s) at the unit:
M1 M2

1 – Single speed motor
2 – Two speed motor
3 – Variable speed motor
4 – Steam turbine
5 – Fluid drive
9 – *Other, describe* _____

32. Boiler – Secondary Air Fan System

Secondary air is used for purposes such as fuel transport. Enter the following information on the secondary air fans installed at the unit:

_____ Secondary air fan(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s)/steam turbine(s) that drives the secondary air fan(s)

_____ Number of secondary air fans per manufacturer; include installed spares

_____ TOTAL number of secondary air fans for the unit

_____ MINIMUM number of i secondary air fans required to obtain maximum capacity from the unit

_____ Horsepower of fan(s)

_____ _____ Enter the type of secondary air fan(s) at the unit:
M1 M2

Centrifugal – blades mounted on an impeller (or rotor) which rotates within a spiral or volute housing. Mark the type of blades used on this type of fan:

1 – Forward curved
2 – Straight (radial or radial tipped)
3 – Backward curved (air foil or flat)

4 – Axial (fixed or variable pitch) – blades attached to central hub parallel to air flow

9 – *Other, describe* _____

_____ _____ Enter the type of secondary air fan drives(s) at the unit:
M1 M2

1 – Single speed motor

2 – Two speed motor

3 – Variable speed motor

4 – Steam turbine

5 – Fluid drive

9 – *Other, describe* _____

33. Boiler – Primary Air Heating System

Enter the following information about the air heaters used to transfer the excess heat from the flue gases to the incoming primary air for the furnace:

_____ Primary air heater(s) manufacturer(s)

_____ TOTAL number of primary air heaters per manufacturer

_____ Air heater outlet temperature

_____ _____ Enter the type of primary air heater(s) at the unit:
M1 M2

1 – *Regenerative (Ljungstrom)* – rotating heat exchanger that continuously rotates sections (baskets) composed of metal plates from the hot flue gas furnace exit plenum to the furnace intake air plenums thus heating the intake air.

2 – *Tubular* – hot flue gas from the furnace is channeled through tubes (vertical or horizontal) where the heat is transferred to the furnace intake air passing across the outside of the tubes.

3 – *Steam Coil* – similar to tubular except steam is used to preheat the intake air.

4 – *Regenerative (Rothemule)* – rotating heat exchanger similar to Regenerative (Ljungstrom) except sections (baskets) remain stationary while the housing rotates.

5 – *Recuperative (plate-type)* – air heater which uses thin, flat, parallel plates with alternate wide and narrow spacing to match the ratio of gas weight to air weight. Thus, flue gas is made to pass through the wider spaced passages (1" to ½") and the air through the narrower passages (3/4" to ¼") generally in counter flow relation

6 – *Heat pipe* – this air heater allows the transfer of very substantial quantities of heat through small surface areas. Hollow pipes with wicking material covering the inside surface area used to transfer the heat in the following manner. A condensable fluid inside the pipes permeates the wicking material by capillary action. When heat is added by the flue gas at one end of the pipes (evaporator), liquid is vaporized in the wick and the vapor moves to the central core. At the air end of the pipes, heat is removed (the condenser) and the vapor condenses back into the wick. Liquid is replenished in the evaporator section by capillary action.

9 – *Other, describe* _____

34. Boiler – Secondary Air Heating System

Enter the following information about the secondary (or backup) air heaters used in the transfer of excess heat from the flue gases to the incoming primary air for the furnace:

_____ Secondary air heater(s) manufacturer(s)

_____ TOTAL number of secondary air heaters per manufacturer

_____ Air heater outlet temperature

_____ _____ Enter the type of primary air heater(s) at the unit:
M1 M2

1 – *Regenerative (Ljungstrom)* – rotating heat exchanger that continuously rotates sections (baskets) composed of metal plates from the hot flue gas furnace exit plenum to the furnace intake air plenums thus heating the intake air.

2 – *Tubular* – hot flue gas from the furnace is channeled through tubes (vertical or horizontal) where the heat is transferred to the furnace intake air passing across the outside of the tubes.

3 – *Steam Coil* – similar to tubular except steam is used to preheat the intake air.

4 – *Regenerative (Rothemule)* – rotating heat exchanger similar to Regenerative (Ljungstrom) except sections (baskets) remain stationary while the housing rotates.

5 – *Recuperative (plate-type)* – air heater which uses thin, flat, parallel plates with alternate wide and narrow spacing to match the ratio of gas weight to air weight. Thus, flue gas is made to pass through the wider spaced passages (1" to ½") and the air through the narrower passages (3/4" to ¼") generally in counter flow relation

6 – *Heat pipe* – this air heater allows the transfer of very substantial quantities of heat through small surface areas. Hollow pipes with wicking material covering the inside surface area used to transfer the heat in the following manner. A condensable fluid inside the pipes permeates the wicking material by capillary action. When heat is added by the flue gas at one end of the pipes (evaporator), liquid is vaporized in the wick and the vapor moves to the central core. At the air end of the pipes, heat is removed (the condenser) and the vapor condenses back into the wick. Liquid is replenished in the evaporator section by capillary action.

9 – *Other, describe* _____

35. Boiler – Soot blowers

Enter the following information on the soot blower system installed on the furnace:

_____ Soot blower(s) manufacturer(s

_____ TOTAL number of soot blowers installed on the furnace per manufacturer.

_____ Air heater outlet temperature

_____ _____ _____ Enter the type(s) of medium(s) used to blow the soot. If a variety of soot blowers are used at the unit, note the number of each.
M1 M2 M3

1 – Steam

2 – Air

3 – *Water*

4 – *Sonic*

5 – *Steam/Air*

9 – *Other, describe* _____

36. Boiler – Bed Material Coolers

Bed material coolers are heat exchangers used to cool the hot bed material as it is drained from the fluidized bed. Enter the following information on the bed material coolers:

_____ Bed material cooler manufacturer.

_____ TOTAL number of bed material coolers installed on the unit.

_____ Bed material cooler tube materials used in the majority (50% or greater) of the tubes made by each manufacturer.

_____ Bed material cooler type (screw, counter flow, fluid bed, other)

_____ Exit material temperature (ºF)

37. Boiler – Bed Material Handling System

Enter the following information on the bed material handling equipment:

_____ Bed material handling system manufacturer

_____ Enter the type of bed material removal system used

1 – *Vacuum* – bed material conveying system operates at a vacuum relative to the bed material collection hoppers.

2 – *Pressure* – bed material conveying system operates at a pressure greater than the pressure in the bed material collection hoppers

3 – *Vacuum pressure* – employs the best features of both the vacuum and pressure systems.

4 – *Water (sluice)* – employs water to sluice the bed material away from the hoppers

5 – *Vacuum/water slurry* – bed material conveying system operates at a vacuum relative to the bed material collection hoppers

6 – *Mechanical* – refers to mechanical conveying systems such as conveyor belts, bucket elevators, and screw conveyors

9 – *Other, describe* _____

38. Boiler – Char Disposal System

Char (unburned fuel, sorbent, and ash) is captured by the separator and transferred to disposal and/or reinjected into the fluidized bed. Enter the following information on the char disposal handling equipment:

_____ Char disposal handling system manufacturer

_____ Enter the type of bed material removal system used

1 – *Vacuum* – char disposal conveying system operates at a vacuum relative to the char disposalcollection hoppers.

2 – *Pressure* – char disposal conveying system operates at a pressure greater than the pressure in the char disposal collection hoppers

3 – *Vacuum pressure* – employs the best features of both the vacuum and pressure systems.

4 – *Water (sluice)* – employs water to sluice the char disposal away from the hoppers

5 – *Vacuum/water slurry* – char disposal conveying system operates at a vacuum relative to char disposal collection hoppers

6 – *Mechanical* – refers to mechanical conveying systems such as conveyor belts, bucket elevators, and screw conveyors

9 – *Other, describe* _____

39. Boiler – Electrostatic Precipitator

Fly ash contained in the furnace exit flue gases can be removed by using an electrostatic precipitator. Enter the following information:

_____ Electrostatic precipitator manufacturer

_____ Number of fields

_____ Surface collection area (SCA) (ft^2/kacfm) at maximum continuous rating (MCR)

_____ Enter the location of the electrostatic precipitator with respect to the air

1 – Before air heaters

2 – After air heaters

3 – Both before and after, or between the air heaters

40. Boiler – Baghouse Fly Ash System

Fly ash contained in the furnace exit flue gas is removed using fabric or fabric bag fillers. Enter the following information:

_____ Baghouse system manufacturer

_____ Manufacturer(s) of the baghouse exhauster booster fan(s)

_____ Manufacturer(s) of the motor(s) that drive the baghouse booster fan(s)

_____ TOTAL number of baghouse booster fans installed on the unit

_____ Air-to-cloth ratio, in ACFM/kft^2

_____ Bag material

_____ Sonic assist cleaning? 1 – Yes 2 – No

_____ Enter the type of baghouse at the unit:

1 – *Reverse* – clean flue gas is blown in a direction counter to normal operation to remove the fly ash from the bag.

2 – *Pulse (or pulse set)* – short bursts of compressed air are blown into the bag to cause a momentary expansion of the bag which dislodges the entrapped fly ash.

3 – *Shaker* – the bag is literally shaken to remove the fly ash collected on its surface.

4 – *Combination (reverse/shaker)*

9 – *Other, describe* _____

_____ Enter the type of baghouse booster fan(s) at the unit:

Centrifugal – blades mounted on an impeller (or rotor) which rotates within a spiral or volute housing. Mark the type of blades used on this type of fan:

1 – Forward curved

2 – Straight (radial or radial tipped)

3 – Backward curved (air foil or flat)

4 – Axial *(fixed or variable pitch)* – blades attached to central hub parallel to air flow.

9 – *Other, describe* _____

41. Boiler – Fly Ash Transport System

Enter the following information:

_____ Fly ash removal system manufacturer

_____ Enter the type of fly ash removal system used:

1 – *Vacuum* – ash-conveying system operates at a vacuum relative to the fly ash collection hoppers. Ash is dry.

2 – *Pressure* – ash conveying system operates at a pressure greater than the pressure in the fly ash collection hoppers. Ash is dry.

3 – *Vacuum-pressure* – employs the best features of both the vacuum and pressure systems.

4 – *Water (sluice)* – employs water to sluice the ash away from the hoppers.

5 – Vacuum/water slurry – ash conveying system operates at a vacuum relative to the fly ash collection hoppers. Ash is wet.

6 – *Mechanical* – refers to mechanical conveying systems such as conveyor belts, bucket elevators, and screw conveyors.

9 – *Other, describe* _____

42. Steam Turbine – Manufacturer

Enter the name of the manufacturer of the steam turbine:

_____ Steam turbine manufacturer

43. Steam Turbine – Enclosure

Is 50% or more of the steam turbine outdoors (not enclosed in building framing and siding)?

_____ 1 – Yes 2 – No

44. Steam Turbine – Nameplate Rating in MW

"Nameplate" is the design capacity stamped on the steam turbine's nameplate or published on the turbine guarantee flow diagram. In cases where the steam turbine's nameplate rating cannot be determined, approximate the rating by multiplying the MVA (megavolt amperes) by the rated power factor found on the nameplate affixed to the unit's generator (or nameplates in the case of cross compound units).

_____ Steam turbine's nameplate rating (MW)

45. Steam Turbine – Type of Steam Turbine

Identify the steam turbine's casing or shaft arrangement.

_____ Enter the type of steam turbine at the unit:

1 – *Single casing* – single (simple) turbine having one pressure casing (cylinder).

2 – *Tandem compound* – two or more casings coupled together in line.

3 – *Cross compound* – two cross-connected single casing or tandem compound turbine sets where the shafts are not in line.

4 – *Triple compound* – three cross-connected single casing or tandem compound turbine sets.

9 – *Other, describe* _____

46. Steam Turbine – Manufacturer's Building Block or Design Codes

Steam turbine building blocks or manufacturer's design codes are assigned by the manufacturer to designate a series of turbine designs (LM5000 or W501 for example). Enter the following information:

_____ Manufacturer's code, first shaft

_____ Manufacturer's code, second shaft (cross or triple compound

_____ Turbine configuration and number of exhaust flows (e.g. tandem compound, four flow)

47. Steam Turbine – Steam Conditions

Enter the following information on the Main, First Reheat, and Second Reheat Steam design conditions:

	Main Stream	**First Reheat**	**Second Reheat**
Temperature (ºF)			
Pressure (psig)			

48. Steam Turbine – High, Intermediate, and Low Pressure Sections

Enter the following information describing the various sections of the steam turbine:

High Pressure Casings

_____ TOTAL number of high pressure casings, cylinders or shells

_____ Back pressure of the high pressure condenser (if applicable) to the nearest one-tenth inch of mercury at the nameplate capacity and design water temperature.

Combined High Pressure/Intermediate Pressure Casings

_____ TOTAL number of high/intermediate pressure casings, cylinders, or shells.

Intermediate Pressure Casings

_____ TOTAL number of intermediate pressure casings, cylinders, or shells.

Combined Intermediate/Low Pressure Casings

_____ TOTAL number of intermediate/low pressure casings, cylinders, or shells.

Low Pressure Casings

_____ TOTAL number of low pressure casings, cylinders or shells.

_____ Back pressure of the low pressure condenser to the nearest one-tenth inch of mercury at nameplate capacity and design water temperature.

_____ The last stage blade length (inches) of the low pressure turbine, measured from hub to end of top of blade.

49. Steam Turbine – Governing System

Enter the following information for the steam turbine governing system:

_____ Enter the type of governing system used at the unit:

1 – *Partial arc* – main steam flow is restricted to one sector of the turbine's first stage at startup.
2 – *Full arc* – main steam is admitted to all sectors of the turbine's first stage at startup.
3 – *Either* – capable of admitting steam using either partial or full arc techniques.
9 – *Other, describe* _____

_____ Enter the type of turbine governing system used at the unit:

1 – *Mechanical hydraulic control (MHC)* – turbine speed monitored and adjusted through mechanical and hydraulic linkages.
2 – *Analog electro-hydraulic control (EHC)* – analog signals control electro-hydraulic linkages to monitor and adjust turbine speed.
3 – *Digital electro-hydraulic control (DHC)* – same as EHC except signals are digital rather than analog.
9 – *Other, describe* _____

50. Steam Turbine – Lube Oil System

Enter the following information for the steam turbine main lube oil system:

_____ Main lube oil system manufacturer.

_____ Main lube oil pump(s) manufacturer(s).

_____ Manufacturer(s) of the motor(s)/steam turbine(s) that drives the main lube oil pump(s).

_____ TOTAL number of steam turbine main lube oil pumps; include installed spares.

_____ Enter the type of driver on the main lube oil pump:

1 – Motor
2 – Shaft
3 – Steam Turbine

4 – More than one

9 – *Other, describe* _____

51. Generator – Manufacturer

Enter the name of the manufacturer of the electric generator:

_____ Generator manufacturer

52. Generator – Enclosure

Is 50% or more of the generator outdoors (not enclosed in building framing and siding)?

_____ 1 – Yes 2 – No

53. Generator – Ratings and Power Factor

Enter the following information about the generator:

Design (Nameplate) Item	Main Generator	Second* Shaft	Third* Shaft
Voltage to nearest one-tenth kV			
Megavolt amperes (MVA) Capability			
RPM			
Power Factor (enter as %)			
*Cross compound units			

54. Generator – Cooling System

Two types of cooling methods are typically used. First is the "inner cooled" method, where the cooling medium is in direct contact with the conductor copper or is separated by materials having little thermal resistance. The other is the "conventional" cooling method where the heat generated within the windings must flow through the major ground insulation before reaching the cooling medium.

_____ Enter the type of cooling method used by the generator:

1 – Stator inner cooled and rotor inner cooled.

2 – Stator conventionally cooled and rotor conventionally cooled.

3 – Stator inner cooled and rotor conventionally cooled.

9 – *Other, describe* _____

_____ _____ Enter the mediums used to cool the generator's stator and rotor:

Stator Rotor

A – Air

H – Hydrogen

O – Oil

W – Water

M – More than one

55. Generator – Hydrogen Pressure

_____ Enter the generator hydrogen pressure IN PSIG at nameplate MVA.

56. Exciter – Configuration

Enter the following information about the main exciter:

_____ Exciter manufacturer

_____ TOTAL number of exciters; include installed spares.

_____ MINIMUM number of exciters required to obtain maximum capacity from the unit.

_____ Enter the type of main exciters used at the unit:

1 – *Static* – static excitation where D.C. is obtained by rectifying A.C. from generator terminals and D.C. is fed into rotor by collector rings.

2 – *Rotating D.C. generator* – exciter supplies D.C. from a commutator into the main rotor by means of collector rings.

3 – *Brushless* – an A.C. exciter (rotating armature type) whose output is rectified by a semiconductor device to provide excitation to an electric machine. The semiconductor device would be mounted on and rotate with the A.C. exciter armature.

4 – *Alternator rectifier*

9 – *Other, describe* _____

_____ Enter the type(s) of exciter drive(s) used by the main exciter IF it is rotating:

1 – Shaft direct

2 – Shaft gear

3 – Motor

9 – *Other, describe* _____

57. Auxiliary Systems – Main Condenser

Enter the following information for the main condenser and its auxiliaries:

_____ Main condenser manufacturer

_____ TOTAL number of passes made by the circulating water as it passes through the condenser.

_____ TOTAL number of condenser shells.

_____ Condenser tube materials used in the majority (50% or more) of the condenser tubes.

_____ Air ejector or vacuum pump manufacturer.

_____ Enter the type of air removal equipment used on the condenser:

1 – Vacuum pump

2 – Steam jet air ejector

3 – Both

9 – *Other, describe* _____

_____ Enter the type of cooling water used in the condenser:

1 – *Fresh* – salinity values less than 0.50 parts per thousand.
2 – *Brackish* – salinity value ranging from approximately 0.50 to 17 parts per thousand.
3 – *Salt* – salinity values greater than 17 parts per thousand.
9 – *Other, describe* _____

_____ Enter the origin of the circulating water used in the condenser:

1 – River
2 – Lake
3 – Ocean or Bay
4 – Cooling Tower
5 – Fresh water wells
9 – *Other, describe* _____

58. Auxiliary Systems – Condenser Cleaning System

Enter the following information about the ON-LINE main condenser cleaning system at the unit (leave blank if cleaning is manual):

_____ On-line main condenser cleaning system manufacturer.

_____ Enter the type of on-line main condenser cleaning system used at the unit:

1 – Ball sponge rubber
2 – Brushes
3 – Chlorination
4 – On-line backwash
9 – *Other, describe* _____

59. Auxiliary Systems – Condensate Polishing System

A "condensate polisher" is an in-line demineralizer located in the condensate water system to treat water coming from the condenser to the boiler. It is not the demineralizer that prepares raw or untreated water for eventual use in the steam production process.

Enter the following information about the condensate polishing system at the unit:

_____ Condensate polishing system manufacturer

Enter the % treated of the condensate flow at maximum unit capacity that can be treated:

_____ % Treated

60. Auxiliary Systems – Condensate Pumps

Enter the following information for the main condensate pumps (those at the discharge of the condenser):

_____ Condensate pump(s) manufacturer(s).

_____ Manufacturer(s) of the motor(s) that drives the condensate pump(s).

_____ Number of condensate pumps per manufacturer; include installed spares.

_____ TOTAL number of condensate pumps for the unit.

_____ MINIMUM number of condensate pumps required to obtain maximum capacity from the unit.

61. Auxiliary Systems – Condensate Booster Pumps

Condensate booster pumps increase the pressure of the condensate water between the low pressure and the intermediate or high pressure feedwater heaters. Enter the following information for the condensate booster pumps:

_____ Condensate booster pump(s) manufacturer(s)

_____ Manufacturer(s) of the motor(s) that drives the condensate booster pump(s).

_____ Number of condensate booster pumps per manufacturer; include installed spares.

_____ TOTAL number of condensate booster pumps for the unit.

_____ MINIMUM number of condensate booster pumps required for maximum capacity from the unit.

62. Auxiliary Systems – Feedwater (Boiler Feed) Pumps

The feedwater (boiler feed) pumps move the feedwater through the feedwater system into the boiler. Enter the following information on the feedwater pumps installed at the unit:

_____ Feedwater (boiler feed) pump(s) manufacturer(s).

_____ Operating speed (RPM) of the feedwater pump(s) at full load.

_____ Number of feedwater pumps per manufacturer; include installed spares.

_____ TOTAL number of feedwater pumps for the unit.

_____ MINIMUM number of feedwater pumps required to obtain maximum capacity from the unit.

_____ PERCENT (%) of the unit's maximum capacity that can be achieved with a single feedwater pump.

63. Auxiliary Systems – Feedwater (Boiler Feed) Pump Drives

Enter the following information for the feedwater (boiler feed) pump drives:

_____ Manufacturer(s) of motor(s) or steam turbine(s) that drives the feedwater pump(s).

_____ _____ Enter the type of equipment used to drive the feedwater (boiler feed)
M1 M2

1 – Motor – single speed
2 – Motor – two speed
3 – Motor – variable speed
4 – Steam turbine
5 – Shaft
6 – Motor gear
7 – Steam gear
8 – Shaft gear
9 – *Other, describe* _____

_____ _____ Specify coupling type used for feedwater (boiler feed) pump.
M1 M2

1 – Hydraulic
2 – Mechanical
9 – *Other, describe* _____

64. Auxiliary Systems – Startup Feedwater (Boiler Feed) Pumps

Enter the following information for the startup feedwater pump(s) at the unit:

_____ Startup feedwater pump(s) manufacturer(s).

_____ Manufacturer(s) of the motor(s) that drives the startup feedwater pump(s).

_____ TOTAL number of startup feedwater pumps for the unit.

_____ PERCENT (%) of the unit's maximum capacity that can be achieved using a single startup feedwater pump.

_____ _____ Indicate the additional capabilities of the startup feedwater pump:
M1 M2

1 – ADDITIVE: operated in conjunction with the feedwater (boiler feed) pumps.
2 – REPLACEMENT: can carry load for the feedwater (boiler feed) pumps at such times when the feedwater pumps are inoperative.
3 – STARTUP ONLY: cannot be used in lieu of the feedwater pumps.
9 – *Other, describe* _____

65. Auxiliary Systems – High Pressure Feedwater Heaters

High pressure feedwater heaters are those heat exchangers between the feedwater (boiler feed) pumps discharge and the economizer inlet. Enter the following information for the HIGH pressure feedwater heaters at the unit:

_____ High pressure feedwater heater(s) manufacturer(s).

_____ Number of high pressure feedwater heaters per manufacturer.

_____ Feedwater heater tube materials used in 50% or more of the tubes per manufacturer.

_____ TOTAL number of high pressure feedwater heaters for the unit.

_____ _____ Enter the type of HIGH pressure feedwater heater(s):
M1 M2

1 – *Horizontal* – longitudinal axis of the heater shell is horizontal.

2 – *Vertical* – *l*ongitudinal axis of the heater shell is vertical.

3 – *Both*

9 – *Other, describe* _____

66. Auxiliary Systems – Intermediate Pressure Feedwater Heaters

Intermediate pressure feedwater heaters are those heat exchangers between the condensate booster pump discharge and the deaerator. Enter the following information for the INTERMEDIATE pressure feedwater heaters at the unit:

_____ Intermediate pressure feedwater heater(s) manufacturer(s).

_____ Number of intermediate pressure feedwater heaters per manufacturer.

_____ Feedwater heater tube materials used in 50% or more of the tubes, per manufacturer.

_____ TOTAL number of intermediate pressure feedwater heaters for the unit.

_____ _____ Enter the type of INTERMEDIATE pressure feedwater heater(s):
M1 M2

1 – *Horizontal* – longitudinal axis of the heater shell is horizontal.

2 – *Vertical* – *l*ongitudinal axis of the heater shell is vertical.

3 – *Both*

9 – *Other, describe* _____

67. Auxiliary Systems – Low Pressure Feedwater Heaters

Low pressure feedwater heaters are those heat exchangers between the condensate pump discharge and the condensate booster pump inlet. If the unit does not have condensate booster pumps, the low pressure feedwater heaters are located between the condensate pumps and the deaerator. Enter the following information for the LOW pressure feedwater heaters at the unit:

_____ Low pressure feedwater heater(s) manufacturer(s).

_____ Number of low pressure feedwater heaters per manufacturer.

_____ Feedwater heater tube materials used in 50% or more of the tubes, per manufacturer.

_____ TOTAL number of low pressure feedwater heaters for the unit.

_____ _____ Enter the type of LOW pressure feedwater heater(s):
M1 M2

1 – *Horizontal* – longitudinal axis of the heater shell is horizontal.
2 – *Vertical* – *l*ongitudinal axis of the heater shell is vertical.
3 – *Both*
9 – *Other, describe* _____

68. Auxiliary Systems – Deaerator Heater
Enter the following information on the deaerator heater at the unit:

_____ Deaerator manufacturer(s)

_____ _____ Enter the type of deaerator heater(s):
M1 M2

1 – *Spray* – high-velocity stream jet atomizes and scrubs the condensate.
2 – *Tray* – series of trays over which the condensate passes and is deaerated.
3 – *Vacuum* – a vacuum condition inside the shell for deaeration.
4 – *Combination*
9 – *Other, describe* _____

69. Auxiliary Systems – Heater Drain Pumps
Enter the following information for the heater drain pumps at the unit:

_____ Heater drain pump(s) manufacturer(s).
_____ Manufacturer(s) of the motor(s) that drives the heater drain pump(s).

70. Auxiliary Systems – Circulating Water Pumps
Enter the following information for the circulating water pumps:

_____ Circulating water pump(s) manufacturer(s).
_____ Manufacturer(s) of the motor(s) that drives the circulating water pump(s).
_____ Number of circulating water pumps per manufacturer; include installed spares.
_____ TOTAL number of circulating water pumps for the unit.
_____ MINIMUM number of circulating water pumps required to obtain maximum capacity from the unit DURING WINTER SEASON.

71. Auxiliary Systems – Cooling Tower and Auxiliaries
Enter the following information for the cooling tower and all its related auxiliary equipment at the unit:

_____ Cooling tower manufacturer(s)
_____ Cooling tower fan(s) manufacturer(s).
_____ Manufacturer(s) of the motor(s) that drives the cooling tower fan(s).

71. Auxiliary Systems – Cooling Tower and Auxiliaries (Continued)

_____ _____ Enter the type of cooling tower used by the unit:
M1 M2

1 – *Mechanical draft* (induced, forced, cross-flow and counter-flow) – fan(s) used to move ambient air through the tower.

2 – *Atmospheric spray* – air movement is dependent on atmospheric conditions and the aspirating effect of the spray nozzles.

3 – *Hyperbolic* (natural draft) – temperature difference between condenser circulating water and ambient air conditions, aided by hyperbolic tower shape, creates natural draft of air through the tower to cool the water.

4 – *Deck-filled* – wetted surfaces such as tiers of splash bars or decks aid in the breakup and retention of water drops to increase the evaporation rate.

5 – *Coil shed* – a combination structure of a cooling tower installed over a substructure that houses atmospheric coils or sections.

9 – *Other, describe* _____

The cooling tower booster pumps increase the pressure of the circulating water and force the water to the top of the cooling tower.

_____ Cooling tower booster pump(s) manufacturer(s).

_____ Manufacturer(s) of the motor(s) that drives the cooling tower booster pump(s).

_____ Number of cooling tower booster pumps per manufacturer; include installed spares.

_____ TOTAL number of cooling tower booster pumps for the unit.

_____ MINIMUM number of cooling tower booster pumps required to obtain maximum capacity from the unit.

72. Balance of Plant – Main Transformer

The "main transformer" is the unit step-up transformer connecting the generator (or multiple generators if unit is cross compound) to the transmission system. Enter the following information for the MAIN transformer(s) at the unit:

_____ Main transformer(s) manufacturer(s).

_____ TOTAL number of main transformers per manufacturer; include installed spares.

_____ Megavolt ampere (MVA) size of the main transformer(s); per manufacturer

_____ _____ Enter the type of MAIN transformer at the unit
M1 M2

1 – Single phase

2 – Three phase

9 – *Other, describe* _____

73. Balance of Plant – Unit Auxiliary Transformer

The "unit auxiliary transformer" supplies the auxiliaries when the unit is synchronized. Enter the following information for this transformer:

_____ Unit auxiliary transformer(s) manufacturer(s).

_____ TOTAL number of unit auxiliary transformers per manufacturer.

_____ LOW SIDE voltage in kilovolts (kV) of the unit auxiliary transformer(s) at 55 ºF, per manufacturer

74. Balance of Plant – Station Service Transformer

The "station service (start-up) transformer" supplies power from a station high voltage bus to the station auxiliaries and also to the unit auxiliaries during unit start-up and shutdown. It also may be used when the unit auxiliary transformer is not available (or nonexistent).

_____ Station service transformer(s) manufacturer(s).

_____ TOTAL number of station service transformers per manufacturer.

_____ HIGH SIDE voltage in kilovolts (kV) of the station service transformer(s) at 55 ºF, per manufacturer

_____ LOW SIDE voltage in kilovolts (kV) of the station service transformer(s) at 55 ºF, per manufacturer

75. Balance of Plant – Auxiliary (Start-up) Boiler

Enter the following information on the auxiliary boiler at the unit:

_____ Auxiliary boiler manufacturer(s).

76. Balance of Plant – Auxiliary Generator

Enter the following information on the auxiliary generator at the unit:

_____ Auxiliary generator manufacturer(s).

_____ _____ Is the auxiliary generator shaft driven?
M1 M2

1 – Yes
2 – No

77. Balance of Plant – Plant Process Computer

Enter the following information for the plant process computer(s):

_____ Plant process computer manufacturer(s).

_____ _____ Enter the number of plant process computers available to the unit
M1 M2

1 – One computer for this unit only.

2 – Two computers for this unit only.
3 – One computer shared by one or more units.
4 – Two computers shared by one or more units.
9 – *Other, describe* _____

_____ _____ Describe how the plant process computers are linked within the plant:
M1 M2

1 – Centralized
2 – Distributive
3 – Stand alone
9 – *Other, describe* _____

77. Balance of Plant – Plant Process Computer (Cont.)

_____ _____ Enter the system capability of the plant process computer:
M1 M2

1 – Monitor only
2 – Monitor and control
9 – *Other, describe* _____

_____ System vendor

First certified date

_____ _____ _____
Year Month Day

_____ Monitoring technique

1 – Extractive
2 – Dilution
3 – In Situ

_____ Analysis Method

1 – Wet
2 – Dry
9 – *Other, describe* _____

79. CEMS – Pollutant Gas and Diluent Gas Analyzers/Monitors

Sulfur Dioxide (SO_2) Analyzers

_____ Manufacturer(s)
_____ Model number(s)

_____ _____ Number of installed analyzers
M1 M2

_____ _____ Number of installed spare analyzers
M1 M2

_____ _____ Type(s)
M1 M2

1 – Ultraviolet
2 – Infrared
3 – Fluorescence
9 – *Other, describe* _____

_____ _____ Instrument range (parts per million)
M1 M2

1 – 0-50
2 – 0-150
3 – 0-500
9 – *Other, describe* _____

_____ _____ Shared? (1 - Yes, 2 – No)
M1 M2

Oxides of Nitrogen (NO_x) Analyzers

_____ Manufacturer(s)
_____ Model number(s)

_____ _____ Number of installed analyzers
M1 M2

_____ _____ Number of installed spare analyzers
M1 M2

_____ _____ Type(s)
M1 M2

1 – Infrared
2 – Chemiluminescent
9 – *Other, describe* _____

_____ _____ Instrument range (parts per million)
M1 M2

1 – 0-50
2 – 0-150
3 – 0-500
9 – *Other, describe* _____

_____ _____ Shared? (1 - Yes, 2 – No)
M1 M2

Carbon Monoxide (CO) Analyzers

_____ Manufacturer(s)
_____ Model number(s)

_____ _____ Number of installed analyzers
M1 M2

_____ _____ Number of installed spare analyzers
M1 M2

_____ _____ Type(s)
M1 M2

1 – Infrared solid state
2 – Infrared luft
3 – Gas filter correlation
9 – *Other, describe* _____

_____ _____ Instrument range (parts per million)
M1 M2

1 – 0-50
2 – 0-150
3 – 0-500
9 – *Other, describe* _____

_____ _____ Shared? (1 - Yes, 2 – No)
M1 M2

Carbon Dioxide (CO_2) Analyzers

_____ Manufacturer(s)
_____ Model number(s)

_____ _____ Number of installed analyzers
M1 M2

_____ _____ Number of installed spare analyzers
M1 M2

_____ _____ Instrument range (parts per million)
M1 M2

1 – 0-50
2 – 0-150
3 – 0-500
9 – *Other, describe* _____

_____ _____ Shared? (1 - Yes, 2 – No)
M1 M2

Oxygen (O_2) Analyzers

_____ Manufacturer(s)
_____ Model number(s)

_____ _____ Number of installed analyzers
M1 M2

_____ _____ Number of installed spare analyzers
M1 M2

_____ _____ Type(s)
M1 M2

1 – Zirconia oxide
2 – Paramagnetic
3 – Fuel cell
9 – *Other, describe* _____

_____ _____ Instrument range (parts per million)
M1 M2

1 – 0-50
2 – 0-150
3 – 0-500
9 – *Other, describe* _____

_____ _____ Shared? (1 - Yes, 2 – No)
M1 M2

Opacity Monitors

_____ Manufacturer(s)
_____ Model number(s)

_____ _____ Number of installed analyzers

M1 M2

Number of installed spare analyzers

M1 M2

Probe placement (if unit is equipped with a FGD system)

M1 M2

1 – Before scrubber 2 – After scrubber

80. CEMS – Flue Gas Flow Monitors

Manufacturer(s)

Model number(s)

Number of installed monitors

M1 M2

Number of installed spare monitors

M1 M2

Volumetric Flow Rate (ACFM):

M1 M2

Flow rate measurement technique

M1 M2

1 – Thermal sensing (hot-wire anemometer or dispersion)
2 – Differential pressure array
3 – Acoustic velocimetry (ultrasonic transducers)
4 – Combination
9 – *Other, describe* _____

81. CEMS – Data Acquisition and Reporting System

Hardware manufacturer(s)

Hardware architecture

1 – Vendor-supplied dedicated system
2 – Modified existing plant computer
3 – Stand alone, pc-based system not supplied by CEMS system vendor
9 – *Other, describe* _____

Software supplier

Shared? (1 - Yes, 2 – No)

M1 M2

NO_x REDUCTION SYSTEMS

These systems include Selective Non-catalytic Reduction, Selective Catalytic Reduction, Catalytic Air Heaters, and Staged NO_x Reduction, which is a combination of the three methods. Excluded from this category are Low NO_x burners, combustion modifications, and flue gas recirculation.

Please complete the following information for the NO_x Reduction Systems installed on your unit. (The appropriate items under each method should be completed for a Staged NO_x Reduction System).

82. Selective Non-Catalytic Reduction System (SNCR)

_____ Reagent

1 – Ammonia
2 – Urea
9 – *Other, describe* _____

_____ Injector Type

1 – Wall nozzles
2 – Lance
9 – *Other, describe* _____

_____ Injection Equipment Location

1 – Furnace
2 – Superheater
3 – Economizer
9 – *Other, describe* _____

_____ Number of Injectors

82. Selective Non-Catalytic Reduction System (SNCR) (Continued)

_____ Carrier Gas Type

1 – Steam
2 – Air
9 – *Other, describe* _____

_____ Total flow rate (lb/hr)
_____ Pressure at nozzle (psi)
_____ Nozzle exit velocity (ft/sec)

83. Selective Catalytic Reduction System (SCR)

_____ Reactor

1 – Separate
2 – In Duct

_____ Flue gas take-off location

_____ Reagent

1 – Ammonia
2 – Urea
9 – *Other, describe* _____

_____ Ammonia Injection Grid Location

1 – Furnace
2 – Superheater
3 – Economizer
4 – Zoned

_____ Duct Configuration

1 – Flow straighteners
2 – Turning vanes
3 – Dampers

_____ Catalyst Element Type

1 – Plate
2 – Honeycomb
9 – *Other, describe* _____

_____ Catalyst Support Material

1 – Stainless steel
2 – Carbon steel
9 – *Other, describe* _____

_____ Catalytic Material Configuration

1 – Vertical
2 – Horizontal
9 – *Other, describe* _____

_____ Surface face area (sq. ft.)
_____ Catalyst volume (cu. ft.)
_____ Number of layers
_____ Layer thickness (inches)

_____ Soot blowers (if applicable)

1 – Air
2 – Steam
3 – Both air and steam

_____ Manufacturer(s)
_____ Number of soot blowers

84. Catalytic Air Heaters

_____ Element Type

1 – Laminar surface
2 – Turbulent surface
9 – *Other, describe* _____

_____ Support Material, if any

1 – Stainless steel
2 – Carbon steel
9 – *Other, describe* _____

_____ Catalyst Material Configuration

1 – Horizontal air shaft
2 – Carbon steel
9 – *Other, describe* _____

_____ Total face area (sq. ft.)
_____ Open face area (sq. ft.)
_____ Layer thickness (inches)

Appendix E3: Unit Design Data – Nuclear (Voluntary Reporting)

Note: The NERC Board of Trustees approved the *GADS Task Force Report* (dated July 20, 2011)[1], which states that design data collection outside the required nine fields is solely voluntary. However, the GADS staff encourages that reporters report and update GADS design data frequently. This action can be completed by sending in this form to gads@nerc.net. GADS staff encourages using the software for design entry and updating.

Instructions

Submit the data in this section once during the life of each nuclear unit. If a major change is made to a unit which significantly changes its characteristics, then resubmit this section with updated information.

For coded entries, enter a (9) to indicate an alternative other than those specified. Whenever you enter a (9), write the column number and the answer on the reverse side of the form.

When submitting an original copy of the form, make sure that it is legible.

Unit Name	
Location of Unit (State)	
Energy Information Administration (EIA) Number	
Regional Entity	
Subregion	
Date Reporter	
Telephone Number	
Date	

General Data

	Col No.	Column Information
	01	Utility Identification Number
	04	Unit Identification Number
	07	Card code
	09	Columns 09 through 12 are blank
	13	Year unit first paralleled for load
	17	Month unit first paralleled for load
	19	Day unit first paralleled for load

[1] http://www.nerc.com/pa/RAPA/gads/MandatoryGADS/Revised_Final_Draft_GADSTF_Recommendation_Report.pdf

Nuclear Reactor Data

	Col No.	Column Information
	21	Manufacturer – (1) Westinghouse; (2) General Electric (3) Babcock and Wilcox; (4) Combustion Engineering; (5) General Atomics; (9) Other
	22	Type – (1) Pressurized (light) water (PWR); (2) Boiling (light) water (BWR); (3) CANDU; (9) Other
	23	Nameplate capacity in MW
	27	Outlet temperature in ºF at nameplate capacity
	31	Outlet pressure in PSIG at nameplate capacity
	35	Reactor flow in thousands of pounds per hour at nameplate capacity
	42	Secondary loop flow in thousands of pounds per hour at nameplate capacity, if applicable
	49	Number of primary loop or recirculating pumps
	50	Primary loop or recirculating pump manufacturer – (1) Westinghouse; 2) Worthington; (3) Byron-Jackson; (4) Ingersoll-Rand; (9) Other
	51	Primary loop or recirculating pump type drives – (1) Motor variable speed; (2) Motor constant speed; (9) Other
	52	Steam generator manufacturer, if applicable – (1) Westinghouse; (2) Combustion Engineering; (3) Babcock and Wilcox; (4) Foster Wheeler; (9) Other
	53	Type of control rod drive – (1) Magnetic jack; (2) Hydraulic water; (3) Rack and pin; (9) Other
	54	Control rod configuration – (1) Cruciform; (2) Rod cluster; (9) Other
	55	Enter (1) if chemical shim is used
	56	Initial weight of uranium in thousands of pounds
	60	Highest initial enrichment to one-tenth %
	62	Fuel type – (1) U-235 oxide; (9) Other
	63	Fuel cladding material – (1) Zirconium; (2) Stainless steel; (9) Other
	64	Containment type – (1) Dry; (2) Pressure suppression; (9) Other

Architect/Engineering Data

	Col No.	Column Information
	65	Architect/Engineer – (1) All A/E work inhouse; (2) Burns & Roe; (3) Black & Veatch; (4) Bechtel; (5) Brown & Root; (6) Durham & Richardson; (7) Ebasco Services; (8) Gibbs & Hill; (9) Gilbert

Architect/Engineering Data

	Col No.	Column Information
		Associates; (10) Offshore Power Systems; (11) Ralph M Parsons; (12) Pioneer Services & Engineering; (13) Sargent & Lundy; (14) Stone & Webster; (15) United Engineers & Constructors; (99) Other
	67	Columns 67 through 80 are blank

Steam Turbine Data

	Col No.	Column Information
	01	Utility Identification Number
	04	Unit Identification Number
	07	Card code
	09	Columns 09 through 12 are blank
	14	Manufacturer (see table of Manufacturers)
	16	Type – (1) Single cylinder; (2) Tandem compound; (3) Cross Compound; (4) Triple compound; (9) Other
	17	Enter (1) if more than 50% of turbine is outdoors
	18	Total nameplate capacity in MW
	22	Main steam pressure in PSIG, full load at throttle
	26	Main steam temperature in ºF, full load at throttle
	30	First reheat temperature in ºF, if applicable
	34	Second reheat temperature in ºF, if applicable
	38	Back pressure to nearest one-tenth inch of Hg for nameplate capacity and design water temperature

Condenser Data

	Col No.	Column Information
	40	Manufacturer – (1) Foster Wheeler; (2) Ingersoll-Rand; (3) Westinghouse; (4) Yuba; (5) Worthington; (6) C. H. Wheeler; (9) Other
	41	Passes – (1) Single; (2) Double
	42	Number of shells
	43	Tube material – (1) Arsenical Admirality; (2) Arsenical Aluminum Brass; (3) Stainless Steel; (4) Cupro-Nickel; (5) Aluminum Bronze; (6) Arsenical Phosphorized Copper; (9) Other

	44	Type cooling water – (1) Fresh; (2) Salt
	45	Cooling water origin – (1) River; (2) Lake; (3) Ocean or bay; (4) Cooling tower
	46	Number of condensate pumps
	47	Condensate pump manufacturer – (1) Worthington; (2) Allis Chalmers; (3) Byron-Jackson; (4) DeLaval; (5) Ingersoll-Rand; (6) Fairbanks-Morse; (7) Pacific Pump; (9) Other
	48	Number of circulating water pumps
	49	Circulating water pump manufacturer – (1) Worthington; (2) Allis Chalmers; (3) Ingersoll-Rand; (4) Westinghouse; (5) Foster Wheeler; (9) Other

Auxiliaries Data

	Col No.	Column Information
	50	Number of secondary loop or single loop feed pumps required for normal operation at full load
	51	Number of spare feed pumps which are approximately the same size as one normally used pump
	52	Number of spare or startup feed pumps which are smaller than one normally used pump
	53	Normal feed pump manufacturer – (1) Worthington; (2) DeLaval; (3) Ingersoll-Rand; (4) Byron-Jackson; (5) Pacific Pump; (9) Other
	54	Normal feed pump type drive – (1) Motor; (2) Steam; (3) Shaft; (4) Motor gear; (5) Steam gear; (6) Shaft gear; (9) Other
	55	Normal feed pump, enter (1) if hydraulic coupling(s) used
	56	
	57	
	58	
	59	
	61	
	62	
	63	
	64	
	65	Columns 65 through 80 are blank

Generator Data

	Col No.	Column Information
	01	Utility Identification Number
	04	Unit Identification Number
	07	Card code
	09	Columns 09 through 12 are blank
	14	Manufacturer – (see table of Manufacturers, page E-2)
	16	Type – (1) Three-phase, 60-cycle; (9) Other
	17	Nameplate voltage to nearest one-tenth KV
	21	Nameplate capability MVA, first shaft
	25	Speed in RPM, first shaft
	29	Nameplate capability MVA, second shaft if any
	33	Speed in RPM, second shaft if any
	37	Nameplate capability MVA, third shaft if any
	41	Speed in RPM, third shaft if any
	45	Nameplate power factor in percent
	47	Cooling medium, stator/rotor – (1) Air/air; (2) Hydrogen/ hydrogen; (3) Oil/hydrogen; (4) Water/hydrogen; (9) Other
	48	Cooling method, stator/rotor – (1) Intercooled/intercooled; (2) Conventional/conventional; (3) Intercooled/conventional; (9) Other
	49	Hydrogen pressure in PSIG at nameplate MVA, if applicable
	51	Number of exciters required by the unit for normal operation at rated output
	52	Type normal exciters - (1) Rotating DC generator; (2) Rotating alternator rectifier; (3) Static; (9) Other
	53	Type drive for normal exciters, if rotating – (1) Shaft direct; (2) Shaft gear; (3) Motor; (9) Other
	54	Number of spare exciters available to the unit
	55	Enter (1) if more than 50% of generator is outdoors
	56	Name of Unit (Columns 55-80)

Appendix E4: Unit Design Data – Internal Combustion / Reciprocating Engine (Voluntary Reporting)

Note: The NERC Board of Trustees approved the *GADS Task Force Report* (dated July 20, 2011)[1], which states that design data collection outside the required nine fields is solely voluntary. However, the GADS staff encourages that reporters report and update GADS design data frequently. This action can be completed by sending in this form to gads@nerc.net. GADS staff encourages using the software for design entry and updating.

Instructions

Submit the data in this section once during the life of each internal combustion/reciprocating engine unit. If a major change is made to a unit which significantly changes its characteristics, then resubmit this section with updated information.

For coded entries, a (9) is entered to indicate an alternative other than those specified. Whenever a (9) is entered, write the column number and the answer on the reverse side of the form.

If a copy of the original form is being submitted, make sure that it is legible.

Unit Name	
Location of Unit (State)	
Energy Information Administration (EIA) Number	
Regional Entity	
Subregion	
Date Reporter	
Telephone Number	
Date	

General Data

	Col No.	Column Information
	01	Utility Identification Number
	04	Unit Identification Number
	07	Card code
	09	Columns 09 through 12 are blank
	13	Year unit first paralleled for load
	17	Month unit first paralleled for load

[1] http://www.nerc.com/pa/RAPA/gads/MandatoryGADS/Revised_Final_Draft_GADSTF_Recommendation_Report.pdf

	19	Day unit first paralleled for load

Internal Combustion/Reciprocating Engine Data

	Col No.	Column Information
	01	Utility Identification Number
	04	Unit Identification Number
	07	Card code
	09	Columns 09 through 12 are blank
	21	Diesel engine manufacturer – (1) General Motors; (2) General Electric; (3) Consolidated Diesel Electric; (4) Allis Chalmers; (5) Caterpillar Tractor; (6) Cummins; (7) Fairbanks Morse; (9) Other
	22	Fuel, type – (1) No. 2 fuel oil; (2) Diesel oil; (3) JP 5 fuel; (4) Kerosene; (5) Heavy oil; (9) Other
	23	Cylinders, number per engine
	25	Cycle, type – (1) 2-stroke; (2) 4-stroke; (9) Other
	26	Startup system, type – (1) Automatic, on site; (2) Automatic remote; (9) Other
	27	Time for normal cold start to full load in seconds
	30	Time for emergency cold start to full load in seconds
	33	Coolant, type – (1) Water; (2) Oil; (3) Air; (9) Other
	34	Columns 34 through 80 are blank

Generator Data

	Col No.	Column Information
	01	Utility Identification Number
	04	Unit Identification Number
	07	Card code
	09	Columns 09 through 12 are blank
	14	Manufacturer – (see table of Manufacturers, page E-2)
	16	Type – (1) Three-phase, 60-cycle; (9) Other
	17	Nameplate voltage to nearest one-tenth KV
	21	Nameplate capability MVA, first shaft
	25	Speed in RPM, first shaft

Generator Data

	Col No.	Column Information
	29	Nameplate capability MVA, second shaft if any
	33	Speed in RPM, second shaft if any
	37	Nameplate capability MVA, third shaft if any
	41	Speed in RPM, third shaft if any
	45	Nameplate power factor in percent
	47	Cooling medium, stator/rotor – (1) Air/air; (2) Hydrogen/ hydrogen; (3) Oil/hydrogen; (4) Water/hydrogen; (9) Other
	48	Cooling method, stator/rotor – (1) Intercooled/intercooled; (2) Conventional/conventional; (3) Intercooled/conventional; (9) Other
	49	Hydrogen pressure in PSIG at nameplate MVA, if applicable
	50	Number of exciters required by the unit for normal operation at rated output
	51	Type normal exciters - (1) Rotating DC generator; (2) Rotating alternator rectifier; (3) Static; (9) Other
	52	Type drive for normal exciters, if rotating – (1) Shaft direct; (2) Shaft gear; (3) Motor; (9) Other
	53	Number of spare exciters available to the unit
	54	Enter (1) if more than 50% of generator is outdoors
	55	Name of Unit (Columns 55-80)

Appendix E5: Unit Design Data – Hydro or Pumped Storage (Voluntary Reporting)

Note: The NERC Board of Trustees approved the *GADS Task Force Report* (dated July 20, 2011)[1], which states that design data collection outside the required nine fields is solely voluntary. However, the GADS staff encourages that reporters report and update GADS design data frequently. This action can be completed by sending in this form to gads@nerc.net. GADS staff encourages using the software for design entry and updating.

Instructions

Submit the data in this section once during the life of each pumped storage or hydro unit. If a major change is made to a unit which significantly changes its characteristics, then resubmit this section with updated information.

For coded entries, enter a (9) to indicate an alternative other than those specified. Whenever you enter a (9), write the column number and the answer on the reverse side of the form.

When submitting an original copy of the form, make sure that it is legible.

Unit Name	
Location of Unit (State)	
Energy Information Administration (EIA) Number	
Regional Entity	
Subregion	
Date Reporter	
Telephone Number	
Date	

General Data

	Col No.	Column Information
	01	Utility Identification Number
	04	Unit Identification Number
	07	Card code
	09	Columns 09 through 12 are blank
	13	Year unit first paralleled for load
	17	Month unit first paralleled for load
	19	Day unit first paralleled for load

[1] http://www.nerc.com/pa/RAPA/gads/MandatoryGADS/Revised_Final_Draft_GADSTF_Recommendation_Report.pdf

Hydro Turbine/Pump Data

	Col No.	Column Information
	01	Utility Identification Number
	04	Unit Identification Number
	07	Card code
	09	Columns 09 through 12 are blank
	18	Nameplate rating of unit (MVA times power factor)
	21	Hydro or Pumped Storage – (1) Hydro; (2) Pump/turbine; (3) Pump
	22	Turbine/Pump manufacturer – (0) Allis Chalmers; (1) Pelton; (2) S. Morgan Smith; (3) Newport News; (4) Worthington; (5) Dobie; (6) I.P. Morris; (7) W.S. Morgan; 8) B.L. Hamilton; (9) Other
	23	Turbine/Pump impulse type – (1) Horizontal; (2) Vertical; (9) Other
	24	Turbine/Pump reaction type – (1) Francis; (2) Kaplan – adjustable blade propeller; (3) Fix blade propeller; (4) Pump/turbine; (9) Other
	25	Turbine rated head to nearest foot
	29	Turbine rated speed to nearest RPM
	32	Turbine rating in horsepower to nearest 100 hp
	38	Turbine runner, type – (1) Single; (2) Twin; (3) Triplex; (4) Double discharge; (9) Other
	39	Number of buckets/blades per runner
	41	Governor type – (1) Gate shaft; (2) Actuator; (3) Cabinet type; (4) Electric; (5) Electro hydraulic, speed sensing; (6) Electronic hydraulic, speed sensing; (7) Mechanical, speed sensing; (9) Other
	42	Turbine bearing type – (1) Water lubricated; (2) Oil lubricated; (9) Other
	43	Thrust bearing location – (1) Above generator; (2) Below generator
	44	Guide bearing, location - (1) Above generator; (2) Below generator
	45	Columns 45 through 80 are blank

Generator Data

	Col No.	Column Information
	01	Utility Identification Number
	04	Unit Identification Number
	07	Card code

Generator Data

	Col No.	Column Information
	09	Columns 09 through 13 are blank
	14	Generator Manufacturer – (See Table of Manufacturers Codes)
	16	Generator Type – (1) Three-phase, 60-cycle; (2) Other
	17	Nameplate voltage to nearest one-tenth KV
	21	Nameplate capability MVA, first shaft
	25	Speed in RPM, first shaft
	29	Nameplate capability MVA, second shaft if any
	33	Speed in RPM, second shaft if any
	37	Nameplate capability MVA, third shaft if any
	41	Speed in RPM, third shaft if any
	45	Nameplate power factor in percent
	47	Cooling medium, stator/rotor – (1) Air/air; (2) Hydrogen/ hydrogen; (3) Oil/hydrogen; (4) Water/hydrogen; (9) Other
	48	Cooling method, stator/rotor – (1) Intercooled/intercooled; (2) Conventional/conventional; (3) Intercooled/conventional; (9) Other
	49	Hydrogen pressure in PSIG at nameplate MVA, if applicable
	51	Number of exciters required by the unit for normal operation at rated output
	52	Type normal exciters - (1) Rotating DC generator; (2) Rotating alternator rectifier; (3) Static; (9) Other
	53	Type drive for normal exciters, if rotating – (1) Shaft direct; (2) Shaft gear; (3) Motor; (9) Other
	54	Number of spare exciters available to the unit
	55	Enter (1) if more than 50% of generator is outdoors
	56	Name of Unit (Columns 55-80)

Appendix E6: Unit Design Data – Gas Turbine or Jet Engine (Voluntary Reporting)

Note: The NERC Board of Trustees approved the *GADS Task Force Report* (dated July 20, 2011)[1], which states that design data collection outside the required nine fields is solely voluntary. However, the GADS staff encourages that reporters report and update GADS design data frequently. This action can be completed by sending in this form to gads@nerc.net. GADS staff encourages using the software for design entry and updating.

Instructions

Submit the data in this section once during the life of each pumped storage or hydro unit. If a major change is made to a unit which significantly changes its characteristics, then resubmit this section with updated information.

For coded entries, enter a (9) to indicate an alternative other than those specified. Whenever you enter a (9), write the column number and the answer on the reverse side of the form.

When submitting an original copy of the form, make sure that it is legible.

Unit Name	
Location of Unit (State)	
Energy Information Administration (EIA) Number	
Regional Entity	
Subregion	
Date Reporter	
Telephone Number	
Date	

General Data

	Col No.	Column Information
	01	Utility Identification Number
	04	Unit Identification Number
	07	Card code
	09	Columns 09 through 12 are blank
	13	Year unit first paralleled for load
	17	Month unit first paralleled for load
	19	Day unit first paralleled for load

[1] http://www.nerc.com/pa/RAPA/gads/MandatoryGADS/Revised_Final_Draft_GADSTF_Recommendation_Report.pdf

Gas Turbine or Jet Engine Data

	Col No.	Column Information
	21	Engine manufacturer – (1) Pratt & Whitney; (2) General Electric; (3) Westinghouse; (4) ABB Gas Turbine Power Division; (5) Rolls Royce; (6) Cooper Bessemer; (7) Worthington; (8) Allison; (9) Other
	22	Engine type – (1) Gas turbine single shaft; (2) Gas turbine split shaft; (3) Jet engine; (9) Other
	23	Engines, number per unit
	25	Expander turbines, number per unit if applicable
	26	Type expander, if applicable – (1) Single flow; (2) Double flow
	27	Cycle type – (1) Reheat; (2) Simple; (3) Regenerative; (4) Recuperative; (5) Intercooled; (6) Precooled; (7) Complex; (8) Compound; (9) Other
	28	Startup system – (1) Air; (2) Auxiliary motor; (3) Electric motor; (4) Natural gas; (5) Flow turbine; (6) Supercharging fan; (7) Hydraulic; (9) Other
	29	Startup type – (1) Automatic, on site; (2) Automatic, remote; (9) Other
	30	Type of Fuel(s) that will be used (see table of Fuel Codes, page E-2)
	32	Enter (1) if sound attenuators located at inlet
	33	Enter (1) if sound attenuators located at outlet
	34	Enter (1) if sound attenuators located in building enclosures
	35	Time for normal cold start to full load in seconds
	38	Time for emergency cold start to full load in seconds
	41	Black start capability – (1) Yes; (2) No
	42	Columns 42 through 70 are blank
	71	Engine Model Number (MS 7001EA, W501AA, FT4A11, etc.)

Pollution Control Equipment Data

	Col No.	Column Information
	01	Utility Identification Number
	04	Unit Identification Number
	07	Card code
	09	Columns 09 through 21 are blank

Selective Non-Catalytic Reduction System (SNCR)

	Col No.	Column Information
	22	SNCR reagent – (1) Ammonia; (2) Urea; (9) Other
	23	SNCR injector type – (1) Wall nozzle; (2) Lance; (9) Other
	24	SNCR injection equipment location – (1) Furnace; (2) Super-heater; (3) Economizer; (9) Other
	25	Number of SNCR injectors
	28	SNCR carrier gas type – (1) Steam; (2) Air; (9) Other
	29	SNCR carrier gas total flow rate (thousands of lbs./hr.) i.e. 6,000,000 lbs./hr. enter 6000
	34	SNCR carrier gas pressure at nozzle (psi)
	38	SNCR carrier gas nozzle exit velocity (thousands of ft./sec.)

Selective Catalytic Reduction System (SCR)

	Col No.	Column Information
	43	SCR reactor – (1) Separate; (2) In Duct
	44	SCR reagent – (1) Ammonia; (2) Urea; (9) Other
	45	SCR ammonia injection grid location – (1) Furnace; (2) Super-heater; (3) Economizer; (4) Zoned
	46	SCR duct configuration – (1) Flow straighteners; (2) Turning vanes; (3) Dampers
	47	SCR Catalyst Element Type (1) Plate; (2) Honeycomb; (9) Other
	48	SCR catalyst support material – (1) Stainless steel; (2) Carbon steel; (9) Other
	49	SCR catalytic material configuration – (1) Vertical; (2) Horizontal; (9) Other
	50	SCR catalyst surface face area (thousands of square feet)
	55	SCR catalyst volume (thousands of cubic feet)
	60	Number of SCR catalytic layers
	62	SCR catalytic layer thickness (1/1000 inches)
	65	SCR sootblower type – (1) Air; (2) Steam; (3) Both
	66	SCR sootblower manufacturer – (see table of Manufacturers Code)

Catalytic Air Heaters (CAH)

	Col No.	Column Information
	68	CAH element type – (1) Laminar surface; (2) Turbulent surface; (9) Other
	69	CAH catalyst material – (1) Titanium oxide; (2) Vanadium pentoxide; (3) Iron (II) oxide; (4) Molybdenum oxide; (9) Other
	70	CAH catalyst support material – (1) Stainless steel; (2) Carbon steel; (9) Other
	71	CAH catalyst material configuration – (1) Horizontal air shaft; (2) Vertical air shaft
	72	CAH catalyst material total face area (thousands of square feet)
	75	CAH catalyst material open face area (thousands of square feet)
	78	CAH catalyst material layer thickness (1/1000 inches)

Generator Data

	Col No.	Column Information
	01	Utility Identification Number
	04	Unit Identification Number
	07	Card code
	09	Columns 09 through 13 are blank
	14	Generator Manufacturer – (See Table of Manufacturers Codes)
	16	Generator Type – (1) Three-phase, 60-cycle; (2) Other
	17	Nameplate voltage to nearest one-tenth KV
	21	Nameplate capability MVA, first shaft
	25	Speed in RPM, first shaft
	29	Nameplate capability MVA, second shaft if any
	33	Speed in RPM, second shaft if any
	37	Nameplate capability MVA, third shaft if any
	41	Speed in RPM, third shaft if any
	45	Nameplate power factor in percent
	47	Cooling medium, stator/rotor – (1) Air/air; (2) Hydrogen/ hydrogen; (3) Oil/hydrogen; (4) Water/hydrogen; (9) Other
	48	Cooling method, stator/rotor – (1) Intercooled/intercooled; (2) Conventional/conventional; (3) Intercooled/conventional; (9) Other

Generator Data

	Col No.	Column Information
	49	Hydrogen pressure in PSIG at nameplate MVA, if applicable
	51	Number of exciters required by the unit for normal operation at rated output
	52	Type normal exciters - (1) Rotating DC generator; (2) Rotating alternator rectifier; (3) Static; (9) Other
	53	Type drive for normal exciters, if rotating – (1) Shaft direct; (2) Shaft gear; (3) Motor; (9) Other
	54	Number of spare exciters available to the unit
	55	Enter (1) if more than 50% of generator is outdoors
	56	Name of Unit (Columns 56-80)

Appendix E7: Unit Design Data – Miscellaneous (Voluntary Reporting)

Note: The NERC Board of Trustees approved the *GADS Task Force Report* (dated July 20, 2011)[1], which states that design data collection outside the required nine fields is solely voluntary. However, the GADS staff encourages that reporters report and update GADS design data frequently. This action can be completed by sending in this form to gads@nerc.net. GADS staff encourages using the software for design entry and updating.

Instructions

Use these forms when no other forms in this appendix are appropriate. Specifically, use them for multi-boiler/multi-turbine units, combined-cycle units, and geothermal units.

Submit the data in this section once during the life of each pumped storage or hydro unit. If a major change is made to a unit which significantly changes its characteristics, then resubmit this section with updated information.

For coded entries, enter a (9) to indicate an alternative other than those specified. Whenever you enter a (9), write the column number and the answer on the reverse side of the form.

When submitting an original copy of the form, make sure that it is legible.

Unit Name	
Location of Unit (State)	
Energy Information Administration (EIA) Number	
Regional Entity	
Subregion	
Date Reporter	
Telephone Number	
Date	

General Data

	Col No.	Column Information
	01	Utility Identification Number
	04	Unit Identification Number
	07	Card code
	09	Columns 09 through 12 are blank
	13	Year unit first paralleled for load

[1] http://www.nerc.com/pa/RAPA/gads/MandatoryGADS/Revised_Final_Draft_GADSTF_Recommendation_Report.pdf

	17	Month unit first paralleled for load
	19	Day unit first paralleled for load
	21	Energy source – (1) Fossil (Multi-Boiler – Multi-Turbine); (3) Geothermal; (4) More than one; (9) Other
	22	Energy medium – (1) Water and/or steam; (2) Heavy water and/or steam; (3) Liquid metal; (4) Gas; (5) More than one; (6) Direct conversion; (9) Other
	23	Enter (1) if header unit
	24	Enter (1) if noncondensing steam turbine
	25	Columns 25 through 80 are blank

Pollution Control Equipment Data

	Col No.	Column Information
	01	Utility Identification Number
	04	Unit Identification Number
	07	Card code
	09	Columns 09 through 17 are blank
	18	Nameplate MW Rating of the unit

Selective Non-Catalytic Reduction System (SNCR)

	Col No.	Column Information
	22	SNCR reagent – (1) Ammonia; (2) Urea; (9) Other
	23	SNCR injector type – (1) Wall nozzle; (2) Lance; (9) Other
	24	SNCR injection equipment location – (1) Furnace; (2) Super-heater; (3) Economizer; (9) Other
	25	Number of SNCR injectors
	28	SNCR carrier gas type – (1) Steam; (2) Air; (9) Other
	29	SNCR carrier gas total flow rate (thousands of lbs./hr.) i.e. 6,000,000 lbs./hr. enter 6000
	34	SNCR carrier gas pressure at nozzle (psi)
	38	SNCR carrier gas nozzle exit velocity (thousands of ft./sec.)

Selective Catalytic Reduction System (SCR)

	Col No.	Column Information
	43	SCR reactor – (1) Separate; (2) In Duct
	44	SCR reagent – (1) Ammonia; (2) Urea; (9) Other
	45	SCR ammonia injection grid location – (1) Furnace; (2) Super-heater; (3) Economizer; (4) Zoned
	46	SCR duct configuration – (1) Flow straighteners; (2) Turning vanes; (3) Dampers
	47	SCR Catalyst Element Type (1) Plate; (2) Honeycomb; (9) Other
	48	SCR catalyst support material – (1) Stainless steel; (2) Carbon steel; (9) Other
	49	SCR catalytic material configuration – (1) Vertical; (2) Horizontal; (9) Other
	50	SCR catalyst surface face area (thousands of square feet)
	55	SCR catalyst volume (thousands of cubic feet)
	60	Number of SCR catalytic layers
	62	SCR catalytic layer thickness (1/1000 inches)
	65	SCR sootblower type – (1) Air; (2) Steam; (3) Both
	66	SCR sootblower manufacturer – (see table of Manufacturers Code)

Catalytic Air Heaters (CAH)

	Col No.	Column Information
	68	CAH element type – (1) Laminar surface; (2) Turbulent surface; (9) Other
	69	CAH catalyst material – (1) Titanium oxide; (2) Vanadium pentoxide; (3) Iron (II) oxide; (4) Molybdenum oxide; (9) Other
	70	CAH catalyst support material – (1) Stainless steel; (2) Carbon steel; (9) Other
	71	CAH catalyst material configuration – (1) Horizontal air shaft; (2) Vertical air shaft
	72	CAH catalyst material total face area (thousands of square feet)
	75	CAH catalyst material open face area (thousands of square feet)
	78	CAH catalyst material layer thickness (1/1000 inches)

General Data

	Col No.	Column Information
	01	Utility Identification Number
	04	Unit Identification Number
	07	Card code
	09	Columns 09 through 14 are blank
	15	Total nameplate rating in MW
	19	Type electrical output – (1) Three-phase, 60 cycle; (9) other
	20	Columns 20 through 55 are blank
	56	Name of Unit

Appendix E8: Unit Design Data – Combined Cycle Units and Block Design Data (Voluntary Reporting)

Note: The NERC Board of Trustees approved the *GADS Task Force Report* (dated July 20, 2011)[1], which states that design data collection outside the required nine fields is solely voluntary. However, the GADS staff encourages that reporters report and update GADS design data frequently. This action can be completed by sending in this form to gads@nerc.net. GADS staff encourages using the software for design entry and updating.

Instructions

Submit the data in this section once during the life of each combined cycle/block unit. If a major change is made to a unit which significantly changes its characteristics, then resubmit this section with updated information.

For coded entries, enter a (9) to indicate an alternative other than those specified, and whenever a (9) is entered, write the column number and the answer on the reverse side of the form.

When submitting a copy of the original form, make sure that it is legible.

Unit Name	_____
Location of Unit (State)	_____
Energy Information Administration (EIA) Number	_____
Regional Entity	_____
Subregion	_____
Date Reporter	_____
Telephone Number	_____
Date	_____

Here are some definitions used to eliminate some of the ambiguity concerning combined-cycle blocks.

- Combined-Cycle Block (referred to here as a "Block") – By definition, a combined-cycle is a process for generating energy (either electricity or steam) constituted by the marriage of a Brayton Cycle (expand hot gas to turn a gas turbine) with a Rankine Cycle (use heat to boil water to make steam to turn a steam turbine). The combined-cycle block employs electric generating technology that produces electricity from otherwise lost waste heat exiting from one or more gas turbines/jet engines, one or more steam turbines, and balance of plant equipment supporting the production of electricity. In the combined-cycle block, the exiting heat is routed to a conventional boiler or to a heat-recovery steam generator (HRSG) for use by a steam turbine in the production of electricity or steam energy.

  There may be more than one block at a plant site. Reporters should complete a form for each individual block.

- Units – Each gas turbine/jet engine and each steam turbine is considered a "unit." Each unit contributes to the total electric generation or steam production of the block. Each unit has its own or shares its generator for providing electric power. They should be considered individual parts of the block.

[1] http://www.nerc.com/pa/RAPA/gads/MandatoryGADS/Revised_Final_Draft_GADSTF_Recommendation_Report.pdf

- Heat Recovery Steam Generator (HRSG) – There may be one or more HRSG or waste heat boilers in a block. Some blocks may have a single HRSG per GT/jet; others may have several GT/jets feeding a single HRSG or any combination thereof. The HRSG does not contribute electricity to the output of the block so is considered a component rather than a "unit."
- Other Balance of Plant Equipment – There is other equipment in the block used to support the production of electricity/heat energy, but they are not related to any specific generating unit and are also considered components. Submit the data in this section once during the life of each block. If a major change is made to a site that significantly changes its characteristics, then resubmit this section with updated information.

General Block Identification

1. Identification

A series of codes uniquely identifies your utility (or company) and the block. NERC assigned a unique code to identify your company. You must assign a unique code that will identify the block being reported. This block code may be any number from 800 to 899. Enter the unique company and block codes and the full name of the entire block below:

Utility (Company) Code: _____ Block Code: _____

Name of Block, including site name:

_____

2. Date the Block Entered Service

The in-service date establishes the starting point for review of historical performance of the block. Starting dates of each unit may be different. Supply unit dates at the specified location on this form. Using the criteria described below, report the date the block entered service.

Date (Month/day/year): _____

Criteria:
a) The date the block was first declared available for dispatch at some level of its capability, OR
b) The date the block first operated at 50% of its generator nameplate megawatt capability (product of the megavolt amperes (MVA) and the rated power factor as stamped on the generator nameplate(s)).

3. Block Loading Characteristics at Time of Design

Enter the number from the list below that best describes the mode of operation for the block as it *was **originally** designed:*

Loading Characteristic: _____

1 - Base loaded with minor load following at night and on weekends
2 - Periodic startups with daily load-following and reduced load nightly
3 - Weekly startup with daily load-following and reduced load nightly
4 - Daily startup with daily load-following and taken off-line nightly
5 - Startup chiefly to meet daily peaks
6 – Other, describe: _____
7 - Seasonal Operation

4. Design and Construction Contractors

Identify both the architect/engineer and the general construction contractor responsible for the design and construction of the block. If your company was the principal designer or general constructor, enter "SELF"

Architect/Engineer: _____

Constructor: _____

5. Total Nameplate Rating of all units in the block (in MW)

Enter the TOTAL capability (sum of all gas turbines/jet engines and steam turbines) MW nameplate or published MW rating of the block. In cases where the turbine's nameplate rating cannot be determined, approximate the rating by multiplying the MVA (megavolt amperes) by the rated power factor found on the nameplate affixed to each unit's generator (or nameplates in the case of cross compound units).

Total block rating (MW) based on sum of nameplate ratings on all units (in XXXX.X format):

_____

6. Does the block have co-generation (steam for other than electric generation) capabilities (yes/no)?

_____

7. What is the number of gas turbines/jet engines per Heat Recovery Steam Generator (HRSG)

Identify the number of gas turbines/jet engines feeding exhaust gases into a single HRSG: _____

8. What is the number of gas turbines/jet engines – Heat Recovery Steam Generator (HRSG) Trains

Identify the number of sets of gas turbines/jet engines and HRSG trains supplying steam to the steam turbine: _____

9. Total number of gas turbines/jet engines in block

Identify the number of GT/Jets used for generating power: _____

10. Total number of Heat Recovery Steam Generator (HRSG) in block

Identify the number of HRSG supplying steam to the steam turbine: _____

11. Total number of Steam Turbines in block

Identify the number of steam turbines receiving steam for generating power: _____

For each Gas Turbine (GT) or Jet Engine (JE) complete items #12 to #65 (If you have 3 GT, then complete items #12-65 once for each GT.)

Gas Turbine or Jet Engine data

12. Identification

A series of codes uniquely identifies your utility (company), the combined-cycle block and its units. NERC assigned a unique code to identify your company. You must assign the unique code that will identify the GAS TURBINE/JET ENGINE unit being reported. This code may be any number from 300 to 399 or 700-799. Enter the unique company, block and unit code and the full name of each gas turbine/jet engine below:

Utility (Company) Code: _____ Unit Code: _____ Block Code: _____

Name of unit: _____

13. Date the gas turbine/jet engine Entered Service

The in-service date establishes the starting point for review of historical performance of each unit. Using the criteria described below, report the date this gas turbine/jet engine entered service.

Date (Month/day/year): _____

Criteria:
a) The date the gas turbine/jet engine was first declared available for dispatch at some level of its capability, OR
b) The date the gas turbine/jet engine first operated at 50% of its generator nameplate megawatt capability (product of the megavolt amperes (MVA) and the rated power factor as stamped on the generator nameplate(s)).

14. Design and Construction Contractors

Identify both the architect/engineer and the general construction contractor responsible for the design and construction of the unit. If your company was the principal designer or general constructor, enter "SELF"

Architect/Engineer: _____

Constructor: _____

15. Gas turbine/jet engine nameplate rating in MW

The nameplate is the design capacity stamped on the gas turbines/jet engines or published on the guarantee flow diagram. In cases where the gas turbine's nameplate rating cannot be determined, approximate the rating by multiplying the MVA (megavolt amperes) by the rated power factor found on the nameplate affixed to each unit's generator (or nameplates in the case of cross compound units).

Gas turbine/jet engine rating (MW) (in XXXX.X format): _____

16. Engine manufacturer – (1) Pratt & Whitney; (2) General Electric; (3) Siemens Westinghouse; (4) Alstom (ABB); (5) Rolls Royce; (6) Cooper Bessemer; (7) Worthington; (8) Allison; (9) Other, describe

_____

17. **Engine type** – (1) Gas turbine single shaft; (2) Gas turbine split shaft; (3) Jet engine; (9) Other, describe

_____

18. **Expander turbines, number per unit if applicable: _____**

19. **Type expander**, if applicable – (1) Single flow; (2) Double flow _____

20. **Cycle type** – (1) Reheat; (2) Simple; (3) Regenerative; (4) Recuperative; (5) Intercooled; (6) Pre-cooled; (7) Complex; (8) Compound; (9) Other, describe

_____

21. **Start-up system** – (1) Air; (2) Auxiliary motor; (3) Electric motor; (4) Natural gas; (5) Flow turbine; (6) Supercharging fan; (7) Hydraulic; (9) Other, describe

_____

22. **Start-up type** – (1) Automatic, on site; (2) Automatic, remote; (9) Other, describe

_____

23. **Type of Fuel(s) that will be used: _____**

Fuel codes:

BM	Biomass	OO	Oil
CC	Coal	OS	Other-Solid (Tons)
DI	Distillate Oil (No. 2)	PC	Petroleum Coke
GE	Geothermal	PE	Peat
GG	Gas	PR	Propane
JP	JP4 or JP5	SL	Sludge Gas
KE	Kerosene	SO	Solar
LI	Lignite	WA	Water
NU	Nuclear	WD	Wood
OG	Other-Gas (Cu. Ft.)	WH	Waste Heat
OL	Other-Liquid (BBL)	WM	Wind

24. **Enter (1) if sound attenuators located at inlet: _____**

25. **Enter (1) if sound attenuators located at outlet: _____**

26. **Enter (1) if sound attenuators located in building enclosures: _____**

27. **Time in seconds for normal cold start to full load: _____**

28. **Time in seconds for emergency cold start to full load: _____**

29. **Black start capability – (1) Yes; (2) No _____**

30. **Engine Model Number (MS 7001EA, W501AA, FT4A11, etc.)** _____

Gas Turbine Selective Non-Catalytic Reduction System (SNCR)

31. **SNCR reagent** – (1) Ammonia; (2) Urea; (9) Other, describe _____

32. **SNCR injector type** – (1) Wall nozzle; (2) Lance; (9) Other, describe _____

33. **SNCR injection equipment location** – (1) Furnace; (2) Super-heater; (3) Economizer; (9) Other, describe _____

34. **Number of SNCR injectors: _____**

35. **SNCR carrier gas type** – (1) Steam; (2) Air; (9) Other, describe _____

36. **SNCR carrier gas total flow rate** (thousands of lb./hr.) i.e. 6,000,000 lbs./hr. enter 6000 _____

37. **SNCR carrier gas pressure at nozzle (psi): _____**

38. **SNCR carrier gas nozzle exit velocity (thousands of ft./sec.): _____**

Gas Turbine Selective Catalytic Reduction System (SCR)

39. **SCR reactor** – (1) Separate; (2) In Duct; (3) Other, describe _____

40. **SCR reagent** – (1) Ammonia; (2) Urea; (9) Other, describe _____

41. **SCR ammonia injection grid location** – (1) Furnace; (2) Super-heater; (3) Economizer; (4) Zoned; (5) Other, describe _____

42. **SCR duct configuration** – (1) Flow straighteners; (2) Turning vanes; (3) Dampers _____

43. **SCR catalyst element type** (1) Plate; (2) Honeycomb; (9) Other, describe _____

44. **SCR catalyst support material** – (1) Stainless steel; (2) Carbon steel; (9) Other, describe _____

45. **SCR catalytic material configuration** – (1) Vertical; (2) Horizontal; (9) Other, describe _____

46. **SCR catalyst surface face area** (thousands of square feet): _____

47. **SCR catalyst volume** (thousands of cubic feet): _____

48. **Number of SCR catalytic layers: _____**

49. **SCR catalytic layer thickness (1/1000 inches): _____**

50. **SCR soot blower type –** (1) Air; (2) Steam; (3) Both _____

51. **SCR soot blower manufacturer**: _____

Gas Turbine Catalytic Air Heaters (CAH)

52. **CAH element type** – (1) Laminar surface; (2) Turbulent surface;
(9) Other, describe _____

53. **CAH catalyst material** – (1) Titanium oxide; (2) Vanadium pentoxide; (3) Iron (II) oxide;
(4) Molybdenum oxide; (9) Other, describe _____

54. **CAH catalyst support material** – (1) Stainless steel; (2) Carbon steel;
(9) Other, describe _____

55. **CAH catalyst material configuration** – (1) Horizontal air shaft; (2) Vertical air shaft _____

56. **CAH catalyst material total face area** (thousands of square feet): _____

57. **CAH catalyst material open face area** (thousands of square feet): _____

58. **CAH catalyst material layer thickness** (1/1000 inches): _____

For Electric Generator on Each GT/Jet Engine

59. **Generator – Manufacturer**
Enter the name of the manufacturer of the electric generator:

Generator manufacturer: _____

60. **Number of generators per gas turbine/jet engine:**_____

61. **Generator – Enclosure**
Is 50% or more of the generator outdoors (not enclosed in building framing and siding)? Yes/no:
_____

62. **Generator – Ratings and Power Factor**
Enter the following information about the generator:

Design (Nameplate) Item	Main Generator	Second* Shaft	Third* Shaft
Voltage to nearest one-tenth kV	▲	▲	▲
Megavolt amperes (MVA) Capability			
RPM			
Power Factor (enter as %)	▲	▲	▲

*Cross compound units.

63. Generator – Cooling System

Two types of cooling methods are typically used. First is the "inner cooled" method, where the cooling medium is in direct contact with the conductor copper or is separated by materials having little thermal resistance. The other is the "conventional" cooling method where the heat generated within the windings must flow through the major ground insulation before reaching the cooling medium.

Enter the type of cooling method used by the generator: _____

1 – Stator inner cooled and rotor inner cooled.
2 – Stator conventionally cooled and rotor conventionally cooled.
3 – Stator inner cooled and rotor conventionally cooled.
9 – Other, describe: _____

Enter the mediums used to cool the generator's stator (air, hydrogen, oil, water): _____

Enter the mediums used to cool the generator's rotor (air, hydrogen, oil, water): _____

64. Generator – Hydrogen Pressure

Enter the generator hydrogen pressure IN PSIG at nameplate MVA (XX.X format): _____

Exciter on Each GT/Jet Engine Generator

65. Exciter – Configuration

Enter the following information about the main exciter:

Exciter manufacturer: _____

TOTAL number of exciters; include installed spares: _____

MINIMUM number of exciters required to obtain maximum capacity from the unit: _____

ENTER the type of main exciter used at the unit from the list below: _____

1 – *Static* – static excitation where D.C. is obtained by rectifying A.C. from generator terminals and D.C. is fed into rotor by collector rings.
2 – *Rotating D.C. generator* – exciter supplies D.C. from a commutator into the main rotor by means of collector rings.
3 – *Brushless* – an A.C. exciter (rotating armature type) whose output is rectified by a semiconductor device to provide excitation to an electric machine. The semiconductor device would be mounted on and rotate with the A.C. exciter armature.
4 – *Alternator rectifier*
9 – *Other, describe:* _____

ENTER the type(s) of exciter drive(s) used by the main exciter IF it is rotating: _____

1 – Shaft direct
2 – Shaft gear
3 – Motor
9 – *Other, describe:* _____

For each Heat Recovery Steam Generator (HRSG) Complete items #66 to #87 (If you have 3 HRSGs, then complete items #66-87 once for each HRSG.)

66. Enter the unit code information for each GT/Jet Engine that supplies heat energy to this single HRSG.

Utility (Company) Code: _____ Unit Code "A": _____ Block Code:_____

Name of unit "A", including site name: _____

Utility (Company) Code: _____ Unit Code "B": _____ Block Code:_____

Name of unit "B", including site name: _____

Utility (Company) Code: _____ Unit Code "C": _____ Block Code:_____

Name of unit "C", including site name: _____

Utility (Company) Code: _____ Unit Code "D": _____ Block Code:_____

Name of unit "D", including site name: _____

67. HRSG – Manufacturer

Enter the name of the manufacturer and the model or series name or number of the HRSG:

HRSG manufacturer: _____

HRSG model or series name/number: _____

68. HRSG – Enclosure

Is 50% or more of the HRSG outdoors (not enclosed in building framing and siding)? (Y/N):_____

69. HRSG – Nameplate Steam Conditions With Duct Burners

Enter the following steam conditions at the full load, valves-wide-open design point at the exit of the HRSG to the steam turbine when the HRSG is experiencing supplemental firing:

HIGH-PRESSURE

Steam flow rate (in lbs/hr): _____

Design temperature (ºF): _____

Design pressure (psig): _____

INTERMEDIATE PRESSURE

Steam flow rate (in lbs/hr): _____

Design temperature (ºF): _____

Design pressure (psig): _____

LOW-PRESSURE
Steam flow rate (in lbs/hr): _____

Design temperature (ºF): _____

Design pressure (psig): _____

REHEAT PRESSURE
Steam flow rate (in lbs/hr): _____

Design temperature (ºF): _____

Design pressure (psig): _____

70. HRSG – Nameplate Steam Conditions Without Duct Burners
Enter the following steam conditions at the full load, valves-wide-open design point at the exit of the HRSG to the steam turbine when the HRSG is not experiencing supplemental firing:

HIGH-PRESSURE
Steam flow rate (in lbs/hr): _____

Design temperature (ºF): _____

Design pressure (psig): _____

INTERMEDIATE PRESSURE
Steam flow rate (in lbs/hr): _____

Design temperature (ºF): _____

Design pressure (psig): _____

LOW-PRESSURE
Steam flow rate (in lb/hr): _____

Design temperature (ºF): _____

Design pressure (psig): _____

REHEAT PRESSURE
Steam flow rate (in lb/hr): _____

Design temperature (ºF): _____

Design pressure (psig): _____

71. Is the HRSG top-supported (pressure parts hang like in a utility boiler) or bottom-supported?

_____

72. Does the HRSG have vertical or horizontal heat exchangers? _____

73. Is the duct insulation cold casing (insulation on the inside of the duct) or hot casing (insulation on the outside of the duct)? _____

74. HRSG Supplemental Firing (duct burners)

Does the HRSG have the capability of supplemental firing (duct firing) (y/n)?_____

Is the HRSG supplemental used "normally, as needed" or only in extreme emergency?

_____

75. HRSG bypass capabilities

Does the HRSG have bypass capability? (y/n) _____

76. Does the HRSG have a drum or is it a once-through design? _____

77. HRSG – Circulation System

Enter the following information on the pumps used to recirculate water through the HRSG:

HRSG recirculation pump(s) manufacturer(s):

_____

TOTAL number of HRSG recirculation pumps; include installed spares:_____

MINIMUM number of HRSG recirculation pumps required to obtain maximum capacity from this HRSG:_____

Enter the type of HRSG recirculation pump(s) at the block:

1 – *Injection* (or injection seal) – controlled-leakage HRSG recirculation pumps mounted vertically with a rigid shaft designed to carry its own thrust.
2 – *Leakless* (or canned, canned-motor, or zero-leakage) – pump and its motor are an integral pressurized and sealed component.
9 – *Other, describe:* _____

78. HRSG – Duct-Burner System (General)

Enter the following information on the duct burner systems installed for use by this HRSG:

Duct fuel burner(s) manufacturer(s):

_____

TOTAL number of duct fuel burners: _____

79. HRSG – Duct-Burner Management System

Enter the name of the manufacturer of each of the following burner management systems:

Manufacturer of the combustion control system that coordinates the feedwater, air, and fuel subsystems for continuous HRSG operation:

_____

Manufacturer of the burner management system that monitors only the fuel and air mixture during all phases of operation to prevent the formation of an explosive mixture:

_____

80. Auxiliary Systems – Feedwater (HRSG Feed) Pumps

The feedwater (HRSG feed) pumps move the feedwater through the feedwater system into the HRSG. Enter the following information on the feedwater pumps installed at this HRSG:

Feedwater (HRSG feed) pump(s) manufacturer(s):

_____

Normal operating speed (RPM) of the feedwater pumps: _____

TOTAL number of feedwater pumps. Include installed spares: _____

MINIMUM number of feedwater pumps required to obtain maximum capacity from the HRSG: _____

PERCENT (%) of the HRSG's maximum capacity that can be achieved with a single feedwater pump (XXX.X format): _____

81. Auxiliary Systems – Feedwater (HRSG Feed) Pump Drives

Manufacturer(s) of motor(s) or steam turbine(s) that drives the feedwater pump(s).

_____

Enter the type of equipment used to drive the feedwater (HRSG feed) pumps: _____

1 – Motor – single speed
2 – Motor – two speed
3 – Motor – variable speed
4 – Steam turbine
5 – Shaft
6 – Motor gear
7 – Steam gear
8 – Shaft gear
9 – Other, describe

Specify coupling type used for feedwater (HRSG feed) pump: _____

1 – Hydraulic
2 – Mechanical
9 – Other, describe: _____

82. Auxiliary Systems – Start-up Feedwater (HRSG Feed) Pumps

Start-up feedwater pump(s) manufacturer(s):

_____

Manufacturer(s) of the motor(s) that drives the start-up feedwater pump(s):

_____

PERCENT (%) of the HRSG's maximum capacity that can be achieved with a single Start-up feedwater pump (XXX.X format): _____

Indicate the additional capabilities of the start-up feedwater pump: _____

1 – ADDITIVE: operated in conjunction with the feedwater (HRSG feed) pumps.
2 – REPLACEMENT: can carry load when the feedwater pumps are inoperative.
3 – START-UP only: cannot be used in lieu of the feedwater pumps.
9 – Other, describe: _____

83. Auxiliary Systems – High-pressure Feedwater Heaters

High-pressure feedwater heaters are those heat exchangers between the feedwater (HRSG feed) pumps discharge and the economizer inlet. Enter the following information for the High-pressure feedwater heaters for this HRSG:

High-pressure feedwater heater(s) manufacturer(s):

_____

TOTAL number of high-pressure feedwater heaters: _____

Feedwater heater tube materials used in 50% or more of the tubes: _____

Enter the type of high-pressure feedwater heater(s): _____

1 – Horizontal – longitudinal axis of the heater shell is horizontal.
2 – Vertical – longitudinal axis of the heater shell is vertical.
3 – Both
9 – Other, describe: _____

84. Auxiliary Systems – Intermediate Pressure Feedwater Heaters

Intermediate-pressure feedwater heaters are those heat exchangers between the condensate booster pump discharge and the deaerator. Enter the following information for the intermediate pressure feedwater heaters for this HRSG:

Intermediate-pressure feedwater heater(s) manufacturer(s):

_____

TOTAL number of intermediate-pressure feedwater heaters: _____

Feedwater heater tube materials used in 50% or more of the tubes:_____

Enter the type of INTERMEDIATE pressure feedwater heater(s): _____

1 – Horizontal – longitudinal axis of the heater shell is horizontal.
2 – Vertical – longitudinal axis of the heater shell is vertical.
3 – Both
9 – Other, describe: _____

85. Auxiliary Systems – Low-Pressure Feedwater Heaters

Low-pressure feedwater heaters are those heat exchangers between the condensate pump discharge and the condensate booster pump inlet. If the HRSG does not have condensate booster pumps, the low-pressure feedwater heaters are located between the condensate pumps and the deaerator. Enter the following information for the Low-pressure feedwater heaters for this HRSG:

Low-pressure feedwater heater(s) manufacturer(s):

_____

TOTAL number of low-pressure feedwater heaters: _____

Feedwater heater tube materials used in 50% or more of the tubes: _____

Enter the type of Low-pressure feedwater heater(s): _____

1 – Horizontal – longitudinal axis of the heater shell is horizontal.
2 – Vertical – longitudinal axis of the heater shell is vertical.
3 – Both
9 – Other, describe: _____

86. Auxiliary Systems – Deaerator Heater

Deaerator manufacturer(s):

_____

Enter the type of deaerator heater(s): _____

1 – Spray – high-velocity stream jet atomizes and scrubs the condensate.
2 – Tray – series of trays over which the condensate passes and is deaerated.
3 – Vacuum – a vacuum condition inside the shell for deaeration.
4 – Combination
9 – Other, describe: _____

87. Auxiliary Systems – Heater Drain Pumps

Heater drain pump(s) manufacturer(s):

_____

Manufacturer(s) of the motor(s) that drives the heater drain pump(s):

_____

For each Steam Turbine (ST) Complete items #88 to #104
(If you have 3 ST, then complete items #88-104 once for each ST.)

88. Identification

A series of codes uniquely identifies your company and generating units. NERC assigned a unique code to identify your company. You must assign the unique code that will identify the STEAM TURBINE unit being reported. This code may be any number from 100 to 199 or 600-649. Enter the unique company, block and generating-unit code and the full name of each steam turbine below:

Company Code: _____ Unit Code: _____ Block Code:_____

Name of unit, including site name:

_____

89. Does the steam turbine have bypass capability? (y/n) _____

90. Steam Turbine – Manufacturer

Enter the name of the manufacturer of the steam turbine:

Steam turbine manufacturer:

_____

91. Steam Turbine – Enclosure

Is 50% or more of the steam turbine outdoors (not enclosed in building framing and siding)? (Y/N)

_____

92. Steam Turbine – Nameplate Rating in MW

Nameplate is the design capacity stamped on the steam turbine's nameplate or published on the turbine guarantee flow diagram. In cases where the steam turbine's nameplate rating cannot be determined, approximate the rating by multiplying the MVA (megavolt amperes) by the rated power factor found on the nameplate affixed to the unit's generator (or nameplates in the case of cross compound units).

Steam turbine's nameplate rating (MW) (in XXXX.X format): _____

93. Steam Turbine – Type of Steam Turbine

Identify the steam turbine's casing or shaft arrangement.

Enter the type of steam turbine at the unit: _____

1 – *Single casing* – single (simple) turbine having one pressure casing (cylinder).
2 – *Tandem compound* – two or more casings coupled together in line.
3 – *Cross compound* – two cross-connected single casing or tandem compound turbine sets where the shafts are not in line.
4 – *Triple compound* – three cross-connected single casing or tandem compound turbine sets.
9 – *Other, describe:* _____

94. Steam Turbine – Manufacturer's Building Block or Design Codes

Steam turbine building blocks or manufacturer's design codes are assigned by the manufacturer to designate a series of turbine designs, LM5000 or W501 for example. Enter the following information:

Manufacturer's code, first shaft: _____

Manufacturer's code, second shaft (cross or triple compound units): _____

Turbine configuration and number of exhaust flows (e.g., tandem compound, four flow): _____

95. Steam Turbine – Steam Conditions

Enter the following information on the Main, First Reheat, and Second Reheat Steam design conditions:

Main steam: Temperature (ºF): _____ Pressure (psig): _____

First reheat steam: Temperature (ºF): _____ Pressure (psig): _____

Second reheat steam: Temperature (ºF): _____ Pressure (psig): _____

96. Steam Turbine – High, Intermediate, and Low-pressure Sections

Enter the following information describing various sections of the steam turbine:

High-Pressure Casings

TOTAL number of high pressure casings, cylinders or shells: _____

Back pressure of the high pressure condenser (if applicable) to the nearest one-tenth inch of mercury at the nameplate capacity and design water temperature. (XX.X format): _____

Combined High-pressure/Intermediate Pressure Casings

TOTAL number of high/intermediate-pressure casings, cylinders or shells: _____

Intermediate Pressure Casings

TOTAL number of intermediate-pressure casings, cylinders or shells: _____

Combined Intermediate/Low-pressure Casings

TOTAL number of intermediate/low-pressure casings, cylinders or shells: _____

Low-pressure Casings

TOTAL number of low-pressure casings, cylinders or shells: _____

Back pressure of the low pressure condenser to the nearest one-tenth inch of mercury at nameplate capacity and design water temperature. (XX.X format): _____

The last stage blade length (inches) of the low-pressure turbine, measured from hub to end of top of blade. (XX.X format): _____

97. Steam Turbine – Governing System

Enter the following information for the steam turbine governing system:

Enter the type of governing system used at the unit: _____

1 – *Partial arc* – main steam flow is restricted to one sector of the turbine's first stage at start-up.
2 – *Full arc* – main steam is admitted to all sectors of the turbine's first stage at start-up.
3 – *Either* – capable of admitting steam using either partial or full arc techniques.
9 – *Other*, describe: _____

Enter the type of turbine governing system used at the unit: _____

1 – *Mechanical hydraulic control (MHC)* – turbine speed monitored and adjusted through mechanical and hydraulic linkages.
2 – *Analog electro-hydraulic control (EHC)* – analog signals control electro-hydraulic linkages to monitor and adjust turbine speed.
3 – *Digital electro-hydraulic control (DHC)* – same as EHC except signals are digital rather than analog.
9 – *Other*, describe: _____

98. Steam Turbine – Lube Oil System

Enter the following information for the steam turbine main lube oil system:

Main lube oil system manufacturer:

_____

Main lube oil pump(s) manufacturer:

_____

Manufacturer of the motor(s)/steam turbine(s) that drives the main lube oil pump(s):

_____

TOTAL number of steam turbine main lube oil pumps; include installed spares: _____

Enter the type of driver on the main lube oil pump: _____

1 – Motor
2 – Shaft
3 – Steam turbine
9 – Other, describe: _____

FOR ELECTRIC GENERATOR ON A STEAM TURBINE

99. Generator – Manufacturer

Enter the name of the manufacturer of the electric generator:

Generator manufacturer:

_____

100. Generator – Enclosure

Is 50% or more of the generator outdoors (not enclosed in building framing and siding)? (Y/N)

_____

101. Generator – Ratings and Power Factor

Enter the following information about the generator:

Design (Nameplate) Item	Main Generator	Second* Shaft	Third* Shaft
Voltage to nearest one-tenth kV	☐☐☐▲☐	☐☐☐▲☐	☐☐☐▲☐
Megavolt amperes (MVA) Capability	☐☐☐☐	☐☐☐☐	☐☐☐☐
RPM	☐☐☐☐	☐☐☐☐	☐☐☐☐
Power Factor (enter as %)	☐☐▲☐☐	☐☐▲☐☐	☐☐▲☐☐

*Cross compound units.

102. Generator – Cooling System

Two types of cooling methods are typically used. First is the "inner cooled" method, where the cooling medium is in direct contact with the conductor copper or is separated by materials having little thermal resistance. The other is the "conventional" cooling method where the heat generated within the windings must flow through the major ground insulation before reaching the cooling medium.

Enter the type of cooling method used by the generator: _____

1 – Stator inner cooled and rotor inner cooled.
2 – Stator conventionally cooled and rotor conventionally cooled.
3 – Stator inner cooled and rotor conventionally cooled.
9 – Other, describe _____

Enter the mediums used to cool the generator's stator (air, hydrogen, oil, water): _____

Enter the mediums used to cool the generator's rotor (air, hydrogen, oil, water): _____

103. Generator – Hydrogen Pressure

Enter the generator hydrogen pressure in PSIG at nameplate MVA (XX.X format): _____

Exciter for Each Steam Turbine Generator

104. Exciter – Configuration

Enter the following information about the main exciter:

Exciter manufacturer: _____

TOTAL number of exciters. Include installed spares: _____

MINIMUM number of exciters required to obtain maximum capacity from the unit: _____

Enter the type of main exciter used at the unit:

1 – *Static* – static excitation where D.C. is obtained by rectifying A.C. from generator terminals and D.C. is fed into rotor by collector rings.
2 – *Rotating D.C. generator* – exciter supplies D.C. from a commutator into the main rotor by means of collector rings.
3 – *Brushless* – an A.C. exciter (rotating armature type) whose output is rectified by a semiconductor device to provide excitation to an electric machine. The semiconductor device would be mounted on and rotate with the A.C. exciter armature.
4 – *Alternator rectifier*
9 – *Other, describe:* _____

Enter the type(s) of exciter drive(s) used by the main exciter IF it is rotating:

1 – Shaft direct
2 – Shaft gear
3 – Motor
9 – Other, describe: _____

Auxiliary Systems

105. Auxiliary Systems – Main Condenser

Enter the following information for the main condenser and its auxiliaries:

Main condenser manufacturer:

_____

Type of condenser (water, air): _____

TOTAL number of passes made by the circulating water as it passes through the condenser: _____

TOTAL number of condenser shells: _____

Condenser tube materials used in the majority (50% or more) of the condenser tubes: _____

Air ejector(s) or vacuum pump(s) manufacturer:

_____

Enter the type of air-removal equipment used on the condenser: _____

1 – Vacuum pump
2 – Steam jet air ejector
3 – Both
9 – Other, describe: _____

Enter the type of cooling water used in the condenser: _____

1 – *Fresh* – salinity values less than 0.50 parts per thousand.
2 – *Brackish* – salinity values ranging from approximately 0.50 to 17 parts per thousand.
3 – *Salt* – salinity values greater than 17 parts per thousand.
9 – Other, describe: _____

Enter the origin of the circulating water used in the condenser: _____

1 – River
2 – Lake
3 – Ocean or Bay
4 – Cooling Tower
9 – Other, describe: _____

106. Auxiliary Systems – Condenser Cleaning System

Enter the following information about the ON-LINE main condenser cleaning system (leave blank if cleaning is manual):

On-line main condenser cleaning system manufacturer:

_____

Enter the type of on-line main condenser cleaning system used at the unit: _____

1 – Ball sponge rubber
2 – Brushes
9 – Other, describe: _____

107. Auxiliary Systems – Condensate Polishing System

A "condensate polisher" is an in-line demineralizer located in the condensate water system to treat water coming from the condenser to the HRSG. It is **not** the demineralizer that prepares raw or untreated water for eventual use in the steam production process.

Enter the following information about the condensate polishing system at the unit:

Condensate polishing system manufacture:

_____

Enter the % of the condensate flow at maximum unit capacity that can be treated (XX.X format):

_____

108. Auxiliary Systems – Condensate Pumps

Enter the following information for the main condensate pumps (those at the discharge of the condenser):

Condensate pump(s) manufacturer(s):

_____

Manufacturer(s) of the motor(s) that drives the condensate pump(s):

_____

TOTAL number of condensate pumps. Include installed spares:_____

MINIMUM number of condensate pumps required to obtain maximum capacity from the block: _____

109. Auxiliary Systems – Condensate Booster Pumps

Condensate booster pumps increase the pressure of the condensate water between the low-pressure and the intermediate or high-pressure feedwater heaters. Enter the following information for the condensate booster pumps:

Condensate booster pump(s) manufacturer(s):

_____

Manufacturer(s) of the motor(s) that drives the condensate booster pump(s):

_____

TOTAL number of condensate booster pumps; include installed spares: _____

MINIMUM number of condensate booster pumps required for maximum capacity from the block: _____

110. Auxiliary Systems – Circulating Water Pumps

Enter the following information for the circulating water pumps:

Circulating water pump(s) manufacturer(s):

_____

Manufacturer(s) of the motor(s) that drives the circulating water pump(s):

_____

TOTAL number of circulating water pumps; include installed spares: _____

MINIMUM number of circulating water pumps required to obtain maximum capacity from the block DURING WINTER SEASON._____

111. Auxiliary Systems – Cooling Tower and Auxiliaries

Enter the following information for the cooling towers and all related auxiliary equipment at the block:

Cooling tower manufacturer(s):

_____

Cooling tower fan(s) manufacturer(s):

_____

Manufacturer(s) of the motor(s) that drives the cooling tower fan(s):

_____

Enter the type of cooling tower(s) used: _____

1 – *Mechanical draft* (induced, forced, cross-flow and counter-flow) – fan(s) used to move ambient air through the tower.
2 – *Atmospheric spray* – air movement is dependent on atmospheric conditions and the aspirating effect of the spray nozzles.
3 – *Hyperbolic* (natural draft) – temperature difference between condenser circulating water and ambient air conditions, aided by hyperbolic tower shape, creates natural draft of air through the tower to cool the water.
4 – *Deck-filled* – wetted surfaces such as tiers of splash bars or decks aid in the breakup and retention of water drops to increase the evaporation rate.
5 – *Coil shed* – a combination structure of a cooling tower installed over a substructure that houses atmospheric coils or sections.
9 – *Other, describe:* _____

The cooling tower booster pumps increase the pressure of the circulating water and force the water to the top of the cooling tower.

Cooling tower booster pump(s) manufacturer(s):

_____

Manufacturer(s) of the motor(s) that drives the cooling tower booster pump(s):

_____

TOTAL number of cooling tower booster pumps; include installed spares: _____

MINIMUM number of cooling tower booster pumps required to obtain maximum capacity from the block: _____

Balance of Plant

112. Balance of Plant – Main Transformer

The main transformer is the block step-up transformer connecting the generator (or multiple generators if block is cross compound) to the transmission system. Enter the following information for the MAIN transformer(s) at the block:

Main transformer(s) manufacturer(s):

_____

TOTAL number of main transformers; include installed spares: _____

Megavolt ampere (MVA) size of the main transformer(s): _____

HIGH SIDE voltage in kilovolts (kV) of the main transformer(s) at 55 ºF: _____

Enter the type of MAIN transformer at the block: _____

1 – Single phase
2 – Three phase
9 – Other, describe: _____

113. Balance of Plant – Block Auxiliary Transformer

The block auxiliary transformer supplies the auxiliaries when the block is synchronized. Enter the following information for this transformer:

Block auxiliary transformer(s) manufacturer(s):

_____

TOTAL number of block auxiliary transformer(s): _____

LOW SIDE voltage in kilovolts (kV) of the block auxiliary transformer(s) at 55 ºF: _____

114. Balance of Plant – Station Service Transformer

The station service (start-up) transformer supplies power from a station high-voltage bus to the station auxiliaries and also to the block auxiliaries during block start-up and shutdown. It also may be used when the block auxiliary transformer is not available or nonexistent.

Station service transformer(s) manufacturer(s):

_____

TOTAL number of station service transformer(s):_____

HIGH SIDE voltage in kilovolts (kV) of the station service transformer(s) at 55 ºF: _____

LOW SIDE voltage in kilovolts (kV) of the station service transformer(s) at 55 ºF: _____

Appendix F: Performance Indexes and Equations

General Information

Appendix F discusses the relationships among the performance indexes calculated from the event and performance data outlined in Sections III and IV. The basis for these relationships is IEEE Standard No. 762 "Definitions for Use in Reporting Electric Generating Unit Reliability, Availability and Productivity."

All calculations are subject to the following adjustments:

1. All events must be adjusted for Daylight Savings Time (DST) if a unit is in a time zone to which it applies.
2. All events must be adjusted for the time period under analysis. Example: To analyze August for an event that starts in July and ends in September exclude the portions of the event outside August.
3. Derate events must be adjusted for shadowing by outages and by dominant derates. See Appendix G.

Summary of Various Time and Energy Factors Used by Indexes

1.	Service Hours - SH	Sum of all unit Service Hours.
2.	Synchronous Condensing Hours	Sum of all hours the unit is in the synchronous condensing mode. The units are considered to be in non-generating service operation.
3.	Pumping Hours	Sum of all hours the pumped storage unit is in pumping mode. The units are considered to be in non-generating service operation.
4.	Available Hours - AH	Sum of all Service Hours (SH) **+** Reserve Shutdown Hours (RSH) **+** Pumping Hours **+** Synchronous Condensing Hours
5.	Planned Outage Hours - POH	Sum of all hours experienced during Planned Outages (PO) **+** Planned Outage Extensions (PE) of any Planned Outages (PO).
6.	Unplanned Outage Hours - UOH	Sum of all hours experienced during Forced Outages (U1, U2, and U3) **+** Startup Failures (SF) **+** Maintenance Outages (MO) **+** Maintenance Outage Extensions (ME) of any Maintenance Outages (MO).
7.	Forced Outage Hours - FOH	Sum of all hours experienced during Forced Outages (U1, U2, and U3) **+** Startup Failures (SF).
8.	Maintenance Outage Hours - MOH	Sum of all hours experienced during Maintenance Outages (MO) **+** Maintenance Outage Extensions (ME) of any Maintenance Outages (MO).
9.	Unavailable Hours - UH	Sum of all Planned Outage Hours (POH) **+** Forced Outage Hours (FOH) **+** Maintenance Outage Hours (MOH).

10.	Scheduled Outage Hours - SOH	Sum of all hours experienced during Planned Outages (PO) **+** Maintenance Outages (MO) **+** Scheduled Outage Extensions (ME and PE) of any Maintenance Outages (MO) and Planned Outages (PO).
11.	Period Hours - PH	Number of hours in the period being reported that the unit was in the active state.
12.	Equivalent Seasonal Derated Hours - ESEDH	(Net Maximum Capacity (NMC) **-** Net Dependable Capacity (NDC)) **x** Available Hours (AH) **/** Net Maximum Capacity (NMC) $\frac{(NMC - NDC) \times AH}{NMC}$
13a.	Equivalent Forced Derated Hours - EFDH	Each individual Forced Derating (D1, D2, and D3) transformed into equivalent full outage hour(s). This is calculated by multiplying the actual duration of the derating (hours) by the size of the reduction (MW) and dividing by the Net Maximum Capacity (NMC). These equivalent hour(s) are then summed. $\frac{\text{Derating Hours} \times \text{Size of Reduction}^*}{NMC}$ NOTE: Includes Forced Deratings (D1, D2, and D3) during Reserve Shutdowns (RS). See calculation 13f (EFDHRS), Page F-4, for comparison.
13b.	Equivalent Maintenance Derated Hours - EMDH	Each individual Maintenance Derating (D4, DM of D4) is transformed into equivalent full outage hour(s). This is calculated by multiplying the actual duration of the derating (hours) by the size of reduction (MW) and dividing by the Net Maximum Capacity (NMC). These equivalent hour(s) are then summed. $\frac{\text{Derating Hours} \times \text{Size of Reduction}^*}{NMC}$ NOTE: Includes Maintenance Deratings (D4) during Reserve Shutdowns (RS). See calculation 13h (EMDHRS), Page F-5, for comparison.
13c.	Equivalent Planned Derated Hours - EPDH	Each individual Planned Derating (PD, DP of PD) is transformed into equivalent full outage hour(s). This is calculated by multiplying the actual duration of the derating (hours) by the size of reduction (MW) and dividing by the Net Maximum Capacity (NMC). These equivalent hour(s) are then summed.

$$\frac{\text{Derating Hours } \mathbf{x} \text{ Size of Reduction}^*}{\text{NMC}}$$

NOTE: Includes Planned Deratings (PD) during Reserve Shutdowns (RS).
See calculation 13g (EPDHRS), Page F-4, for comparison.

13d. Equivalent Scheduled Derated Hours - ESDH

Each individual Planned Derating (PD, DP of PD) and Maintenance Derating (D4, DM of D4) is transformed into equivalent full outage hour(s). This is calculated by multiplying the actual duration of the derating (hours) by the size of reduction (MW) and dividing by the Net Maximum Capacity (NMC). These equivalent hour(s) are then summed.

$$\frac{\text{Derating Hours } \mathbf{x} \text{ Size of Reduction}^*}{\text{NMC}}$$

13e. Equivalent Unplanned Derated Hours - EUDH

Each individual Unplanned Derating (D1, D2, D3, D4, and DM of D4) is transformed into equivalent full outage hour(s). This is calculated by multiplying the actual duration of the derating (hours) by the size of reduction (MW) and dividing by the Net Maximum Capacity (NMC). These equivalent hour(s) are then summed.

$$\frac{\text{Derating Hours } \mathbf{x} \text{ Size of Reduction}^*}{\text{NMC}}$$

NOTE: Includes Unplanned Deratings (D1, D2, D3, D4, and DM of D4) during Reserve Shutdowns (RS).

13f. Equivalent Forced Derated Hours During Reserve Shutdowns - EFDHRS

Each individual Forced Derating (D1, D2, and D3) or the portion of any Forced Derating which occurred during a Reserve Shutdown (RS) is transformed into equivalent full outage hour(s). This is calculated by multiplying the actual duration of the derating (hours) by the size of the reduction (MW) and dividing by the Net Maximum Capacity (NMC). These equivalent hour(s) are then summed.

$$\frac{\text{Derating Hours } \mathbf{x} \text{ Size of Reduction}^*}{\text{NMC}}$$

13g. Equivalent Planned Derated Hours During Reserve Shutdowns - EPDHRS

Each individual Planned Derating (PD) or the portion of any Planned Derating which occurred during a Reserve Shutdown (RS) is transformed into equivalent full outage hour(s). This is calculated by multiplying the actual duration of the derating (hours) by the size of the reduction (MW) and dividing by the Net Maximum

		Capacity (NMC). These equivalent hour(s) are then summed. Derating Hours **x** Size of Reduction* NMC
13h.	Equivalent Maintenance Derated Hours During Reserve Shutdowns - EMDHRS	Each individual Maintenance Derating (D4) or the portion of any Maintenance Derating which occurred during a Reserve Shutdown (RS) is transformed into equivalent full outage hour(s). This is calculated by multiplying the actual duration of the derating (hours) by the size of the reduction (MW) and dividing by the Net Maximum Capacity (NMC). These equivalent hour(s) are then summed. Derating Hours **x** Size of Reduction* NMC

** Size of Reduction is determined by subtracting the Net Available Capacity (NAC) from the Net Dependable Capacity (NDC). In cases of multiple deratings, the Size of Reduction of each derating will be determined by the difference in the Net Available Capacity of the unit prior to the derating and the reported Net Available Capacity as a result of the derating.*

14.	Number of Planned Outages (PO) which occur from in-service state only	A count of the number of all Planned Outages (PO) reported on the GADS Event Report (07). (Since Planned Outage Extensions (PE) of Planned Outages are considered part of the original Planned Outage (PO), they are not included in this count.)
15.	Number of Unplanned Outages (MO, U1, U2, and U3) which occur from in-service state only	A count of the number of all Unplanned Outages (U1, U2, U3, and MO) reported on the GADS Event Report (07). (IEEE Standard 762 does not include Startup Failures (SF) in this count.)
16.	Number of Forced Outages (U1, U2, and U3) which occur from in-service state only	A count of the number of all Unplanned (Forced) Outages (U1, U2, U3) reported on the GADS Event Report (07). (IEEE Standard 762 does not include Startup Failures (SF) in this count.)
17.	Number of Maintenance Outages (MO) which occur from in-service state only	A count of the number of all Maintenance Outages (MO) reported on the GADS Event Report (07). (Since Maintenance Outage Extensions (ME) of Maintenance Outages are considered part of the original Maintenance Outage (MO), they are not included in this count.)

Performance Indexes

The following sections describe performance indexes used to measure the performance of generating units. The sections are divided into:

- Unweighted (time-based) methods for calculating single unit statistics.
- Unweighted (time-based) methods for calculating pooled (grouped) unit statistics.
- Weighted (capacity-based) methods for calculating pooled (grouped) unit statistics.
- Unweighted (time-based) methods for calculating statistics excluding problems outside management control for single unit and pooled (grouped) unit statistics.
- Weighted (capacity-based) methods for calculating statistics excluding problems outside management control for pooled (grouped) unit statistics.

Calculation Notes

Please note that when you are calculating a single generating unit's performance statistics, it does not matter much if you use unweighted or weighted statistics. If the weighting (NMC) does not vary over the analysis time period it will cancel out and not matter. If NMC varies over the analysis time period it will make a small difference. The real difference between the unweighted and weighted statistics is in pooled (grouped) sets of generating units. In these cases, a group of units of similar size will show only small differences, but a group of units where the MW size is very different (greater than 50 MW), the statistics will be very different.

With unweighted statistics, all units are considered equal in outage impact. In the unweighted equations, no MW size is introduced into the equations and the results are based on time, not energy produced or not produced. In such cases, a 50 MW gas turbine and a 1,000 MW nuclear unit have the same impact on the resulting statistics.

With weighted statistics, the larger MW size unit in the group has more impact on the final statistics than a smaller generating unit. That is because the MW size of the unit (NMC) is part of the equation. In these cases, a 1,000 MW nuclear unit would have 20 times impact on the final outcome of the calculation than would its 50 MW gas turbine companion.

Data Pooling Notes

When grouping a fleet of units of dissimilar size and/or duty cycle, weighting puts the proper relative weight of each unit's contribution into the fleet's composite statistics.

Using the unweighted equations currently in the IEEE 762 Standard (Section 9), an older, smaller, and little-run unit will have just as much weight as a newer, larger, base-load unit. The effect of this could unrealistically and disproportionately swing the fleet unweighted averages too high (for a very high availability on a small unit) or too low (for a very low availability on a small unit).

However, the current IEEE 762 Standard's unweighted equations should not be abandoned even for group statistics. There are valid applications for this method as well. (One being purely to evaluate equipment reliability and availability regardless of size).

The weighted calculations, although primarily needed for grouping units' performance indexes, may apply to individual units as well. The effect depends on how much a unit's net maximum capacities (NMC) changes during the time period in question.

SPECIAL NOTE: *To weight an equation, one does not simply take each unit's EFOR, for example, and multiply the EFOR by the NMC, add them up and divide by the sum of the NMCs. Each term in the equation must be multiplied by the NMC and then all the products are summed over all the units.*

Unweighted (time-based) Methods for Calculating Single Unit Statistics

1. Planned Outage Factor – POF

$$\mathbf{POF} = \frac{\mathbf{POH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

2. Unplanned Outage Factor – UOF

$$\mathbf{UOF} = \frac{\mathbf{UOH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

$$\mathbf{UOF} = \frac{\mathbf{FOH+MOH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

3. Forced Outage Factor – FOF

$$\mathbf{FOF} = \frac{\mathbf{FOH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

4. Maintenance Outage Factor – MOF

$$\mathbf{MOF} = \frac{\mathbf{MOH}}{\mathbf{PH}} \mathbf{x\ 100\ \%}$$

5. Scheduled Outage Factor – SOF

$$\mathbf{SOF} = \frac{\mathbf{SOH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

$$\mathbf{SOF} = \frac{\mathbf{MOH + POH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

6. Unavailability Factor – UF

$$\mathbf{UF} = \frac{\mathbf{UH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

$$\mathbf{UF} = \frac{\mathbf{FOH + MOH + POH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

7. Availability Factor – AF

$$\mathbf{AF} = \frac{\mathbf{AH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

$$\mathbf{AF} = \frac{\mathbf{RSH + SH + Synchronous\ Condensing\ Hours + Pumping\ Hours}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

8. Service Factor – SF

$$\mathbf{SF} = \frac{\mathbf{SH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

9. Seasonal Derating Factor – SEDF

$$\mathbf{SEDF} = \frac{\mathbf{ESEDH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

10. Unit Derating Factor – UDF

$$\mathbf{UDF} = \frac{\mathbf{EPDH + EUDH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

$$\mathbf{UDF} = \frac{\mathbf{EPDH + EMDH + EFDH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

11. Equivalent Unavailability Factor – EUF

$$\mathbf{EUF} = \frac{\mathbf{UOH + POH + EUDH + EPDH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

$$\mathbf{EUF} = \frac{\mathbf{FOH + SOH + EFDH + ESDH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

$$\mathbf{EUF} = \frac{\mathbf{FOH + MOH + POH + EFDH + EMDH + EPDH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

12. Equivalent Availability Factor – EAF

$$\mathbf{EAF} = \frac{\mathbf{AH - EPDH - EUDH - ESEDH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

$$\mathbf{EAF} = \frac{\mathbf{AH - EPDH - EFDH - EMDH - ESEDH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

13. Gross Capacity Factor – GCF

$$\mathbf{GCF} = \frac{\mathbf{Gross\ Actual\ Generation}}{\mathbf{PH\ x\ GMC}} \mathbf{\ x\ 100\%}$$

14. Net Capacity Factor – NCF

$$\mathbf{NCF} = \frac{\mathbf{Net\ Actual\ Generation}}{\mathbf{PH\ x\ NMC}} \mathbf{\ x\ 100\%}$$

Note: *Net capacity factor calculated using this equation can be negative during a period when the unit is shutdown.*

15. Gross Output Factor – GOF

$$\mathbf{GOF} = \frac{\mathbf{Gross\ Actual\ Generation}}{\mathbf{SH\ x\ GMC}} \mathbf{\ x\ 100\%}$$

16. Net Output Factor – NOF

$$\mathbf{NOF} = \frac{\mathbf{Net\ Actual\ Generation}}{\mathbf{SH\ x\ NMC}} \mathbf{\ x\ 100\%}$$

17. Equivalent Maintenance Outage Factor – EMOF

$$\mathbf{EMOF} = \frac{\mathbf{MOH + EMDH}}{\mathbf{PH}} \mathbf{\ x\ 100\%}$$

18. Equivalent Planned Outage Factor – EPOF

$$\mathbf{EPOF} = \frac{\mathbf{POH + EPDH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

19. Equivalent Forced Outage Factor – EFOF

$$\mathbf{EFOF} = \frac{\mathbf{FOH + EFDH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

20. Equivalent Scheduled Outage Factor – ESOF

$$\mathbf{ESOF} = \frac{\mathbf{SOH + ESDH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

$$\mathbf{ESOF} = \frac{\mathbf{MOH + POH + EMDH + EPDH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

21. Equivalent Unplanned Outage Factor – EUOF

$$\mathbf{EUOF} = \frac{\mathbf{UOH + EUDH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

$$\mathbf{EUOF} = \frac{\mathbf{MOH + FOH + EMDH + EFDH}}{\mathbf{PH}} \mathbf{x\ 100\%}$$

(NOTE: This EUOF is identical to the Unit Capability Loss Factor except this equation includes all events, including those outside plant management control.)

22. Forced Outage Rate – FOR

$$\mathbf{FOR} = \frac{\mathbf{FOH}}{\mathbf{FOH + SH + Synchronous\ Condensing\ Hours + Pumping\ Hours}} \mathbf{x\ 100\%}$$

23. Forced Outage Rate Demand – FORd (See Notes 1 and 2 at the end of this section.)

$$\mathbf{FORd} = \frac{\mathbf{FOHd}}{\mathbf{FOHd + SH}} \mathbf{x\ 100\%}$$

Where: FOHd = f x FOH

NOTE: FOHd is the number of hours a unit was in a U1, U2, U3, or SF AND the unit would have operated had it been available. FOHd can be determined directly if periods of demand are recorded. Demand can be defined as the traditional demand for the generating unit for economic or reliable operation of the system, or it can be any other user-defined condition, such as specific weather condition, load level, or energy price. When FOHd is determined directly from recorded periods of demand, service hours (SH) in the above equation should include only those under the specified demand condition. If periods of demand are not recorded, FOHd may be estimated using the demand factor f. The demand factor is applicable to traditional demand for economic or reliable system operation.

$$f = (\frac{1}{r} + \frac{1}{T})/(\frac{1}{r} + \frac{1}{T} + \frac{1}{D})$$

r=Average forced outage duration = (FOH) / (# of FO occurrences)
D=Average demand time = (SH) / (# of unit actual starts)
T=Average reserve shutdown time = (RSH) / (# of unit attempted starts)

24. Equivalent Forced Outage Rate – EFOR

$$\mathbf{EFOR} = \frac{\mathbf{FOH + EFDH}}{\mathbf{FOH + SH + Synchronous\ Condensing\ Hours + Pumping\ Hours + EFDHRS}}\ \mathbf{x\ 100\%}$$

25. Equivalent Forced Outage Rate demand – EFORd (See Notes 1 and 2 at the end of this section.)

$$\mathbf{EFORd} = \frac{\mathbf{FOHd + EFDHd}}{\mathbf{SH + FOHd}}\ \mathbf{x\ 100\%}$$

Where: FOHd = f x FOH
EFDHd = (EFDH – EFDHRS) if reserve shutdown events reported, or
= (fp x EFDH) if no reserve shutdown events reported – an approximation.
fp = (SH/AH)

NOTE: FOHd is the number of hours a unit was in a U1, U2, U3, or SF AND the unit would have operated had it been available. FOHd can be determined directly if periods of demand are recorded. Demand can be defined as the traditional demand for the generating unit for economic or reliable operation of the system, or it can be any other user-defined condition, such as specific weather condition, load level, or energy price. When FOHd is determined directly from recorded periods of demand, service hours (SH) in the above equation should include only those under the specified demand condition. If periods of demand are not recorded, FOHd may be estimated using the demand factor f. The demand factor is applicable to traditional demand for economic or reliable system operation.

$$f = (\tfrac{1}{r} + \tfrac{1}{T})/(\tfrac{1}{r} + \tfrac{1}{T} + \tfrac{1}{D})$$

r=Average forced outage deration = (FOH) / (# of FO occurrences)
D=Average demand time = (SH) / (# of unit actual starts)
T=Average reserve shutdown time = (RSH) / (# of unit attempted starts)

26. Equivalent Planned Outage Rate – EPOR

$$\mathbf{EPOR} = \frac{\mathbf{POH + EPDH}}{\mathbf{POH + SH + Synchronous\ Condensing\ Hours + Pumping\ Hours + EPDHRS}}\ \mathbf{x\ 100\%}$$

27. Equivalent Maintenance Outage Rate – EMOR

$$\mathbf{EMOR} = \frac{\mathbf{MOH + EMDH}}{\mathbf{MOH + SH + Synchronous\ Condensing\ Hours + Pumping\ Hours + EMDHRS}}\ \mathbf{x\ 100\%}$$

28. Equivalent Unplanned Outage Rate – EUOR

$$\mathbf{EUOR} = \frac{\mathbf{UOH + EUDH}}{\mathbf{UOH + SH + Synchronous\ Condensing\ Hours + Pumping\ Hours + EUDHRS}}\ \mathbf{x\ 100\%}$$

$$\mathbf{EUOR} = \frac{\mathbf{FOH + EFDH + MOH + EMDH}}{\mathbf{FOH + MOH + SH + Synchronous\ Condensing\ Hours + Pumping\ Hours + EFDHRS + EMDHRS}}\ \mathbf{x\ 100\%}$$

29. Average Run Time – ART

$$\mathbf{ART} = \frac{\mathbf{SH}}{\mathbf{Actual\ Unit\ Starts}}$$

30. Starting Reliability – SR

$$\mathbf{SR} = \frac{\textbf{Actual Unit Starts}}{\textbf{Attempted Unit Starts}} \mathbf{x\ 100\%}$$

Mean Service Time to Outage:

31a. Mean Service Time to Planned Outage – MSTPO

$$\mathbf{MSTPO} = \frac{\textbf{SH}}{\textbf{Number of Planned Outages which occur from in-service state only}}$$

31b. Mean Service Time to Unplanned Outage – MSTUO

$$\mathbf{MSTUO} = \frac{\textbf{SH}}{\textbf{Number of Unplanned Outages which occur from in-service state only}}$$

31c. Mean Service Time to Forced Outage – MSTFO

$$\mathbf{MSTFO} = \frac{\textbf{SH}}{\textbf{Number of Forced Outages which occur from in-service state only}}$$

31d. Mean Service Time to Maintenance Outage – MSTMO

$$\mathbf{MSTMO} = \frac{\textbf{SH}}{\textbf{Number of Maintenance Outages which occur from in-service state only}}$$

Mean Outage Duration:

32a. Mean Planned Outage Duration – MPOD

$$\mathbf{MPOD} = \frac{\textbf{Planned Outage Hours which occur from in-service state only}}{\textbf{Number of Planned Outages which occur from in-service state only}}$$

32b. Mean Unplanned Outage Duration – MUOD

$$\mathbf{MUOD} = \frac{\textbf{Unplanned Outage Hours which occur from in-service state only}}{\textbf{Number of Unplanned Outages which occur from in-service state only}}$$

32c. Mean Forced Outage Duration – MFOD

$$\mathbf{MFOD} = \frac{\textbf{Forced Outage Hours which occur from in-service state only}}{\textbf{Number of Forced Outages which occur from in-service state only}}$$

32d. Mean Maintenance Outage Duration – MMOD

$$\mathbf{MMOD} = \frac{\textbf{Maintenance Outage Hours which occur from in-service state only}}{\textbf{Number of Maintenance Outages which occur from in-service state only}}$$

Unweighted (time-based) methods for calculating pooled (grouped) unit statistics

33. Planned Outage Factor – POF

$$\mathbf{POF} = \frac{\Sigma\ \textbf{POH}}{\Sigma\ \textbf{PH}} \mathbf{x\ 100\%}$$

34. Unplanned Outage Factor – UOF

$$\mathbf{UOF} = \frac{\mathbf{\Sigma\ (FOH + MOH)}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

35. Forced Outage Factor – FOF

$$\mathbf{FOF} = \frac{\mathbf{\Sigma\ FOH}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

36. Maintenance Outage Factor – MOF

$$\mathbf{MOF} = \frac{\mathbf{\Sigma\ MOH}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

37. Scheduled Outage Factor – SOF

$$\mathbf{SOF} = \frac{\mathbf{\Sigma\ (POH + MOH)}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

38. Unavailability Factor – UF

$$\mathbf{UF} = \frac{\mathbf{\Sigma\ (POH + MOH + FOH)}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

39. Availability Factor – AF

$$\mathbf{AF} = \frac{\mathbf{\Sigma\ AH}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

$$\mathbf{AF} = \frac{\mathbf{\Sigma\ (SH + RSH + Symchronous\ Condensing\ Hours + Pumping\ Hours)}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

40. Service Factor – SF

$$\mathbf{SF} = \frac{\mathbf{\Sigma\ SH}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

41. Seasonal Derating Factor – SEDF

$$\mathbf{SEDF} = \frac{\mathbf{\Sigma\ ESEDH}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

42. Unit Derating Factor – UDF

$$\mathbf{UDF} = \frac{\mathbf{\Sigma\ (EUDH + EPDH)}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

$$\mathbf{UDF} = \frac{\mathbf{\Sigma\ (EFDH + EMDH + EPDH)}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

43. Equivalent Unavailability Factor – EUF

$$\mathbf{EUF} = \frac{\mathbf{\Sigma\ (POH + UOH + EUDH + EPDH)}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

$$\mathbf{EUF} = \frac{\mathbf{\Sigma\ (SOH + FOH + ESDH + EFDH)}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

$$\mathbf{EUF} = \frac{\mathbf{\Sigma\ (POH + MOH + FOH + EFDH + EMDH + EPDH)}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

44. Equivalent Availability Factor – EAF

$$\mathbf{EAF} = \frac{\mathbf{\Sigma\ (AH - EUDH - EPDH - ESEDH)}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

$$\mathbf{EAF} = \frac{\mathbf{\Sigma\ (AH - EFDH - EMDH - EPDH - ESEDH)}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

45. Gross Capacity Factor – GCF *

$$\mathbf{GCF} = \frac{\mathbf{\Sigma\ (Gross\ Actual\ Generation)}}{\mathbf{\Sigma\ (GMC\ x\ PH)}}\mathbf{x\ 100\%}$$

46. Net Capacity Factor – NCF *

$$\mathbf{NCF} = \frac{\mathbf{\Sigma\ (Net\ Actual\ Generation)}}{\mathbf{\Sigma\ (NMC\ x\ PH)}}\mathbf{x\ 100\%}$$

47. Gross Output Factor – GOF *

$$\mathbf{GOF} = \frac{\mathbf{\Sigma\ (Gross\ Actual\ Generation)}}{\mathbf{\Sigma\ (GMC\ x\ SH)}}\mathbf{x\ 100\%}$$

48. Net Output Factor – NOF *

$$\mathbf{NOF} = \frac{\mathbf{\Sigma\ (Net\ Actual\ Generation)}}{\mathbf{\Sigma\ (NMC\ x\ SH)}}\mathbf{x\ 100\%}$$

49. Equivalent Maintenance Outage Factor – EMOF

$$\mathbf{EMOF} = \frac{\mathbf{\Sigma\ (MOH + EMDH)}}{\mathbf{\Sigma\ PH}}\mathbf{x\ 100\%}$$

*These are “energy term” (GCF, NCF, GOF, NOF) statistics, and are inherently energy-weighted. These equations are the same as IEEE-762 9.12 – 9.15. When calculating for a group of units (or a unit that has a varying capacity value over time), do not average the capacities shown in the denominators. Follow the equations.

50. Equivalent Planned Outage Factor – EPOF

$$\mathbf{EPOF} = \frac{\mathbf{\Sigma\ (POH + EPDH)}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

51. Equivalent Forced Outage Factor – EFOF

$$\mathbf{EFOF} = \frac{\mathbf{\Sigma\ (FOH + EFDH)}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

52. Equivalent Scheduled Outage Factor – ESOF

$$\mathbf{ESOF} = \frac{\mathbf{\Sigma\ (SOH + ESDH)}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

$$\mathbf{ESOF} = \frac{\mathbf{\Sigma\ (MOH + POH + EMDH + EPDH)}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

53. Equivalent Unplanned Outage Factor – EUOF

$$\mathbf{EUOF} = \frac{\mathbf{\Sigma\ (UOH + EUDH)}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

$$\mathbf{EUOF} = \frac{\mathbf{\Sigma\ (MOH\ + FOH + EMDH + EFDH)}}{\mathbf{\Sigma\ PH}}\ \mathbf{x\ 100\%}$$

54. Forced Outage Rate – FOR

$$\mathbf{FOR} = \frac{\mathbf{\Sigma\ FOH}}{\mathbf{\Sigma\ (FOH + SH + Synchronous\ Condensing\ Hours + Pumping\ Hours)}}\ \mathbf{x\ 100\%}$$

55. Forced Outage Rate demand – FORd (See Notes 1 and 2 at the end of this section.)

$$\mathbf{FORd} = \frac{\mathbf{\Sigma\ FOHd}}{\mathbf{\Sigma\ (FOHd + SH)}}\ \mathbf{x\ 100\%}$$

Where: FOHd = f x FOH

NOTE: FOHd is the number of hours a unit was in a U1, U2, U3, or SF AND the unit would have operated had it been available. FOHd can be determined directly if periods of demand are recorded. Demand can be defined as the traditional demand for the generating unit for economic or reliable operation of the system, or it can be any other user-defined condition, such as specific weather condition, load level, or energy price. When FOHd is determined directly from recorded periods of demand, service hours (SH) in the above equation should include only those under the specified demand condition. If periods of demand are not recorded, FOHd may be estimated using the demand factor f. The demand factor is applicable to traditional demand for economic or reliable system operation.

$$f = (\tfrac{1}{r} + \tfrac{1}{T})/(\tfrac{1}{r} + \tfrac{1}{T} + \tfrac{1}{D})$$

r=Average forced outage duration = (FOH) / (# of FO occurrences)
D=Average demand time = (SH) / (# of unit actual starts)
T=Average reserve shutdown time = (RSH) / (# of unit attempted starts)

56. Equivalent Forced Outage Rate – EFOR

$$\mathbf{EFOR} = \frac{\mathbf{\Sigma\ (FOH + EFDH)}}{\mathbf{\Sigma\ (FOH + SH + Synchronous\ Condensing\ Hours + Pumping\ Hours + EFDHRS)}}\ \mathbf{x\ 100\%}$$

57. Equivalent Forced Outage Rate demand – EFORd (See Notes 1 and 2 at the end of this section.)

$$\mathbf{EFORd} = \frac{\mathbf{\Sigma\ (FOHd + EFDHd)}}{\mathbf{\Sigma\ (SH + FOHd)}}\ \mathbf{x\ 100\%}$$

Where: FOHd = f x FOH
EFDHd = (EFDH – EFDHRS) if reserve shutdown events reported, or
= (fp x EFDH) if no reserve shutdown events reported – an approximation.
fp = (SH/AH)

NOTE: FOHd is the number of hours a unit was in a U1, U2, U3, or SF AND the unit would have operated had it been available. FOHd can be determined directly if periods of demand are recorded. Demand can be defined as the traditional demand for the generating unit for economic or reliable operation of the system, or it can be any other user-defined condition, such as specific weather condition, load level, or energy price. When FOHd is determined directly from recorded periods of demand, service hours (SH) in the above equation should include only those under the specified demand condition. If periods of demand are not recorded, FOHd may be estimated using the demand factor f. The demand factor is applicable to traditional demand for economic or reliable system operation.

$$f = (\frac{1}{r} + \frac{1}{T})/(\frac{1}{r} + \frac{1}{T} + \frac{1}{D})$$

r=Average forced outage deration = (FOH) / (# of FO occurrences)
D=Average demand time = (SH) / (# of unit actual starts)
T=Average reserve shutdown time = (RSH) / (# of unit attempted starts)

58. Equivalent Planned Outage Rate – EPOR

$$\mathbf{EPOR} = \frac{\mathbf{\Sigma\ (POH + EPDH)}}{\mathbf{\Sigma\ (POH + SH + Synchronous\ Condensing\ Hours + Pumping\ Hours + EPDHRS)}}\ \mathbf{x\ 100\%}$$

59. Equivalent Maintenance Outage Rate – EMOR

$$\mathbf{EMOR} = \frac{\mathbf{\Sigma\ (MOH + EMDH)}}{\mathbf{\Sigma\ (MOH + SH + Synchronous\ Condensing\ Hours + Pumping\ Hours + EMDHRS)}}\ \mathbf{x\ 100\%}$$

60. Equivalent Unplanned Outage Rate – EUOR

$$\mathbf{EUOR} = \frac{\mathbf{\Sigma\ (UOH + EUDH)}}{\mathbf{\Sigma\ (UOH + SH + Synchronous\ Condensing\ Hours + Pumping\ Hours + EUDHRS)}}\ \mathbf{x\ 100\%}$$

$$\mathbf{EUOR} = \frac{\mathbf{\Sigma\ (FOH + EFDH + MOH + EMDH)}}{\mathbf{\Sigma\ (FOH + MOH + SH + Synchronous\ Condensing\ Hours + Pumping\ Hours + EFDHRS + EMDHRS)}}\ \mathbf{x\ 100\%}$$

61. Average Run Time – ART

$$\mathbf{ART} = \frac{\mathbf{\Sigma\ SH}}{\mathbf{\Sigma\ Actual\ Unit\ Starts}}$$

62. Starting Reliability – SR

$$\mathbf{SR} = \frac{\mathbf{\Sigma\ Actual\ Unit\ Starts}}{\mathbf{\Sigma\ Attempted\ Unit\ Starts}}\ \mathbf{x\ 100\%}$$

Mean Service Time to Outage:

63a. Mean Service Time to Planned Outage – MSTPO

$$\mathbf{MSTPO} = \frac{\mathbf{\Sigma\ SH}}{\mathbf{\Sigma\ Number\ of\ Planned\ Outages\ which\ occur\ from\ in-service\ state\ only}}$$

63b. Mean Service Time to Unplanned Outage – MSTUO

$$\mathbf{MSTUO} = \frac{\mathbf{\Sigma\ SH}}{\mathbf{\Sigma\ Number\ of\ Unplanned\ Outages\ which\ occur\ from\ in-service\ state\ only}}$$

63c. Mean Service Time to Forced Outage – MSTFO

$$\mathbf{MSTFO} = \frac{\mathbf{\Sigma\ SH}}{\mathbf{\Sigma\ Number\ of\ Forced\ Outages\ which\ occur\ from\ in-service\ state\ only}}$$

63d. Mean Service Time to Maintenance Outage – MSTMO

$$\mathbf{MSTMO} = \frac{\mathbf{\Sigma\ SH}}{\mathbf{\Sigma\ Number\ of\ Maintenance\ Outages\ which\ occur\ from\ in-service\ state\ only}}$$

Mean Outage Duration:

64a. Mean Planned Outage Duration – MPOD

$$\mathbf{MPOD} = \frac{\mathbf{\Sigma\ Planned\ Outage\ Hours\ which\ occur\ from\ in-service\ state\ only}}{\mathbf{\Sigma\ Number\ of\ Planned\ Outages\ which\ occur\ from\ in-service\ state\ only}}$$

64b. Mean Unplanned Outage Duration – MUOD

$$\mathbf{MUOD} = \frac{\mathbf{\Sigma\ Unplanned\ Outage\ Hours\ which\ occur\ from\ in-service\ state\ only}}{\mathbf{\Sigma\ Number\ of\ Unplanned\ Outages\ which\ occur\ from\ in-service\ state\ only}}$$

64c. Mean Forced Outage Duration – MFOD

$$\mathbf{MFOD} = \frac{\mathbf{\Sigma\ Forced\ Outage\ Hours\ which\ occur\ from\ in-service\ state\ only}}{\mathbf{\Sigma\ Number\ of\ Forced\ Outages\ which\ occur\ from\ in-service\ state\ only}}$$

64d. Mean Maintenance Outage Duration – MMOD

$$\mathbf{MMOD} = \frac{\mathbf{\Sigma\ Maintenance\ Outage\ Hours\ which\ occur\ from\ in-service\ state\ only}}{\mathbf{\Sigma\ Number\ of\ Maintenance\ Outages\ which\ occur\ from\ in-service\ state\ only}}$$

Weighted (capacity-based) methods for calculating pooled (grouped) unit statistics

65. Weighted Forced Outage Factor – WFOF

$$\mathbf{WFOF} = \frac{\mathbf{\Sigma\ (FOH\ x\ NMC)}}{\mathbf{\Sigma\ (PH\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

66. Weighted Maintenance Outage Factor – WMOF

$$\mathbf{WMOF} = \frac{\mathbf{\Sigma\ (MOH\ x\ NMC)}}{\mathbf{\Sigma\ (PH\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

67. Weighted Planned Outage Factor – WPOF

$$\mathbf{WPOF} = \frac{\mathbf{\Sigma\ (POH\ x\ NMC)}}{\mathbf{\Sigma\ (PH\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

68. Weighted Unplanned Outage Factor – WUOF

$$\mathbf{WUOF} = \frac{\mathbf{\Sigma\ (UOH\ x\ NMC)}}{\mathbf{\Sigma\ (PH\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

$$\mathbf{WUOF} = \frac{\mathbf{\Sigma\ ((FOH + MOH)\ x\ NMC)}}{\mathbf{\Sigma\ (PH\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

69. Weighted Scheduled Outage Factor – WSOF

$$\mathbf{WSOF} = \frac{\mathbf{\Sigma\ (SOH\ x\ NMC)}}{\mathbf{\Sigma\ (PH\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

$$\mathbf{WSOF} = \frac{\mathbf{\Sigma\ ((POH + MOH)\ x\ NMC)}}{\mathbf{\Sigma\ (PH\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

70. Weighted Unavailability Factor – WUF

$$\mathbf{WUF} = \frac{\mathbf{\Sigma\ ((FOH +\ MOH + POH)\ x\ NMC)}}{\mathbf{\Sigma\ (PH\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

71. Weighted Availability Factor – WAF

$$\mathbf{WAF} = \frac{\mathbf{\Sigma\ (AH\ x\ NMC)}}{\mathbf{\Sigma\ (PH\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

72. Weighted Service Factor – WSF

$$\mathbf{WSF} = \frac{\mathbf{\Sigma\ (SH\ x\ NMC)}}{\mathbf{\Sigma\ (PH\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

73. Weighted Seasonal Derating Factor – WSEDF

$$\mathbf{WSEDF} = \frac{\mathbf{\Sigma\ (ESEDH\ x\ NMC)}}{\mathbf{\Sigma\ (PH\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

74. Weighted Unit Derating Factor – WUDF

$$\mathbf{WUDF} = \frac{\mathbf{\Sigma\ ((EUDH + EPDH)\ x\ NMC)}}{\mathbf{\Sigma\ (PH\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

$$\mathbf{WUDF} = \frac{\mathbf{\Sigma\ ((EFDH + EMDH + EPDH)\ x\ NMC)}}{\mathbf{\Sigma\ (PH\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

75. Weighted Equivalent Unavailability Factor – WEUF

$$\mathbf{WEUF} = \frac{\mathbf{\Sigma\ ((POH + UOH + EUDH + EPDH)\ x\ NMC)}}{\mathbf{\Sigma\ (PH\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

$$\mathbf{WEUF} = \frac{\mathbf{\Sigma\ ((SOH + FOH + ESDH + EFDH)\ x\ NMC)}}{\mathbf{\Sigma\ (PH\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

$$\mathbf{WEUF} = \frac{\mathbf{\Sigma\ ((POH + MOH + FOH + EFDH + EMDH + EPDH)\ x\ NMC)}}{\mathbf{\Sigma\ (PH\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

76. Weighted Equivalent Availability Factor – WEAF

$$\mathbf{WEAF} = \frac{\mathbf{\Sigma\ ((AH - EUDH - EPDH - ESEDH)\ x\ NMC)}}{\mathbf{\Sigma\ (PH\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

$$\mathbf{WEAF} = \frac{\Sigma\left((\mathbf{AH} - \mathbf{EFDH} - \mathbf{EMDH} - \mathbf{EPDH} - \mathbf{ESEDH})\ \mathbf{x}\ \mathbf{NMC}\right)}{\Sigma\ (\mathbf{PH}\ \mathbf{x}\ \mathbf{NMC})}\ \mathbf{x}\ \mathbf{100}\%$$

77. Gross Capacity Factor – GCF *

$$\mathbf{GCF} = \frac{\Sigma\ (\mathbf{Gross\ Actual\ Generation})}{\Sigma\ (\mathbf{GMC}\ \mathbf{x}\ \mathbf{PH})}\mathbf{x}\ \mathbf{100}\%$$

78. Net Capacity Factor – NCF *

$$\mathbf{NCF} = \frac{\Sigma\ (\mathbf{Net\ Actual\ Generation})}{\Sigma\ (\mathbf{NMC}\ \mathbf{x}\ \mathbf{PH})}\mathbf{x}\ \mathbf{100}\%$$

79. Gross Output Factor – GOF *

$$\mathbf{GOF} = \frac{\Sigma\ (\mathbf{Gross\ Actual\ Generation})}{\Sigma\ (\mathbf{GMC}\ \mathbf{x}\ \mathbf{SH})}\mathbf{x}\ \mathbf{100}\%$$

80. Net Output Factor – NOF *

$$\mathbf{NOF} = \frac{\Sigma\ (\mathbf{Net\ Actual\ Generation})}{\Sigma\ (\mathbf{NMC}\ \mathbf{x}\ \mathbf{SH})}\mathbf{x}\ \mathbf{100}\%$$

*These are "energy term" (GCF, NCF, GOF, NOF) statistics, and are inherently energy-weighted. These equations are the same as IEEE-762 10.12 – 10.15. When calculating for a group of units (or a unit that has a varying capacity value over time), do not average the capacities shown in the denominators. Follow the equations.

81. Weighted Equivalent Maintenance Outage Factor – WEMOF

$$\mathbf{WEMOF} = \frac{\Sigma\left((\mathbf{MOH} + \mathbf{EMDH})\ \mathbf{x}\ \mathbf{NMC}\right)}{\Sigma\ (\mathbf{PH}\ \mathbf{x}\ \mathbf{NMC})}\ \mathbf{x}\ \mathbf{100}\%$$

82. Weighted Equivalent Planned Outage Factor – WEPOF

$$\mathbf{WEPOF} = \frac{\Sigma\left((\mathbf{POH} + \mathbf{EPDH})\ \mathbf{x}\ \mathbf{NMC}\right)}{\Sigma\ (\mathbf{PH}\ \mathbf{x}\ \mathbf{NMC})}\ \mathbf{x}\ \mathbf{100}\%$$

83. Weighted Equivalent Forced Outage Factor – WEFOF

$$\mathbf{WEFOF} = \frac{\Sigma\left((\mathbf{FOH} + \mathbf{EFDH})\ \mathbf{x}\ \mathbf{NMC}\right)}{\Sigma\ (\mathbf{PH}\ \mathbf{x}\ \mathbf{NMC})}\ \mathbf{x}\ \mathbf{100}\%$$

84. Weighted Equivalent Scheduled Outage Factor – WESOF

$$\mathbf{WESOF} = \frac{\Sigma\left((\mathbf{SOH} + \mathbf{ESDH})\ \mathbf{x}\ \mathbf{NMC}\right)}{\Sigma\ (\mathbf{PH}\ \mathbf{x}\ \mathbf{NMC})}\ \mathbf{x}\ \mathbf{100}\%$$

$$\mathbf{WESOF} = \frac{\Sigma\left((\mathbf{MOH} + \mathbf{POH} + \mathbf{EMDH} + \mathbf{EPDH})\ \mathbf{x}\ \mathbf{NMC}\right)}{\Sigma\ (\mathbf{PH}\ \mathbf{x}\ \mathbf{NMC})}\ \mathbf{x}\ \mathbf{100}\%$$

85. Weighted Equivalent Unplanned Outage Factor – WEUOF

$$\mathbf{WEUOF} = \frac{\Sigma\left((\mathbf{UOH} + \mathbf{EUDH})\ \mathbf{x}\ \mathbf{NMC}\right)}{\Sigma\ (\mathbf{PH}\ \mathbf{x}\ \mathbf{NMC})}\ \mathbf{x}\ \mathbf{100}\%$$

$$\mathbf{WEUOF} = \frac{\mathbf{\Sigma\ ((MOH + FOH + EFDH + EMDH)\ x\ NMC)}}{\mathbf{\Sigma\ (PH\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

(NOTE: This is identical to the Weighted Unit Capability Loss Factor except this equation includes all events, including those outside plant management control.)

86. Weighted Forced Outage Rate – WFOR

$$\mathbf{WFOR} = \frac{\mathbf{\Sigma\ (FOH\ x\ NMC)}}{\mathbf{\Sigma\ ((FOH + SH + Sychnronous\ Condensing\ Hours + Pumping\ Hours)\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

87. Weighted Forced Outage Rate demand – WFORd (See Notes 1 and 2 at the end of this section.)

$$\mathbf{WFORd} = \frac{\mathbf{\Sigma\ (FOHd\ x\ NMC)}}{\mathbf{\Sigma\ ((FOHd + SH)\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

Where: FOHd = f x FOH

NOTE: FOHd is the number of hours a unit was in a U1, U2, U3, or SF AND the unit would have operated had it been available. FOHd can be determined directly if periods of demand are recorded. Demand can be defined as the traditional demand for the generating unit for economic or reliable operation of the system, or it can be any other user-defined condition, such as specific weather condition, load level, or energy price. When FOHd is determined directly from recorded periods of demand, service hours (SH) in the above equation should include only those under the specified demand condition. If periods of demand are not recorded, FOHd may be estimated using the demand factor f. The demand factor is applicable to traditional demand for economic or reliable system operation.

$$f = (\tfrac{1}{r} + \tfrac{1}{T})/(\tfrac{1}{r} + \tfrac{1}{T} + \tfrac{1}{D})$$

r=Average forced outage duration = (FOH) / (# of FO occurrences)
D=Average demand time = (SH) / (# of unit actual starts)
T=Average reserve shutdown time = (RSH) / (# of unit attempted starts)

88. Weighted Equivalent Forced Outage Rate – WEFOR

$$\mathbf{WEFOR} = \frac{\mathbf{\Sigma\ ((FOH + EFDH)\ x\ NMC)}}{\mathbf{\Sigma\ ((FOH + SH + Synchronous\ Condensing\ Hours + Pumping\ Hours + EFDHRS)\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

89. Weighted Equivalent Forced Outage Rate demand – WEFORd (See Notes 1 and 2 at the end of this section.)

$$\mathbf{WEFORd} = \frac{\mathbf{\Sigma\ ((FOHd + EFDHd)\ x\ NMC)}}{\mathbf{\Sigma\ ((SH + FOHd)\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

Where: FOHd = f x FOH
EFDHd = (EFDH – EFDHRS) if reserve shutdown events reported, or
= (fp x EFDH) if no reserve shutdown events reported – an approximation.
fp = (SH/AH)

NOTE: FOHd is the number of hours a unit was in a U1, U2, U3, or SF AND the unit would have operated had it been available. FOHd can be determined directly if periods of demand are recorded. Demand can be defined as the traditional demand for the generating unit for economic or reliable operation of the system, or it can be any other user-defined condition, such as specific weather condition, load level, or energy price. When FOHd is determined directly from recorded periods of demand, service hours (SH) in the above equation should include

only those under the specified demand condition. If periods of demand are not recorded, FOHd may be estimated using the demand factor f. The demand factor is applicable to traditional demand for economic or reliable system operation.

$$f = (\frac{1}{r} + \frac{1}{T})/(\frac{1}{r} + \frac{1}{T} + \frac{1}{D})$$

r=Average forced outage deration = (FOH) / (# of FO occurrences)
D=Average demand time = (SH) / (# of unit actual starts)
T=Average reserve shutdown time = (RSH) / (# of unit attempted starts)

90. Weighted Equivalent Planned Outage Rate – WEPOR

$$\mathbf{WEPOR} = \frac{\mathbf{\Sigma((POH + EPDH)\ x\ NMC)}}{\mathbf{\Sigma((POH + SH + Synchronous\ Condensing\ Hours + Pumping\ Hours + EPDHRS)\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

91. Weighted Equivalent Maintenance Outage Rate – WEMOR

$$\mathbf{WEMOR} = \frac{\mathbf{\Sigma((MOH + EMDH)\ x\ NMC)}}{\mathbf{\Sigma((MOH + SH + Synchronous\ Condensing\ Hours + Pumping\ Hours + EMDHRS)\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

92. Weighted Equivalent Unplanned Outage Rate – WEUOR

$$\mathbf{WEUOR} = \frac{\mathbf{\Sigma((UOH + EUDH)\ x\ NMC)}}{\mathbf{\Sigma((UOH + SH + Synchronous\ Condensing\ Hours + Pumping\ Hours + EUDHRS)\ x\ NMC)}}\ \mathbf{x\ 100\%}$$

Mean Service Time to Outage:

93a. Weighted Mean Service Time to Planned Outage – MSTPO

$$\mathbf{WMSTPO} = \frac{\mathbf{\Sigma(SH\ x\ NMC)}}{\mathbf{\Sigma(Number\ of\ Planned\ Outages\ which\ occur\ from\ in-service\ state\ only\ x\ NMC)}}$$

93b. Weighted Mean Service Time to Unplanned Outage – MSTUO

$$\mathbf{WMSTUO} = \frac{\mathbf{\Sigma(SH\ x\ NMC)}}{\mathbf{\Sigma(Number\ of\ Unplanned\ Outages\ which\ occur\ from\ in-service\ state\ only\ x\ NMC)}}$$

93c. Weighted Mean Service Time to Forced Outage – MSTFO

$$\mathbf{WMSTFO} = \frac{\mathbf{\Sigma(SH\ x\ NMC)}}{\mathbf{\Sigma(Number\ of\ Forced\ Outages\ which\ occur\ from\ in-service\ state\ only\ x\ NMC)}}$$

93d. Weighted Mean Service Time to Maintenance Outage – MSTMO

$$\mathbf{WMSTMO} = \frac{\mathbf{\Sigma(SH\ x\ NMC)}}{\mathbf{\Sigma(Number\ of\ Maintenance\ Outages\ which\ occur\ from\ in-service\ state\ only\ x\ NMC)}}$$

Mean Outage Duration:

94a. Weighted Mean Planned Outage Duration – MPOD

$$\mathbf{WMPOD} = \frac{\mathbf{\Sigma(Planned\ Outage\ Hours\ which\ occur\ from\ in-service\ state\ only\ x\ NMC)}}{\mathbf{\Sigma(Number\ of\ Planned\ Outages\ which\ occur\ from\ in-service\ state\ only\ x\ NMC)}}$$

94b. Weighted Mean Unplanned Outage Duration – MUOD

$$\mathbf{WMUOD} = \frac{\Sigma(\text{Unplanned Outage Hours which occur from in-service state only x NMC})}{\Sigma(\text{Number of Unplanned Outages which occur from in-service state only x NMC})}$$

94c. Weighted Mean Forced Outage Duration – MFOD

$$\mathbf{WMFOD} = \frac{\Sigma(\text{Forced Outage Hours which occur from in-service state only x NMC})}{\Sigma(\text{Number of Forced Outages which occur from in-service state only x NMC})}$$

94d. Weighted Mean Maintenance Outage Duration – MMOD

$$\mathbf{WMMOD} = \frac{\Sigma(\text{Maintenance Outage Hours which occur from in-service state only x NMC})}{\Sigma(\text{Number of Maintenance Outages which occur from in-service state only x NMC})}$$

Unweighted (time-based) methods for calculating statistics excluding problems outside management control for single unit and pooled unit calculations

Note: *The equations for calculating unweighted (time-based) performance excluding outside management control (OMC) events are identical to those shown earlier in this Appendix. The only differences are that the events using OMC cause codes are treated as non-curtailing events when analyzing the event records during the time of evaluation. In other words, the OMC events are ignored and not used in the calculations.*

The list of OMC cause codes, conditions and method for removing OMC events from the calculations is described in Appendix K.

95.	W/O OMC Planned Outage Factor – XPOF	(See equations 1 and 33.)
96.	W/O OMC Unplanned Outage Factor – XUOF	(See equations 2 and 34.)
97.	W/O OMC Forced Outage Factor – XFOF	(See equations 3 and 35.)
98.	W/O OMC Maintenance Outage Factor – XMOF	(See equations 4 and 36.)
99.	W/O OMC Scheduled Outage Factor – XSOF	(See equations 5 and 37.)
100.	W/O OMC Unavailability Factor – XUF	(See equations 6 and 38.)
101.	W/O OMC Availability Factor – XAF	(See equations 7 and 39.)
102.	W/O OMC Service Factor – XSF	(See equations 8 and 40.)
103.	W/O OMC Unit Derating Factor – XUDF	(See equations 10 and 42.)
104.	W/O OMC Equivalent Unavailability Factor – XEUF	(See equations 11 and 43.)
105.	W/O OMC Equivalent Availability Factor – XEAF	(See equations 12 and 44.)
106.	W/O OMC Equivalent Maintenance Outage Factor – XEMOF	(See equations 17 and 49.)
107.	W/O OMC Equivalent Planned Outage Factor – XEPOF	(See equations 18 and 50.)
108.	W/O OMC Equivalent Forced Outage Factor – XEFOF	(See equations 19 and 51.)
109.	W/O OMC Equivalent Scheduled Outage Factor – XESOF	(See equations 20 and 52.)
110.	W/O OMC Equivalent Unplanned Outage Factor – XEUOF	(See equations 21 and 53.)
111.	W/O OMC Forced Outage Rate – XFOR	(See equations 22 and 54.)
112.	W/O OMC Forced Outage Rate Demand – XFORd	(See equations 23 and 55.)
113.	W/O OMC Equivalent Forced Outage Rate – XEFOR	(See equations 24 and 56.)
114.	W/O OMC Equivalent Forced Outage Rate demand – XEFORd	(See equations 25 and 57.)
115.	W/O OMC Equivalent Planned Outage Rate – XEPOR	(See equations 26 and 58.)
116.	W/O OMC Equivalent Maintenance Outage Rate – XEMOR	(See equations 27 and 59.)
117.	W/O OMC Equivalent Unplanned Outage Rate – XEUOR	(See equations 28 and 60.)
118.	W/O OMC Average Run Time – XART	(See equations 29 and 61.)

Note: Unweighted single unit equations 9 (SEDF), 13-16 (GCF, NCF, GOF, NOF), 30-32 (SR, Mean Service Time to Outage, Mean Outage Duration), and Unweighted pooled unit equations 41 (SEDF), and 45-48 (GCF, NCF, GOF, NOF) do not have W/O OMC versions.

Weighted (capacity-based) methods for calculating statistics excluding problems outside management control for pooled unit statistics

Note: *The equations for calculating unweighted (time-based) performance excluding outside management control (OMC) events are identical to those shown earlier in this Appendix. The only differences are that the events using OMC cause codes are treated as non-curtailing events when analyzing the event records during the time of evaluation. In other words, the OMC events are ignored and not used in the calculations.*

The list of OMC cause codes, conditions and method for removing OMC events from the calculations is described in Appendix K.

119.	W/O OMC Weighted Forced Outage Factor – XWFOF	(See equation 65.)
120.	W/O OMC Weighted Maintenance Outage Factor – XWMOF	(See equation 66.)
121.	W/O OMC Weighted Planned Outage Factor – XWPOF	(See equation 67.)
122.	W/O OMC Weighted Unplanned Outage Factor – XWUOF	(See equation 68.)
123.	W/O OMC Weighted Scheduled Outage Factor – XWSOF	(See equation 69.)
124.	W/O OMC Weighted Unavailability Factor – XWUF	(See equation 70.)
125.	W/O OMC Weighted Availability Factor – XWAF	(See equation 71.)
126.	W/O OMC Weighted Service Factor – XWSF	(See equation 72.)
127.	W/O OMC Weighted Unit Derating Factor – XWUDF	(See equation 74.)
128.	W/O OMC Weighted Equivalent Unavailability Factor – XWEUF	(See equation 75.)
129.	W/O OMC Weighted Equivalent Availability Factor – XWEAF	(See equation 76.)
	(Also known as the "Unit Capability Factor" (UCF) in Europe and other parts of the world.)	
130.	W/O OMC Weighted Equivalent Maintenance Outage Factor – XWEMOF	(See equation 81.)
131.	W/O OMC Weighted Equivalent Planned Outage Factor – XWEPOF	(See equation 82.)
132.	W/O OMC Weighted Equivalent Forced Outage Factor – XWEFOF	(See equation 83.)
133.	W/O OMC Weighted Equivalent Scheduled Outage Factor – XWESOF	(See equation 84.)
134.	W/O OMC Weighted Equivalent Unplanned Outage Factor – XWEUOF	(See equation 85.)
	(Also known as the "Unit Capability Loss Factor" (UCLF) in Europe and other parts of the world.)	
135.	W/O OMC Weighted Forced Outage Rate – XWFOR	(See equation 86.)
136.	W/O OMC Weighted Forced Outage Rate demand – XWFORd	(See equation 87.)
137.	W/O OMC Weighted Equivalent Forced Outage Rate – XWEFOR	(See equation 88.)
138.	W/O OMC Weighted Equivalent Forced Outage Rate demand – XWEFORd	(See equation 89.)
139.	W/O OMC Weighted Equivalent Planned Outage Rate – XWEPOR	(See equation 90.)
140.	W/O OMC Weighted Equivalent Maintenance Outage Rate – XWEMOR	(See equation 91.)
141.	W/O OMC Weighted Equivalent Unplanned Outage Rate – XWEUOR	(See equation 92.)

Note: Weighted grouped unit equations 73 (WSEDF), 77-80 (GCF, NCF, GOF, NOF) do not have W/O OMC versions.

Run of River Hydro Equations Using Amplification Code WC (Water Condition)

The Run of River hydro equations take into account outages during time periods where water conditions prohibit the unit from operating. The unit is available during these times and can be put into various outage states while water conditions are unfavorable for operation. The outages are tracked by using the amplification code WC (Water Condition). Several of the time and energy factors used by indexes are modified for these equations. See the Hydro White Paper for more details.

There are two types of Run of River hydro equations:

1. Resource: All applicable equations 1 – 141 that ignore the WC amplification code and all factors are treated normally and calculation results are unchanged.
2. Equipment: All applicable equations 1 – 141 in which U3, MO, and PO outage events with amplification code WC are treated as available hours. The definitions of AH, FOH, MOH, and POH in equations 1 – 141 are replaced with the definitions for AH_{WC}, FOH_{WC}, MOH_{WC}, and POH_{WC} respectively, which account for water conditions. Three new terms $U3_{WC}$, MO_{WC}, and PO_{WC} are defined.

Summary of Run of River Hydro Time and Energy Factors Used by Indexes

4.	Available Hours – AH_{WC}	Sum of all Service Hours (SH) **+** Reserve Shutdown Hours (RSH) **+** Pumping Hours **+** Synchronous Condensing Hours + $U3_{WC}$ + MO_{WC} + PO_{WC}
5.	Planned Outage Hours - POH_{WC}	Sum of all hours experienced during Planned Outages (PO) **+** Planned Outage Extensions (PE) of any Planned Outages (PO) - PO_{WC}
	Planned Outage Hours - PO_{WC}	Sum of all hours experienced during Planned Outages (PO) during water conditions (amplification code WC)
7.	Forced Outage Hours – FOH_{WC}	Sum of all hours experienced during Forced Outages (U1, U2, and U3) **+** Startup Failures (SF) - $U3_{WC}$
	Forced Outage Hours – $U3_{WC}$	Sum of all hours experienced during Forced Outages of type U3 during water conditions (amplification code WC)
8.	Maintenance Outage Hours – MOH_{WC}	Sum of all hours experienced during Maintenance Outages (MO) **+** Maintenance Outage Extensions (ME) of any Maintenance Outages (MO) - MO_{WC}
	Maintenance Outage Hours – MO_{WC}	Sum of all hours experienced during Maintenance Outages (MO) during water conditions (amplification code WC)

Sample Equations

The Availability Factor (AF) is the percentage of period hours that a unit is available for generation.

$$\mathbf{AF} = \frac{\mathbf{AH}}{\mathbf{PH}}\mathbf{X100\%}$$

The Availability Factor of a hydro unit from the resource point of view does not account for water conditions and when the AH term is expanded it is the normal equation as expected.

$$\mathbf{AF} = \mathbf{AF_{Resource}} = \frac{\mathbf{RSH + SH + +Sync\ Cond\ Hours + Pumping\ Hours}}{\mathbf{PH}}\mathbf{X100\%}$$

The Availability Factor of a hydro unit from the equipment point of view accounts for water conditions and when the AH term is expanded it is modified to account for the outages marked by amplification code WC.

$$\mathbf{AF} = \frac{\mathbf{AH_{WC}}}{\mathbf{PH}}\mathbf{X100\%}$$

$$\mathbf{AF} = \mathbf{AF_{Equipment}} = \frac{\mathbf{RSH + SH + Sync\ Cond\ hours + Pumping\ Hours + U3_{WC} + PO_{WC} + MO_{WC}}}{\mathbf{PH}}\mathbf{X100\%}$$

The Unplanned Outage Factor (UOF) is the percentage of period hours that a unit is on unplanned outage.

$$\mathbf{UOF} = \frac{\mathbf{UOH}}{\mathbf{PH}}\ \mathbf{x\ 100\%}$$

The Unplanned Outage Factor of a hydro unit from the resource point of view does not account for water conditions and when the UOH term is expanded it is the normal equation as expected.

$$\mathbf{UOF} = \mathbf{UOF_{Resource}} = \frac{\mathbf{FOH + MOH}}{\mathbf{PH}}\ \mathbf{x\ 100\%}$$

The Unplanned Outage Factor of a hydro unit from the equipment point of view accounts for water conditions and when the UOH term is expanded it is modified to account for the outages marked by amplification code WC.

$$\mathbf{UOF} = \frac{\mathbf{UOH_{WC}}}{\mathbf{PH}}\ \mathbf{x\ 100\%}$$

$$\mathbf{UOF} = \mathbf{UOF_{Equipment}} = \frac{\mathbf{FOH_{WC} + MOH_{WC}}}{\mathbf{PH}}\ \mathbf{x\ 100\%}$$

All other applicable equations are to be treated in like manner and are not listed in this appendix.

Note #1 for Appendix F

INTRODUCTION TO NOTE #1:
The information below comes from IEEE 762 Annex F. This section reviews several different methods for pooling EFORd only. Because of the nature of this equation, it can be pooled in several different methods as shown below.

PLEASE NOTE THAT after much consideration, NERC-GADS will use Method 2 in all its EFORd calculations. The reason for method 2 is:

- Consistency – all other GADS equations sum hours in both the denominator and numerator before division.
- Allow calculations of smaller groups. By allowing sums, smaller groups of units can be used to calculate EFORd without experiencing the divide by zero problem (see Note #2 for Appendix F).

FROM IEEE 762, ANNEX F: EFORd Pooling Sample

A comparison of three EFORd pooling methodologies.
Method (I): Pooled individual Unit Demand Studies

This method can give more weight to individual units with extreme $EFOR_d$ that have very few service hours, but with longer study time periods, the difference between the results of Methods I and II should be less.

Method (II): Group Demand Studies

This method may be more applicable in studying group statistics on units with known similar demand patterns, especially for forecasting and modeling. By calculating the f-factors over the group's total FOH, SH, RSH, and starts, the f-factor is "smoothed" and not subject to be unduly influenced by an one or more single units statistics that may have very high or very low hours or starts.

Method (III): Capacity Weighted Average of individually calculated $EFOR_d$ used by PJM to calculate pool average "unforced capacity" values for capacity market purposes.

In order to clearly demonstrate how these methods are used, two sets of comparison will be needed – the first uses the unweighted, time-based calculations as shown in Appendix F. The second will use a weighted version of these pooling methods.

Time-Based Pooling

This comparison of the three (3) pooling methodologies is based on the sample data and calculations found in the following two tables. Table 1 shows the raw data reported by 5 steam turbine generating units. Table 2 shows the interim values of the calculations used to produce the individual $EFOR_d$ for each unit.

Table 1: Raw Data Used as a Sample

Unit	Capacity (MW)	SH	RSH	AH	Actual Starts	Attempted Starts	EFDH	FOH	FO Events
48	55	4556	1963	6519	31	31	110.51	407	5
49	57	4856	2063	6919	34	34	146.99	773	12
50	60	6460	516	6976	17	18	131.03	340	14
51	53	3942	3694	7636	36	36	19.92	504	11
52	55	6904	62	6966	14	16	35.81	138	12
Total	**280**	**26718**	**8298**	**35016**	**132**	**135**	**444.26**	**2162**	**54**

Table 2: Calculated Values Used in EFORd Formula									
Unit	1/r	1/T	1/D	f	f x FOH	fp	fp x EFDH	EFORd x MW	EFORd
48	0.0123	0.0158	0.0068	0.8049	327.608	0.6989	77.233	4.5594	8.29%
49	0.0155	0.0165	0.0070	0.8205	634.247	0.7018	103.163	7.6558	13.43%
50	0.0412	0.0349	0.0026	0.9666	328.630	0.9260	121.338	3.9770	6.63%
51	0.0218	0.0097	0.0091	0.7756	390.920	0.5162	10.283	4.9075	9.26%
52	0.0870	0.2581	0.0020	0.9942	137.194	0.9911	35.491	1.3489	2.45%
Method 1 Summed					1818.598		347.51		7.59%
Method 2 Calculated from reported totals	0.0250	0.0163	0.0049	0.8930	1930.734	0.763	338.98		7.92%
Method 3 Summed								22.4485	8.02%

Using this data, the 3 pooling methods can be shown as follows – Note that methods 1 and 2 are unweighted, time-based calculations.

- **Method 1** uses the sums of SH and the calculated values (f x FOH), (fp x EFDH) giving a pooled EFORd of 7.59%.

$$\frac{(1818.598+347.51)}{(26718+1818.598)} = 7.59\%$$

- **Method 2** uses the sums of the reported data to represent the average unit and then calculates the pooled EFORd to be 7.92%.

$$\frac{(1930.734+338.98)}{(26718+1930.734)} = 7.92\%$$

- **Method 3** weights the individual EFORd values with the unit capacity Σ (EFORd x MW) and uses the total capacity (Σ MW) to calculate a numeric average EFORd as 8.02%.

$$\frac{22.4485}{280} = 8.02\%$$

Weighted Pooling

This method weights all time values by the Net Max Capacity of the individual unit. The raw data is the same as in the first example. Here Table 3 is added to show the weighted values used in the calculations.

Table 3: Weighted Values Used in EFORd Formula								
Unit	wSH	wFOH	wEFDH	f	wFOHd	fp	wEFDHd	wEFORd
48	250580	22385	6078.05	0.8049	18018.42	0.69888	4247.83	8.29%
49	276792	44061	8378.43	0.8205	36152.06	0.701937	5880.28	13.43%
50	387600	20400	7861.80	0.9666	19717.79	0.925767	7280.28	6.63%
51	208926	26712	1055.76	0.7756	20718.75	0.516306	545.024	9.26%
52	379720	7590	1969.55	0.9942	7545.65	0.990815	1952.02	2.45%

Table 3: Weighted Values Used in EFORd Formula								
Unit	**wSH**	**wFOH**	**wEFDH**	**f**	**wFOHd**	**fp**	**wEFDHd**	**wEFORd**
Method 1 Summed	1503618				102152.67		19905.43	7.60%
Method 2 Calculated from reported totals	1503618	121148	25343.59	0.893	108188.97	0.763	19337.73	7.91%
Average wEFORd								8.01%

Weighted values in Table 3 are denoted with preceding w to indicate that the value has been weighted by its NMC. Below we substitute the weighted value for the expanded multiplication – wEFORd in place of (FORd x NMC)

- **Method 1** uses the weighted sums of wSH = SH x NMC, wFOHd = f x FOH x NMC, and wEFDHd = fp x EFDH x NMC, giving a pooled wEFORd of 7.60%.

$$\frac{\mathbf{\Sigma(wFOHd\ +\ wEFDHd)}}{\mathbf{wSH\ +\ \Sigma(wFOHd\ )}} = \mathbf{wEFORd\ (pooled)}$$

$$\frac{(10215.67+19905.43)}{(1503618+10215.67)} = 7.60\%$$

- **Method 2** uses the sums of the weighted reported data to represent the weighted average unit and then calculates the pooled EFORd to be 7.91%

$$\frac{\mathbf{(f\ x\ \Sigma\ wFOH)\ +\ (fp\ x\ \Sigma\ wEFDH)}}{\mathbf{\Sigma\ wSH\ +\ (f\ \ x\ \Sigma\ wFOH)}} = \mathbf{wEFORd\ (pooled)}$$

$$\frac{(0.893x121148)+(0.763x25343.59)}{1503618+(0.893x121148)} = 7.91\%$$

- **Average wEFORd** uses the sum of the weighted unit EFORd values to calculate the numerical average EFORd to be 8.01%.

$$\mathbf{Average\ EFORd} = \frac{\mathbf{\Sigma\ (WEFORd)}}{\mathbf{Count(WEFORd)}}\ \mathbf{x\ 100\%}$$

$$\frac{40.061}{5} = 8.01\%$$

Another Sample

Compare this sample to the samples earlier, and you will see that the relationship between the methods does not remain constant and is dependent on the distribution of the data.

Table 4: Raw Data Used as a Sample									
Unit	**Capacity (MW)**	**SH**	**RSH**	**AH**	**Actual Starts**	**Attempted Starts**	**EFDH**	**FOH**	**FO Events**
41	100	183	8576	8759	35	35	0	1	1
42	150	198	8562	8760	31	31	0	0	0
43	125	186	6867	7053	37	38	0	9	2

Table 4: Raw Data Used as a Sample									
Unit	**Capacity (MW)**	**SH**	**RSH**	**AH**	**Actual Starts**	**Attempted Starts**	**EFDH**	**FOH**	**FO Events**
44	170	105	4128	4233	29	29	0	4528	3
45	180	62	8259	8321	20	20	0	98	1
Total	725	734	36392	37123	152	153	0	4636	7

Table 5: Calculated Values used in EFORd Formula									
Unit	**1/r**	**1/t**	**1/D**	**F**	**f x FOH**	**fp**	**fp x EFDH**	**EFORd x MW**	**EFORd**
41	1.000	0.004	0.191	0.840	0.840	0.021	0.000	0.457	0.46%
42	0.000	0.004	0.157	0.023	0.000	0.023	0.000	0.000	0.00%
43	0.222	0.006	0.199	0.534	4.804	0.026	0.000	3.147	2.52%
44	0.001	0.007	0.276	0.027	122.623	0.025	0.000	91.581	53.87%
45	0.010	0.002	0.323	0.038	3.691	0.007	0.000	10.114	5.62%
Method 1 Summed					131.959		0.000		15.24%
Method 2 Calculated from reported totals	0.002	0.004	0.207	0.027	124.488	0.020	0.000		14.50%
Method 3 Summed								105.299	14.52%

Table 6: Weighted Values Used in EFORd Formula								
Unit	**wSH**	**wFOH**	**wEFDH**	**F**	**wFOHd**	**fp**	**wEFDHd**	**wEFORd**
41	18300	100	0	0.840	84.000	0.021	0	0.46%
42	29700	0	0	0.023	0	0.023	0	0.00%
43	23250	1125	0	0.534	600.509	0.026	0	2.52%
44	17850	769760	0	0.027	20845.957	0.025	0	53.87%
45	11160	17640	0	0.038	664.418	0.007	0	5.62%
Method 1 Summed	100260				22194.884		0	18.12%
Method 2 Calculated from reported totals	100260	788625	0	0.027	21176.435	0.020	0	17.44%
Average wEFORd								12.49%

Hint: To make the second example calculations work correctly you will need to protect yourself against division by zero with statements like if r>0 then 1/r else 1/r= 0.

Note #2 for Appendix F

INTRODUCTION TO NOTE #2:
Table 7 below comes from IEEE 762 Annex G. In some cases Equivalent Forced Outage Rate – Demand (EFORd) and Forced Outage Rate – Demand (FORd) cannot be calculated or produce a reasonable result regardless of the method used or data sample size. Current industry practice is to calculate the six intermediate terms 1/r, 1/T, 1/D, f, fp, and EFDHd using data pooling method #2 with divide by zero protection on each calculation. This may force a meaningless answer in some cases and Table 7 shows under what circumstances a meaningful value can always be calculated.

PLEASE NOTE THAT NERC GADS will follow the recommendations of IEEE 762 Annex G as shown in Table 7 when calculating EFORd numbers. This means that in some GADS reports, there will not be an EFORd number because a calculated EFORd would be meaningless.

Table 7: Limiting Conditions for Forced Outage Indexes

Case	SH	FOH	RSH	FORd	EFORd
Base	>0	>0	>0	Applicable	Applicable
1	0	>0	>0	Cannot be determined	Cannot be determined
2	0	0	>0	Cannot be determined	Cannot be determined
3	0	>0	0	Cannot be determined	Cannot be determined
4	>0	0	>0	0	EFDH/AH
5	>0	0	0	0	EFDH/SH
6	>0	>0	0	FOR	EFOR
7	0	0	0	Cannot be determined	Cannot be determined

Appendix G: Examples and Recommended Methods

Reporting Outages to the Generating Availability Data System (GADS)

Introduction

The examples in this appendix illustrate the reporting of outages and deratings to GADS. They are based on a fictional 600 MW coal-fired unit, Riverglenn #1, operated by the fictional "U.S. Power & Light Company." All the System/Component Cause Codes shown in these examples are real and found in *Appendix B08 – Fossil Steam Units.*

Each example includes a description of circumstances surrounding the event, the effect of the event on unit availability, and component repair time.

For the sake of space, the verbal description element (reported in Sections C and D of the event report (07)) is left out of the event description. Completing this information provides details about a failure's cause and appearance, identifies any contributing factors, and describes the corrective actions taken. Please refer to pages III-25 through III-26 for a discussion regarding the verbal description.

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Example 1: Simple Outage

Event Description

On January 3 at 4:30 a.m., Riverglenn #1 tripped off-line due to high turbine vibration. The cause was Low Pressure (LP) turbine bearings. Repairs began January 3 at 8:00 a.m. and were completed on January 8 at 9:30 a.m. The unit synchronized on January 8 at 5:00 p.m.

Report the following on Records 01, 02 and 03 of Event Report (07):

Event Number:	0001	
Event Type:	U1	
Start of Event:	January 3 at 04:30	
End of Event:	January 8 at 17:00	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	4240	
Time: Work Started:	January 3 at 08:00	
Time: Work Completed:	January 8 at 09:30	
Man Hours Worked:		Records 02/03

Effect on Unit Availability

The duration of this event was 132.50 hours (January 3, 4:30 a.m. to January 8, 5:00 p.m.).
Unit availability was affected for 132.50 hours.

Component Repair

The LP turbine bearings took 121.50 hours to repair (January 3, 8:00 a.m. to January 8 at 9:30 a.m.).

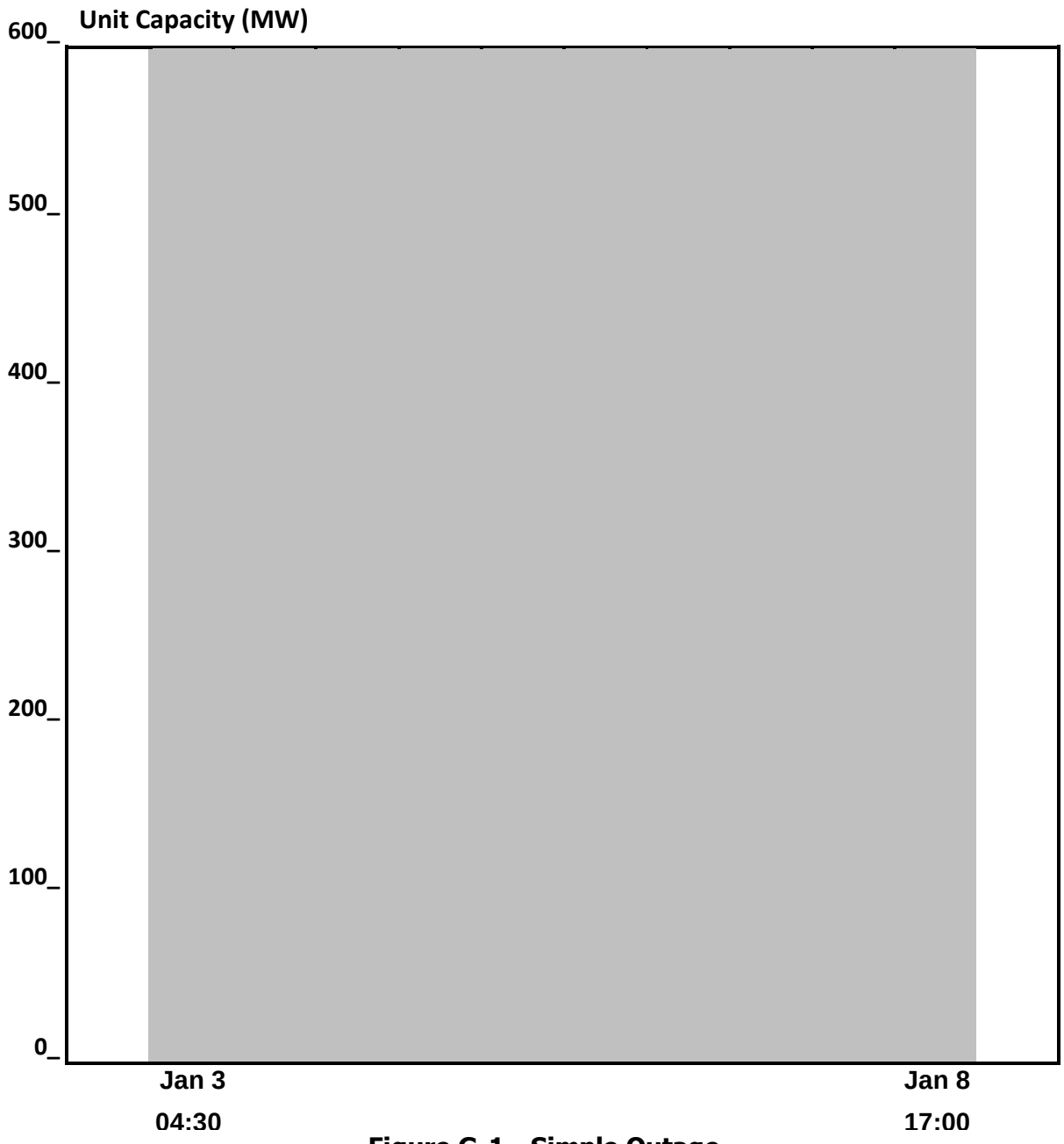


Figure G-1 - Simple Outage

Example 2: Simple Derating

Event Description

On January 10 at 8:00 a.m., Riverglenn #1 reduced capacity by 400 MW due to a fouled north air preheater. Fouling began a few weeks earlier, but the unit stayed on-line at full capacity to meet load demand. Repair crews completed their work and the unit came back to full load (600 MW) on January 11 at 4:00 p.m.

Report the following on Records 01, 02 and 03 of Event Report (07):

Event Number:	0002	
Event Type:	D4	
Start of Event:	January 10 at 08:00	
Event of Event:	January 11 at 16:00	
Gross Available Capacity as a Result of Event:	*	
Net Available Capacity as a Result of Event:	200	
Dominant Derating Column	(blank)	Record 01

System/Component Cause Code:	1492	
Time: Work Started:	January 10 at 08:00	
Time: Work Completed:	January 10 at 16:00	
Man Hours Worked:	100	Records 02/03

Effect on Unit Availability

To measure the impact of this event on unit availability, the duration of the derating is converted to Equivalent Derated Hours. This conversion enables availability losses caused by deratings to be assessed on the same basis as losses caused by outages. It is done by multiplying the event duration (hours) by the size of reduction and dividing by the unit's Net Maximum Capacity (NMC). Size of Reduction is calculated by subtracting the reported Net Available Capacity as a result of the derating (NAC) from Net Dependable Capacity (NDC) of the unit. Equivalent Derated Hours for this event are:

$$[(600\ \text{MW} - 200\ \text{MW}) * 32\ \text{hours}]/600\ \text{MW} = 21.33$$

Thus, the availability of Riverglenn #1 is impacted for 21.33 Equivalent Derated Hours.

Component Repair

The air preheater required 32 hours to repair. The hours are not equivalent.

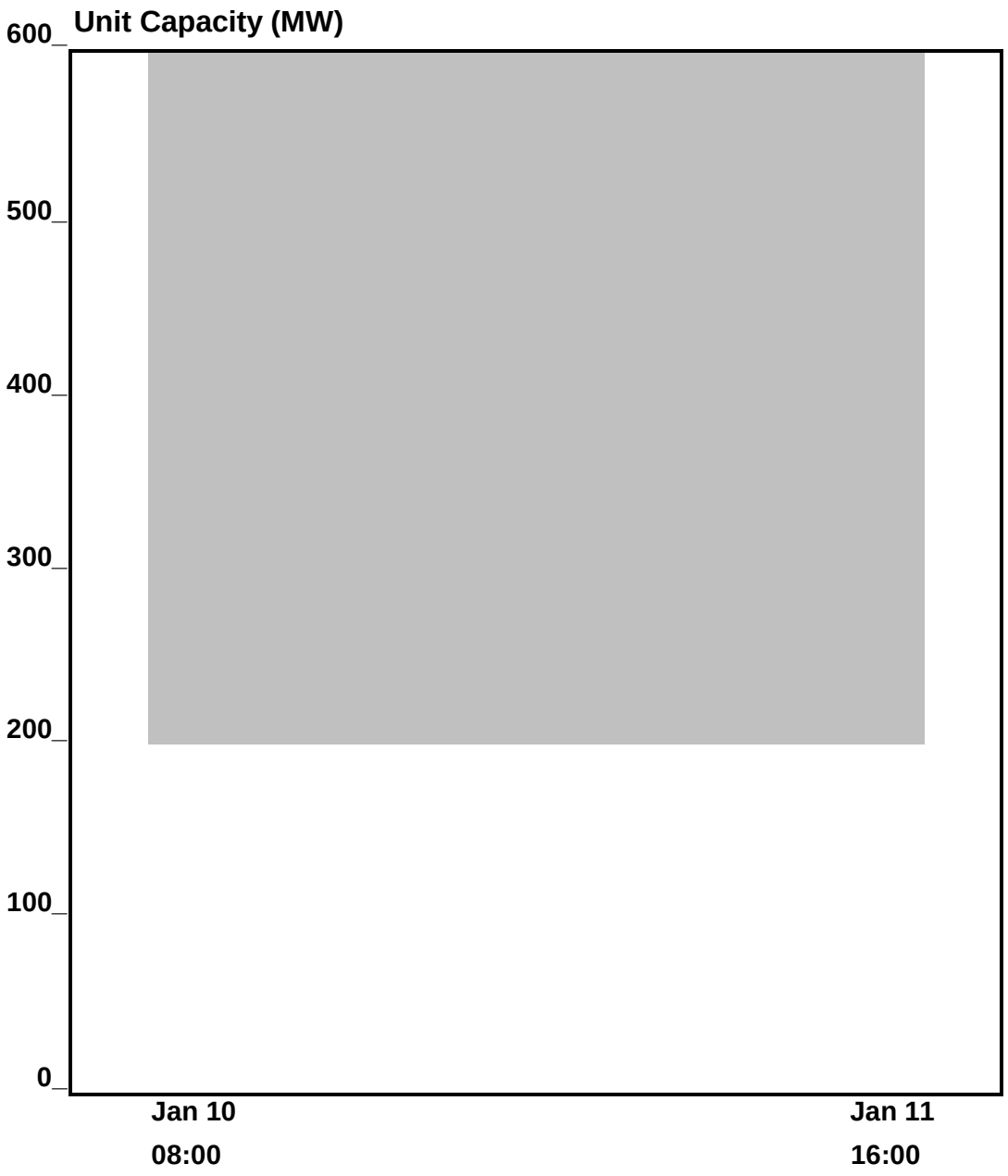


Figure G-2 — Simple Derating

Example 3A: Overlapping Deratings
Second Derating Begins and Ends During First Derating

Description of Events

Riverglenn #1 experienced an immediate 75 MW derating on March 9 at 8:45 a.m. The cause was an "A" pulverizer feeder motor failure (Derating "A"). Net Available Capacity (NAC) as a result was 525 MW.

At 10:00 a.m. the same day, the unit lost another 75 MW due to a trip of the "B" pulverizer feeder motor. The Net Available Capacity (NAC) as a result of the second derating (Derating "B") was 450 MW. The motor was restarted and Derating "B" ended an hour later. The capability of the unit increased by 75 MW at this time.

Derating "A" ended when the "A" pulverizer feeder motor was repaired and the unit brought back to full load at 6:00 p.m. on March 9.

Report the following on Records 01, 02 and 03 of Event Report (07):

Derating "A"

Event Number:	0003	
Event Type:	D1	
Start of Event:	March 9 at 08:45	
End of Event:	March 9 at 18:00	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	525	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	0253	
Time: Work Started:	*	
Time: Work Completed:	*	
Man Hours Worked:		Records 02/03

Derating "B"

Event Number:	0004	
Event Type:	D1	
Start of Event:	March 9 at 10:00	
End of Event:	March 9 at 11:00	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	450	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	0253	
Time: Work Started:	*	
Time: Work Completed:	*	
Man Hours Worked:		Records 02/03

Effect on Unit Availability

In GADS, overlapping deratings are considered additive (unless the second derating occurs wholly within a derating of greater magnitude as in Example #4). When two deratings overlap, the size of reduction caused by

the second derating is determined by subtracting the Net Available Capacity as a result of the second derating from the Net Available Capacity of the unit as a result of the first derating.

The following shows the availability impact these two deratings had on the unit:

Derating "A": [(600 MW - 525 MW) * 9.25 hour]/600 MW = 1.16 Equivalent Derated Hours
Derating "B": [(525 MW - 450 MW) * 1.00 hour]/600 MW = 0.13 Equivalent Derated Hours

Component Repair

When "Time: Work Started" and "Time: Work Completed" are blank or asterisk-filled, the reported Start of Event and End of Event determine component repair time.

In this example, 10.25 hours are charged against the pulverizer feeder motor for repair (9.25 hours for Derating "A" and 1 hour for Derating "B.") These hours are not equivalent.

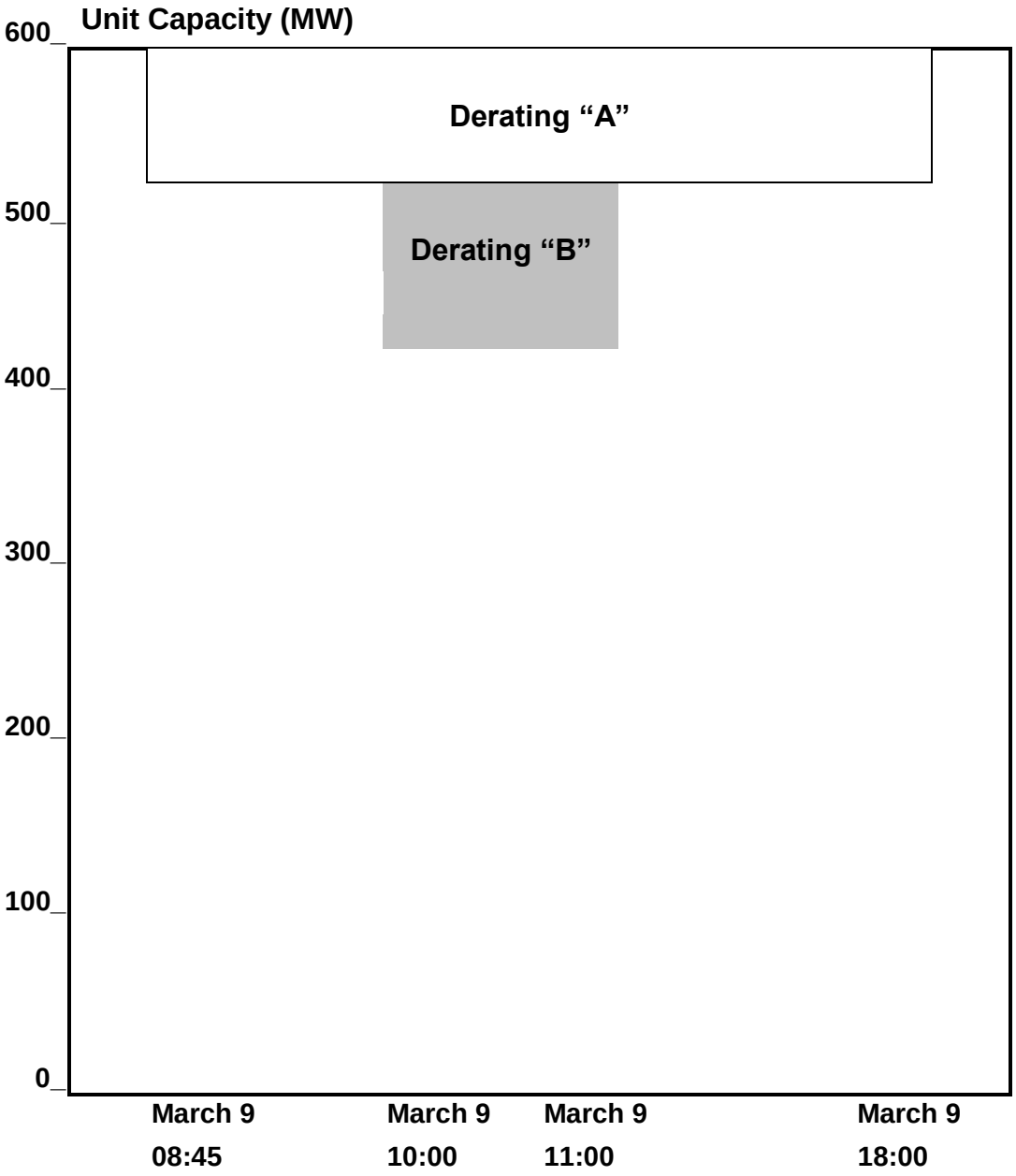


Figure G-3A — Overlapping Deratings

Second derating begins and ends during first derating

Example 3B: Overlapping Deratings
Second Derating Begins and Ends During First Derating
First is Partially Shadowed

Description of Events

A derating began on July 3 at 2:30 p.m., when capacity was reduced to 575 MW for condenser maintenance. The maintenance began July 13 at 8:00 a.m. The event ended on July 23 at 11:45 a.m.

On July 19 at 11:15 a.m., while the maintenance derating was in progress, a feedwater pump tripped. Load immediately fell to 360 MW. (This would have been the case, whether or not the unit was already derated.) The feedwater water pump was back in service at noon the same day.

Report the following on Records 01, 02, and 03 of Event Report (07):

Derating "A"

Event Number:	0005	
Event Type:	D4	
Start of Event:	July 3 at 14:30	
End of Event:	July 23 at 11:45	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	575	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	3112	
Time: Work Started:	July 13 at 08:00	
Time: Work Completed:	July 23 at 11:45	
Man Hours Worked:	550	Records 02/03

Derating "B"

Event Number:	0006	
Event Type:	D1	
Start of Event:	July 19 at 11:15	
End of Event:	July 19 at 12:00	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	360	
Dominant Derating Column	D	Record 01
System/Component Cause Code:	3410	
Time: Work Started:	*	
Time: Work Completed:	*	
Man Hours Worked:	*	Records 02/03

Effect on Unit Availability

Dominant derates are not additive by definition. The reduction due to them always starts at NDC like an outage.

For the duration of the overlap of "A" by "B", or 0.75 hours, 25 MW, which would be attributed to derating "A" if it had occurred alone, are shadowed by derating "B" which acts on derating "A" like an outage. Because of shadowing, these equivalent hours are not double counted.

The unit's availability is affected as follows:

Derating "A": [(600 MW - 575 MW) * (477.25 hours – 0.75 hours)]/600 MW = 19.85 Equivalent Derated Hours
Derating "B": [(600 MW - 360 MW) * 0.75 hours]/600 MW = 0.30 Equivalent Derated Hours

Had derating "B" not been a dominant derate the two derates would have been additive (Figure G-3B would have to be redrawn with the top of Derate "B" starting at NAC_A) and the unit availability would have been affected as follows:

Derating "A": [(600 MW - 575 MW) * (477.25 hours)]/600 MW = 19.89 Equivalent Derated Hours
Derating "B": [(575 MW - 360 MW) * 0.75 hours]/600 MW = 0.27 Equivalent Derated Hours

Component Repair

Condenser maintenance took 243.75 hours. The feedwater pump was out of service for 0.75 hours. These hours are not equivalent.

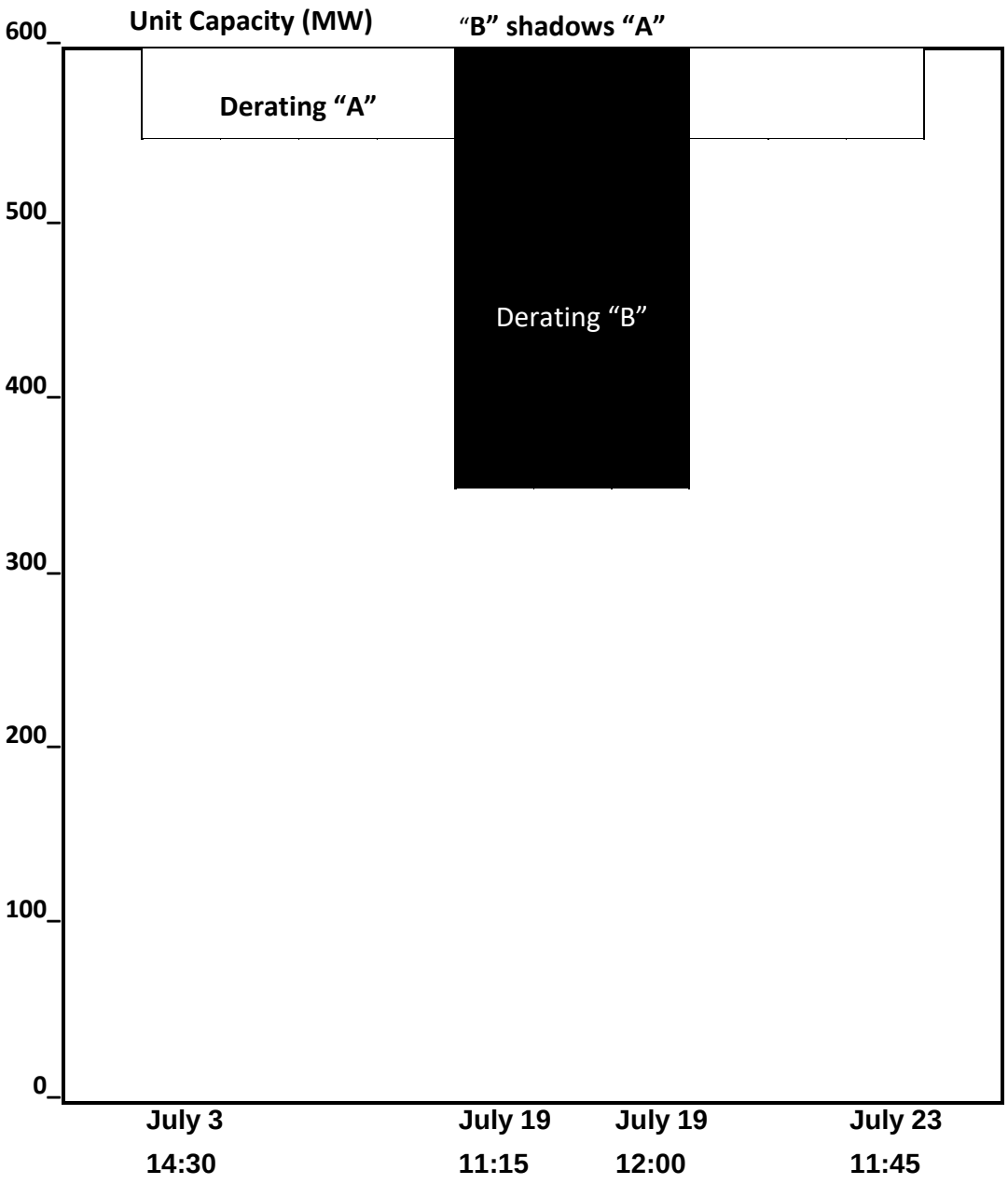


Figure G-3B — Overlapping Deratings

Second derating begins and ends during first derating
Second is partially shadowed

Example 3C: Overlapping Deratings
First Derating Ends before Second Derating Capability of Unit Changes

Description of Events

A 50 MW load reduction occurred on January 13 at 8:00 a.m. for a feedwater heater inspection (Derating "A"). The inspection had been planned several months earlier.

At 10:00 a.m., Riverglenn #1 experienced excessive pulverizer vibration. Available Capacity changed from 550 MW to 350 MW — a 200 MW reduction — as a result. A foreign object was the cause.

While the mill was under repair, the feedwater heater was put back in service, ending Derating "A" at 1:00 p.m. on January 13. This caused a 50 MW increase in the unit's Net Available Capacity.

Derating "B" ended on January 14 at 8:00 p.m. after completing pulverizer repairs.

Report the following on Records 01, 02 and 03 of Event Report (07):

Derating "A"

Event Number:	0007	
Event Type:	PD	
Start of Event:	January 13 at 08:00	
End of Event:	January 13 at 13:00	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	550	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	3340	
Time: Work Started:	January 13 at 08:30	
Time: Work Completed:	January 13 at 13:00	
Man Hours Worked:	*	Records 02/03

Derating "B"

Event Number:	0008	
Event Type:	D1	
Start of Event:	January 13 at 10:00	
End of Event:	January 14 at 20:00	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	350	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	0320	
Time: Work Started:	*	
Time: Work Completed:	*	
Man Hours Worked:	160	Records 02/03

Effect on Unit Availability

These two deratings are additive (See Example 3A). Availability is affected as follows:

Derating "A": [(600 MW - 550 MW) * 5.00 hours)/600 MW = 0.42 Equivalent Derated Hours
Derating "B": [(550 MW - 350 MW) * 34.00 hours)/600 MW = 11.33 Equivalent Derated Hours

Component Repair

The feedwater heater took 5 hours to repair and the pulverizer took 34 hours.

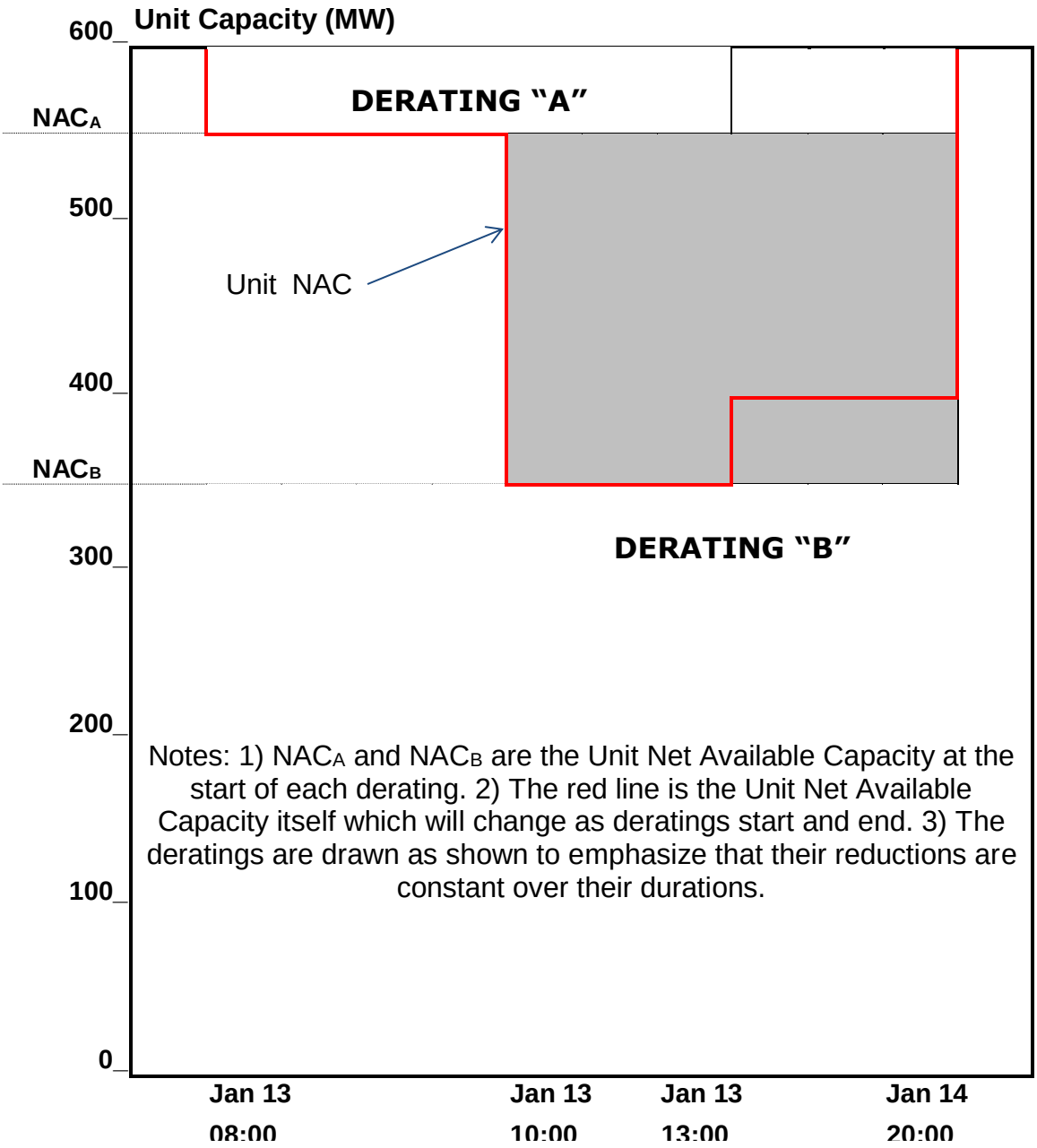


Figure G-3C - Overlapping deratings

First derating ends before second derating; capability changes

Example 3D: Overlapping Deratings First Derating Ends before Second Derating Capability of Unit Does Not Change

Description of Events

A circuit breaker tripped, causing an immediate 100 MW load reduction on March 10 at 6:30 a.m. (Derating "A.") At 7:45 a.m. the same day, a traveling screen jammed, causing one of the unit's circulating water pumps to shut down (Derating "B"). Net Available Capacity as a result of the event was 360 MW.

Derating "A" ended at 10:30 a.m. on March 10 when the circuit breaker repairs were completed. However, the traveling screen problem continued, forcing the unit to remain at 360 MW. The unit was available for full load on March 10 at 7:30 p.m. after completing repairs to the traveling screen.

Report the following on Records 01, 02 and 03 of Event Report (07):

Derating "A"

Event Number:	0009	
Event Type:	D1	
Start of Event:	March 10 at 06:30	
End of Event:	March 10 at 10:30	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	500	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	3661	
Time: Work Started:	March 10 at 08:00	
Time: Work Completed:	March 10 at 10:30	
Man Hours Worked:	*	Records 02/03

Derating "B"

Event Number:	0010	
Event Type:	D1	
Start of Event:	March 10 at 07:45	
End of Event:	March 10 at 19:30	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	360	
Dominant Derating Column	D	Record 01
System/Component Cause Code:	3260	
Time: Work Started:	March 10 at 08:15	
Time: Work Completed:	March 10 at 19:30	
Man Hours Worked:	*	Records 02/03

Effect on Unit Availability

As shown in Example 3A GADS assumes that overlapping deratings are additive. In this example, however, Derating "A" and Derating "B" are not additive because the Net Available Capacity of the unit remains at 360 MW after the Derating "A" ends. The utility must report a dominant derating "turn off" of the additive assumption. To do this, end Derating "A" as normal and mark Derating "B" as a dominant derating (column 65 with a "D"). Net Available Capacity as a result of dominant derating is all that is necessary to retain the 360 MW available capacity.

The following losses are charged against unit availability:

Derating "A": [(600 MW - 500 MW) x 1.25 hours]/600 MW = 0.21 Equivalent Derated Hours
Derating "B": [(600 MW - 360 MW) x 11.75 hours]/600 MW = 4.70 Equivalent Derated Hours

Component Repair

The circuit breaker and the traveling screen are charged with 2.50 clock hours of repair and 11.25 clock hours of repair, respectively.

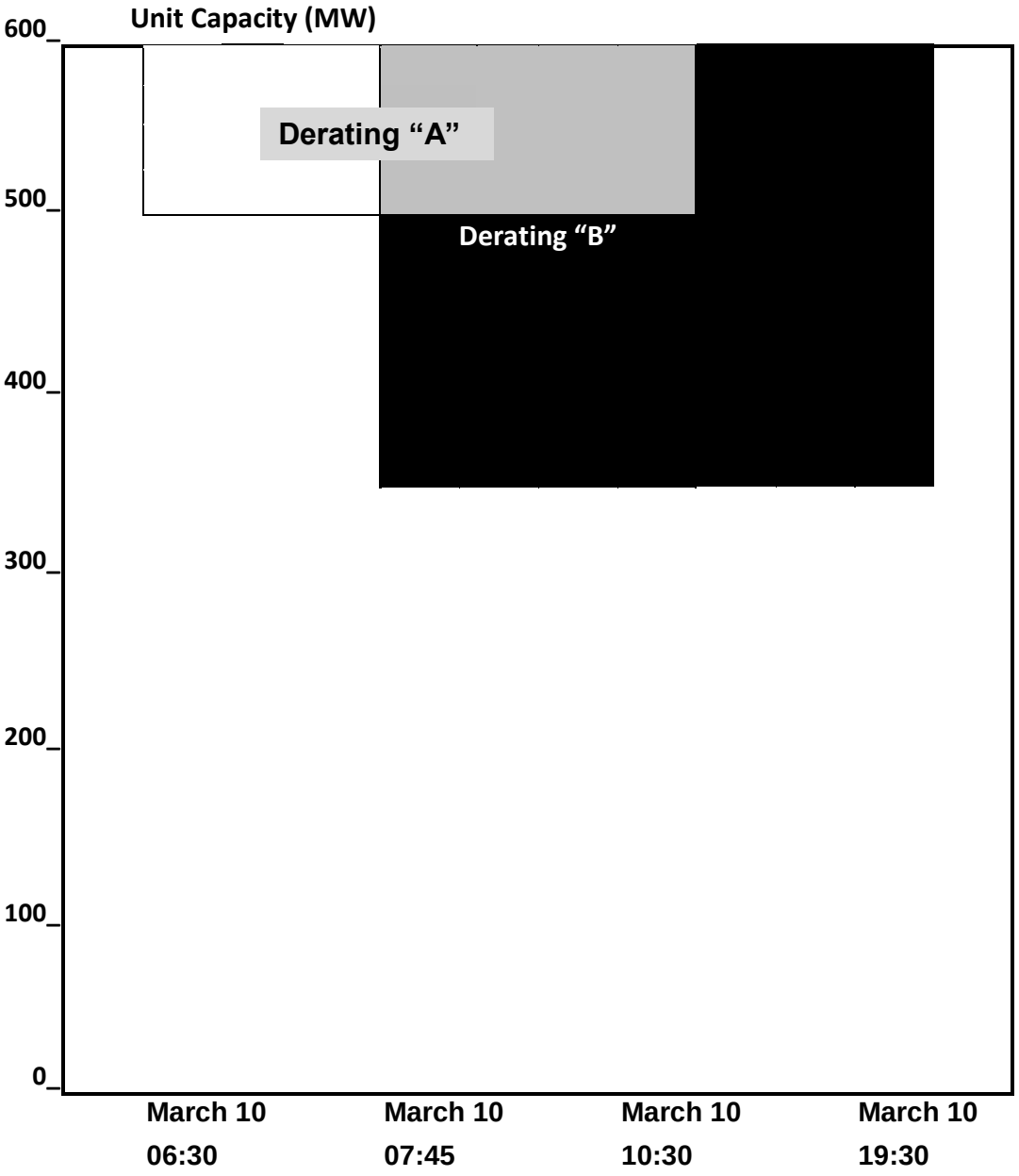


Figure G-3D - Overlapping Deratings

First derating ends before second derating
Capability of unit does not change

Example 4: Derating During a Dominant Derating

Event Description

A forced draft fan failed at 6:30 a.m. on April 10 causing a 300 MW reduction. Repairs began at 8:00 a.m. The unit returned to full capacity at 7:00 p.m. April 10.

During the force draft fan repair, a problem with the feedwater chemistry developed at 8:30 a.m. and it was corrected by 3:45 p.m. If it had occurred alone, a reduction of 100 MW would have resulted. In this example, it is completely shadowed by the dominant derating.

Report the following on Records 01, 02, and 03 of Event Report (07):

Derating "A"

Event Number:	0012	
Event Type:	D1	
Start of Event:	April 10 at 06:30	
End of Event:	April 10 at 19:00	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	300	
Dominant Derating Column:	D	Record 01
System/Component Cause Code:	1400	
Contribution Code:	1	
Time: Work Started:	April 10 at 08:00	
Time: Work Completed:	April 10 at 19:00	
Man Hours Worked:	*	Records 02/03

Derating "B"

Event Number:	0013	
Event Type:	D1	
Start of Event:	April 10 at 08:30	
End of Event:	April 10 at 15:45	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	500	
Dominant Derating Column:	(blank)	Record 01
System/Component Cause Code:	3352	
Contribution Code:	1	
Time: Work Started:	April 10 at 09:00	
Time: Work Completed:	April 10 at 15:45	
Man Hours Worked:	*	Records 02/03

Effect on Unit Availability

The forced draft fan caused the problem that affected Riverglenn's availability. The feedwater chemistry problem did not impact availability because it was completely shadowed by the dominant derating. The unit availability impact is:

[(600 MW - 300 MW) * 12.50 hours]/600 MW = 6.25 Equivalent Derated Hours

Component Repair

Although the feedwater chemistry problem does not affect unit availability, its occurrence should be reported. This information is important for analysis purposes. Never mentally manipulate shadowed events and report the results. Always report the actual events and let the math take care of the shadowing.

Repair of the forced draft fan took 12.5 hours. It took 7.25 hours to correct the feedwater chemistry problem.

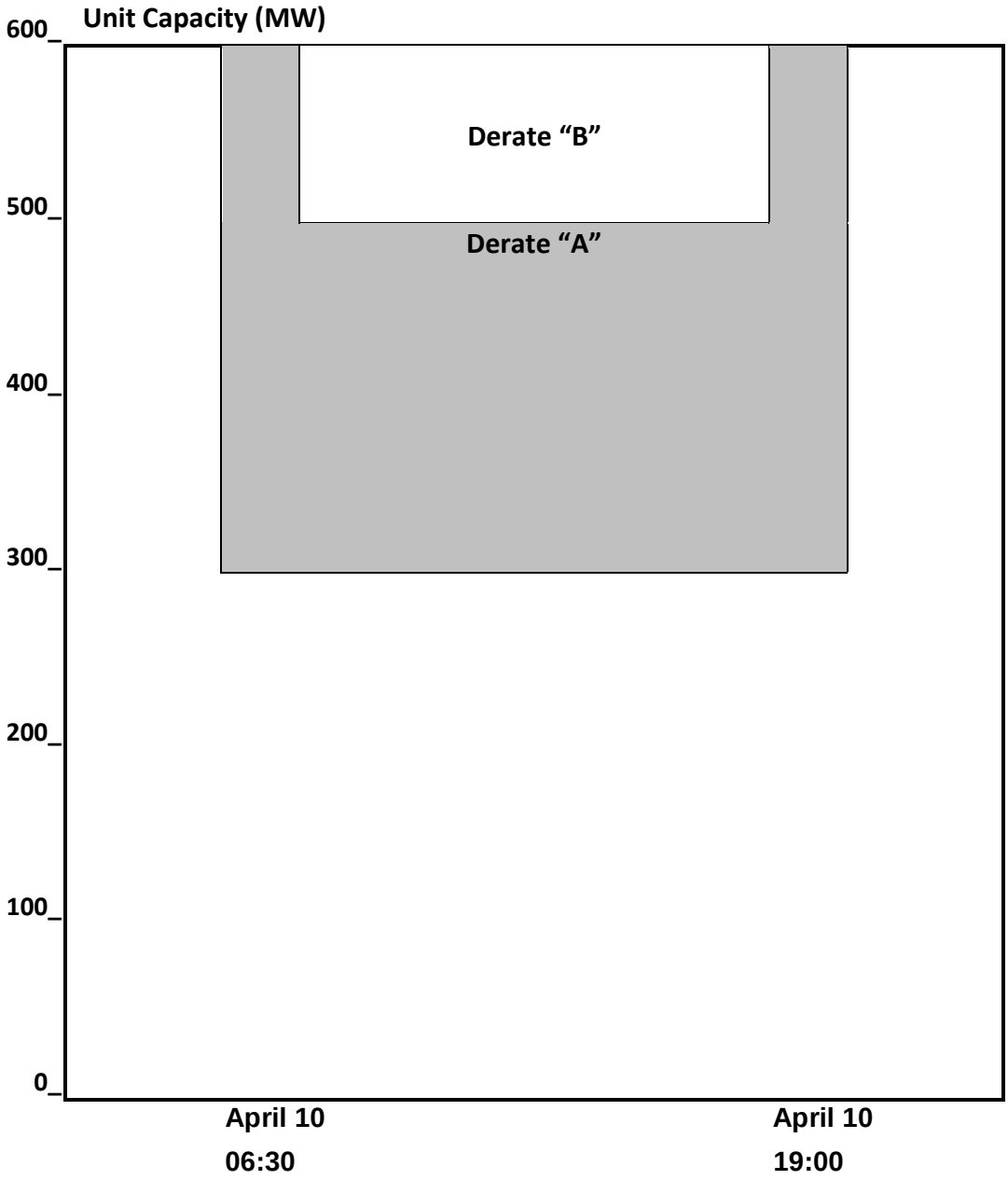


Figure G-4 – Derating During Dominant Derating

Example 5: Derating During a Reserve Shutdown

Description of Event

A reserve shutdown began on May 31 at 7:30 p.m. Maintenance crews took advantage of the off-line time and took one boiler feed pump (BFP) out of service (two other BFP were available) to repair the steam turbine. The work started at 8:00 a.m. on June 1 and ended on June 2 at 3:30 p.m. While the BFP valve maintenance was underway, the unit would have been able to synchronize, but would have been limited to 400 MW.

Riverglenn #1 was back in service on June 3 at 8:30 a.m.

Report the following on Records 01, 02 and 03 of Event Report (07):

Event Number:	0014	
Event Type:	RS	
Start of Event:	May 31 at 19:30	
End of Event:	June 3 at 08:30	
Dominant Derating Column	(blank)	Record 01

Event Number:	0015	
Event Type:	D4	
Start of Event:	June 1 at 08:00	
End of Event:	June 2 at 15:30	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	400	
Dominant Derating Column	(blank)	Record 01

System/Component Cause Code:	3412	
Time: Work Started:	June 1 at 08:00	
Time: Work Completed:	June 2 at 15:30	
Man Hours Worked:	80	Records 02/03

Effect on Unit Availability

Although it is off-line, a unit on reserve shutdown is available for full load. The “cause” of the event is economics, not equipment-related problems. However, if equipment is taken out of service that results in the unit’s inability to come back on-line and achieve full load, the reserve shutdown status has changed. A new event that accurately reflects the available status of the unit is required.

In this example, Riverglenn was available for full load until the BFP valve work began. The status of the unit changed because it was no longer available for full load. A derating event must be reported. (An outage would be reported if the unit would have been unable to synchronize while the BFP work was in progress.) The unit availability impact resulting from the BFP valve maintenance is:

[(600 MW - 400 MW) * 31.50 hours]/600 MW = 10.50 Equivalent Derated Hours

Component Repair

The feedwater pump steam turbine required 31.50 hours to repair.

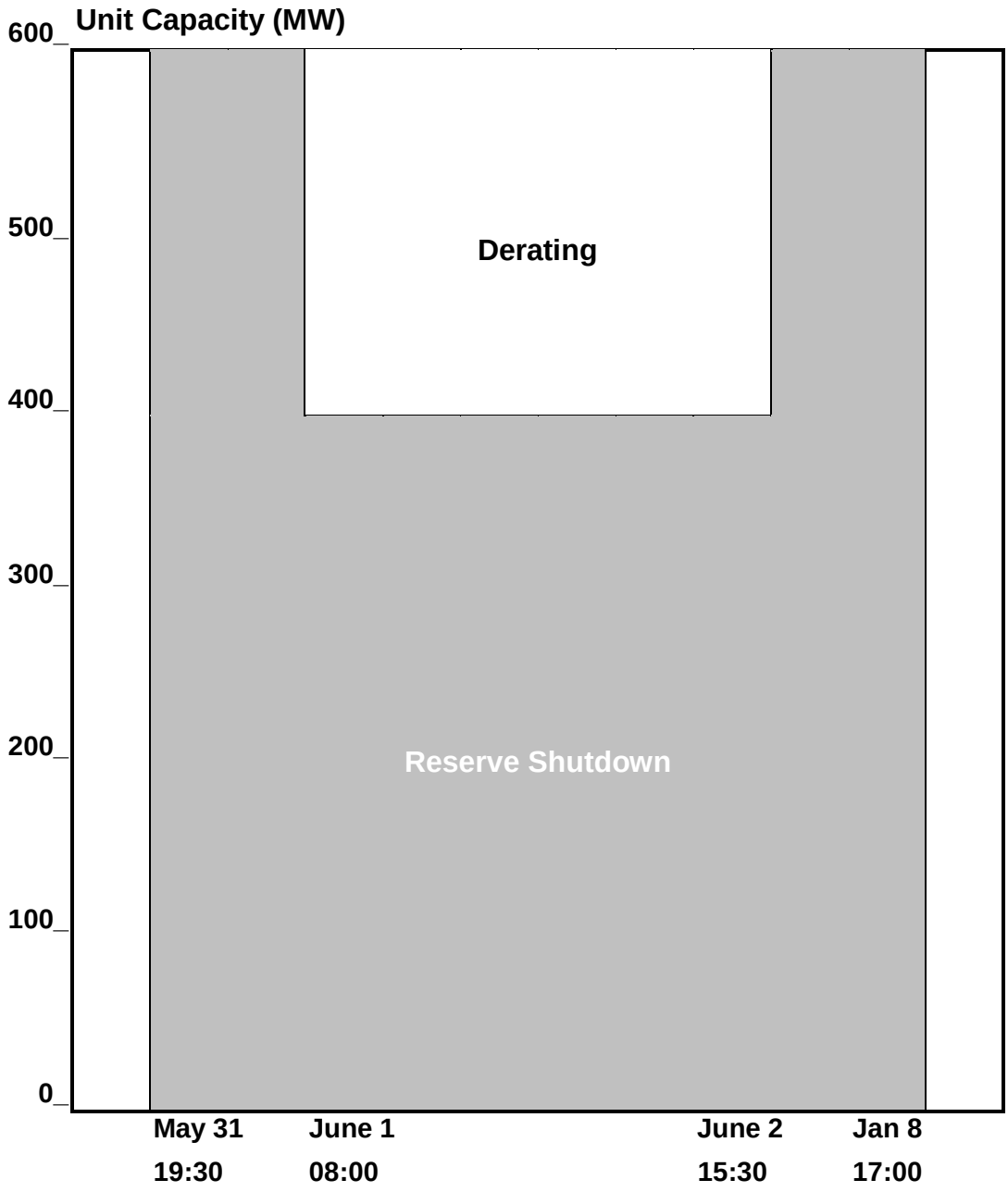


Figure G-5 — Derating During a Reserve Shutdown

Example 6a: Derating Overlapped by a Full Outage Derating Ends before Full Outage

Description of Events

Riverglenn #1 lost 100 MW due to a feedwater heater high-level trip at 9:45 a.m. on February 27. An L.P. heater tube leak was the cause. Repairs began March 2 at 8:00 a.m. A secondary superheater tube leak on March 2 at 1: 15 a.m. caused the unit to trip off-line.

The feedwater heater (cause of the derating) was repaired by March 4 at 6:30 p.m.

Repairs to the superheater (cause of the outage) were completed on March 4 at 10:00 p.m. The unit synchronized on March 5 at 9:22 a.m.

Report the following on Records 01, 02 and 03 of Event Report (07):

Event Number:	0016	
Event Type:	D1	
Start of Event:	February 27 at 09:45	
End of Event:	March 4 at 18:30	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	500	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	3340	
Time: Work Started:	March 2 at 08:00	
Time: Work Completed:	March 4 at 18:30	
Man Hours Worked:	234	Records 02/03
Event Number:	0017	
Event Type:	U1	
Start of Event:	March 2 at 01:15	
End of Event:	March 5 at 09:22	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	1050	
Time: Work Started:	March 2 at 12:00	
Time: Work Completed:	March 4 at 22:00	
Man Hours Worked:	600	Records 02/03

Effect on Unit Availability

The feedwater heater problem impacts availability until the outage begins:

[(600 MW - 500 MW) * 63.50 hours]/600 MW = 10.58 Equivalent Derated Hours

Once initiated, the outage assumes full responsibility for loss of availability. That is 80.12 hours in this example.

Component Repair

The feedwater heater was unavailable for 128.75 hours, the superheater for 80.12.

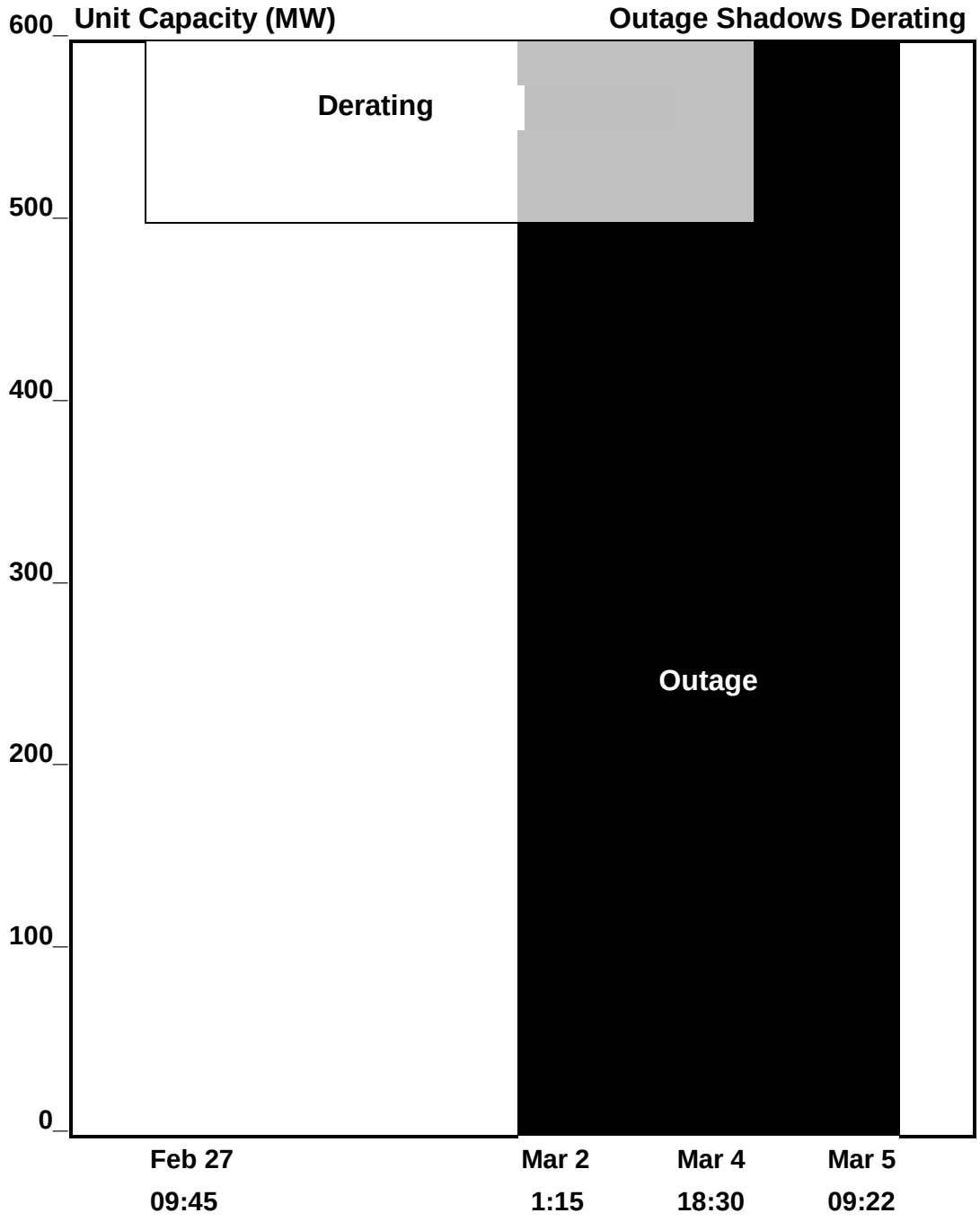


Figure G-6A — Derating Overlapped by an Outage
Derating Ends before Outage

Example 6B: Derating Overlapped by a Full Outage Full Outage Begins and Ends During Derating

Description of Events

A pulverizer motor failed on May 18 at 09:45 a.m. causing a 100 MW derating.

While the unit was derated, a maintenance crew discovered a severe water wall tube leak, forcing the unit off-line immediately. That occurred on May 20 at 6:45 p.m. The tube was welded, and the unit brought back into service at 2:42 a.m. on May 24. Pulverizer repairs were still in progress, so the unit was limited to 500 MW. The unit was available for full load on May 25 at 2:30 p.m. when pulverizer repairs were completed.

Report the following on Records 01, 02 and 03 of Event Report (07):

Event Number:	0018	
Event Type:	D1	
Start of Event:	May 18 at 09:45	
End of Event:	May 25 at 14:30	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	500	
Dominant Derating Column	(blank)	Record 01

System/Component Cause Code:	0253	
Time: Work Started:	*	
Time: Work Completed:	*	
Man Hours Worked:	16	Records 02/03

Event Number:	0019	
Event Type:	U1	
Start of Event:	May 20 at 18:45	
End of Event:	May 24 at 02:42	
Dominant Derating Column	(blank)	Record 01

System/Component Cause Code:	1000	
Time: Work Started:	*	
Time: Work Completed:	*	
Man Hours Worked:	60	Records 02/03

Effect on Unit Availability

The outage interrupts the derating for 79.95 hours. The derating affects availability for 57 hours before the outage and 35.80 hours after the outage. Availability losses due to the derating are:

[(600 MW - 500 MW) * (57.00 Hours + 35.80 Hours)]/600 MW = 15.47 Equivalent Derated Hours

Component Repairs

Repair of the pulverizer motor, the cause of the derating, took 172.75 hours. The waterwall tube section repairs took 79.95 hours.

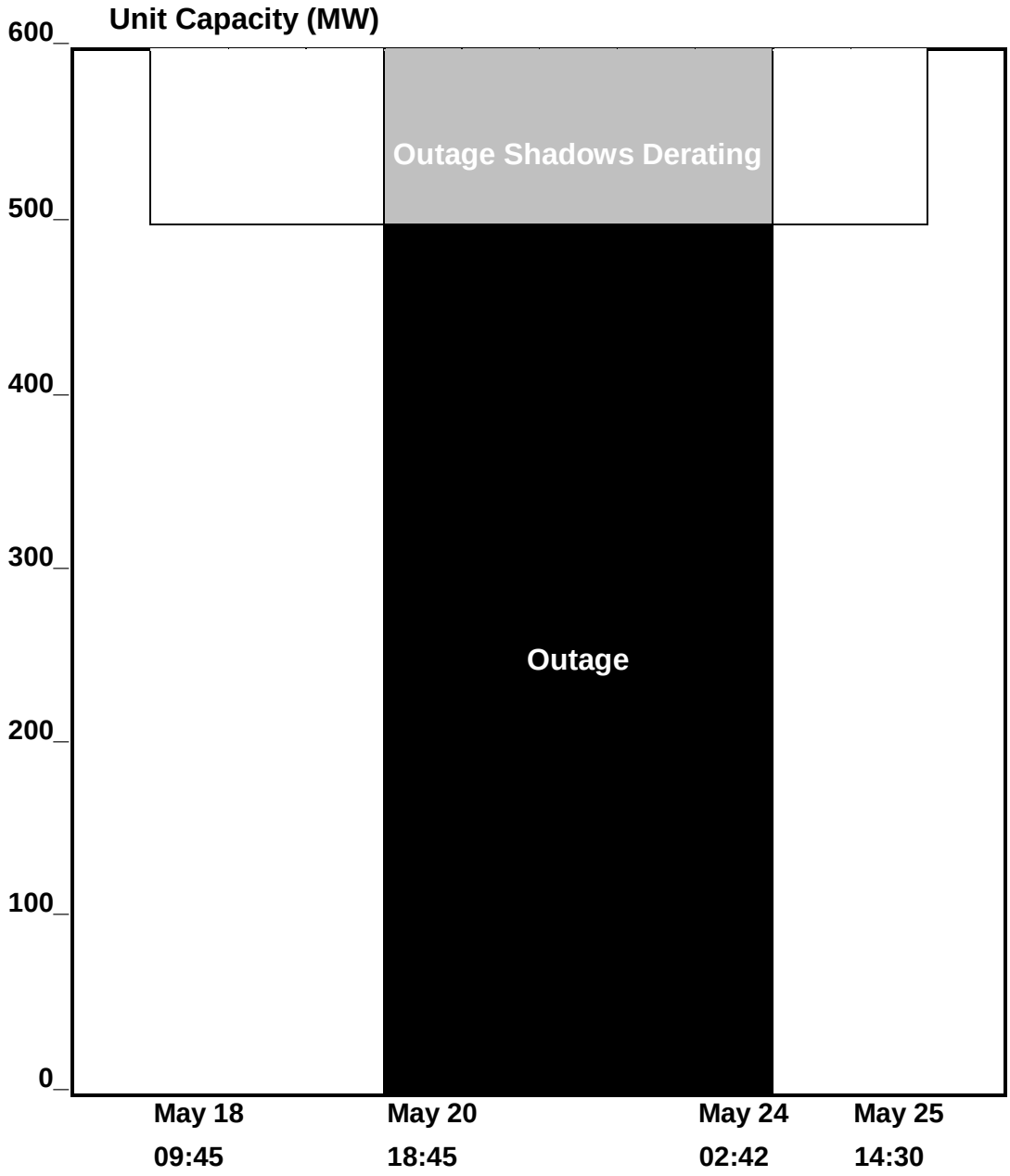


Figure G-6B — Derating Overlapped by an Outage
Outage Begins and Ends during Derating

Example 7: Startup Failure

Event Description

Riverglenn began its normal 15-hour startup cycle following a two-week planned outage on October 1, 7:00 a.m. At the end of the normal cycle; however, the unit was not ready to synchronize. The reason was excessive H.P. turbine rotor vibration. The problem was corrected and Riverglenn #1 synchronized at 3:00 a.m. on October 3.

Report the following on Records 01, 02 and 03 of Event Report (07):

Event Number:	0022	
Event Type:	SF	
Start of Event:	October 1 at 22:00*	
End of Event:	October 3 at 03:00	
Dominant Derating Column	(blank)	Record 01

System/Component Cause Code:	4030	
Time: Work Started:	October 1 at 23:00	
Time: Work Completed:	October 2 at 16:00	
Event Contribution Code:	1	
Man Hours Worked:	*	Records 02/03

Effect on Total Unit Availability

*The startup failure event began when the 15-hour startup cycle was exceeded. The unit is charged with a forced outage (SF) for the 29 hours it took to repair the H.P. turbine vibration problem and synchronize the unit.

Component Repair

The H.P. turbine rotor shaft took 17 hours to repair.

An outage or reserve shutdown must immediately precede a Startup Failure event. The end of the outage must be the same as the start of the SF event (see Page III-8).

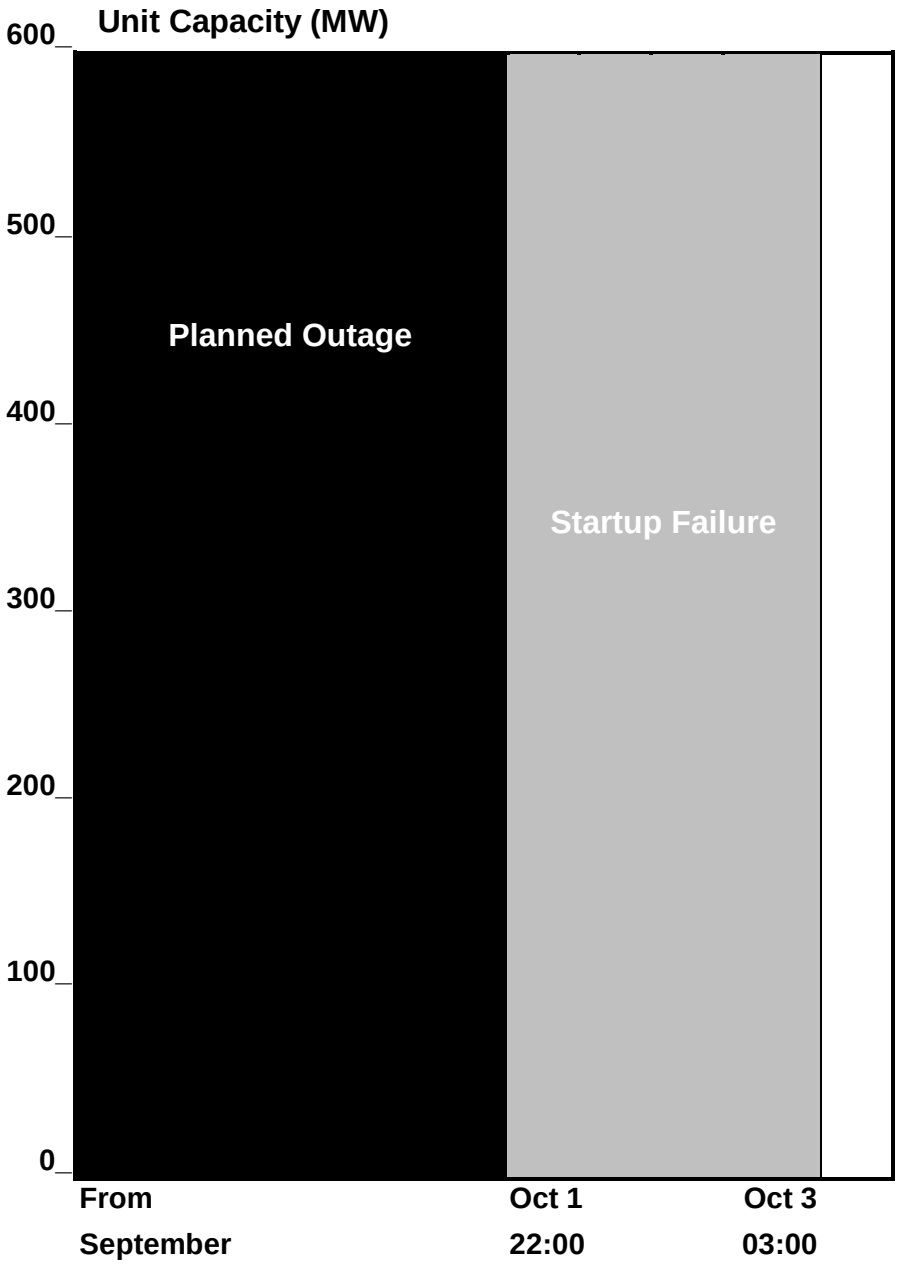


Figure G-7 — Startup Failure

Example 8: Fuel Conservation

Description of Events

On June 10 at 8:00 a.m., management decided to operate Riverglenn #1 at 50% capacity – 300 MW – in order to avoid a potential fuel shortage. If system demand increased, Riverglenn would be returned to full load. Because Riverglenn was not limited by equipment, the decision to operate at a reduced load was an economic issue.

On August 25 at 5:00 a.m., the station reported that fuel was in short supply and the unit could no longer reach full load as a result. An unplanned derating began when fuel became a limitation. The Net Available Capacity as a result of the derating was 300 MW.

Riverglenn's fuel supply was exhausted on September 3 at 9:00 p.m. and the unit was forced out of service. A new supply of fuel was delivered on September 4. The unit was restarted and synchronized at 4:00 p.m. on September 6.

Report the following on Records 01, 02, and, 03 of Event Report (07):

Event Number:	0020	
Event Type:	D1	
Start of Event:	August 25 at 05:00	
End of Event:	September 3 at 21:00	
Gross Available Capacity as a Result of Event:	*	
Net Available Capacity as a Result of Event:	300	
Dominant Derating Column	(blank)	Record 01

System/Component Cause Code:	9130	
Time: Work Started:	*	
Time: Work Ended	*	
Man Hours Worked:	*	Records 02/03

Event Number:	0021	
Event Type:	U1	
Start of Event:	September 3 at 21:00	
End of Event:	September 6 at 16:00	
Dominant Derating Column	(blank)	Record 01

System/Component Cause Code:	9130	
Time: Work Started:	*	
Time: Work Ended:	*	
Man Hours Worked:	*	Records 02/03

Effect of Unit Availability

Availability was unaffected until the fuel limitation prevented the unit from returning to full load. When that occurred, unit availability was affected. Equivalent Derated Hours for the derating are 116 ([(600 MW - 300 MW * 232.00 hours)/600] = 116). The outage was responsible for 67.00 unavailable hours.

The situation described typically affects fossil and hydro units. Nuclear units are sometimes operated at reduced levels to "stretch the core" in order to prolong the time to the next refueling. If the reactor core is capable of full load, the decision to operate at a lower level is an economic issue and therefore not reportable to GADS. When

the core can no longer support operation at full load, a planned derating (PD) is reported. This condition is sometimes referred to as "coasting down." The magnitude of these deratings usually increase incrementally and should be reported as a series of PD events.

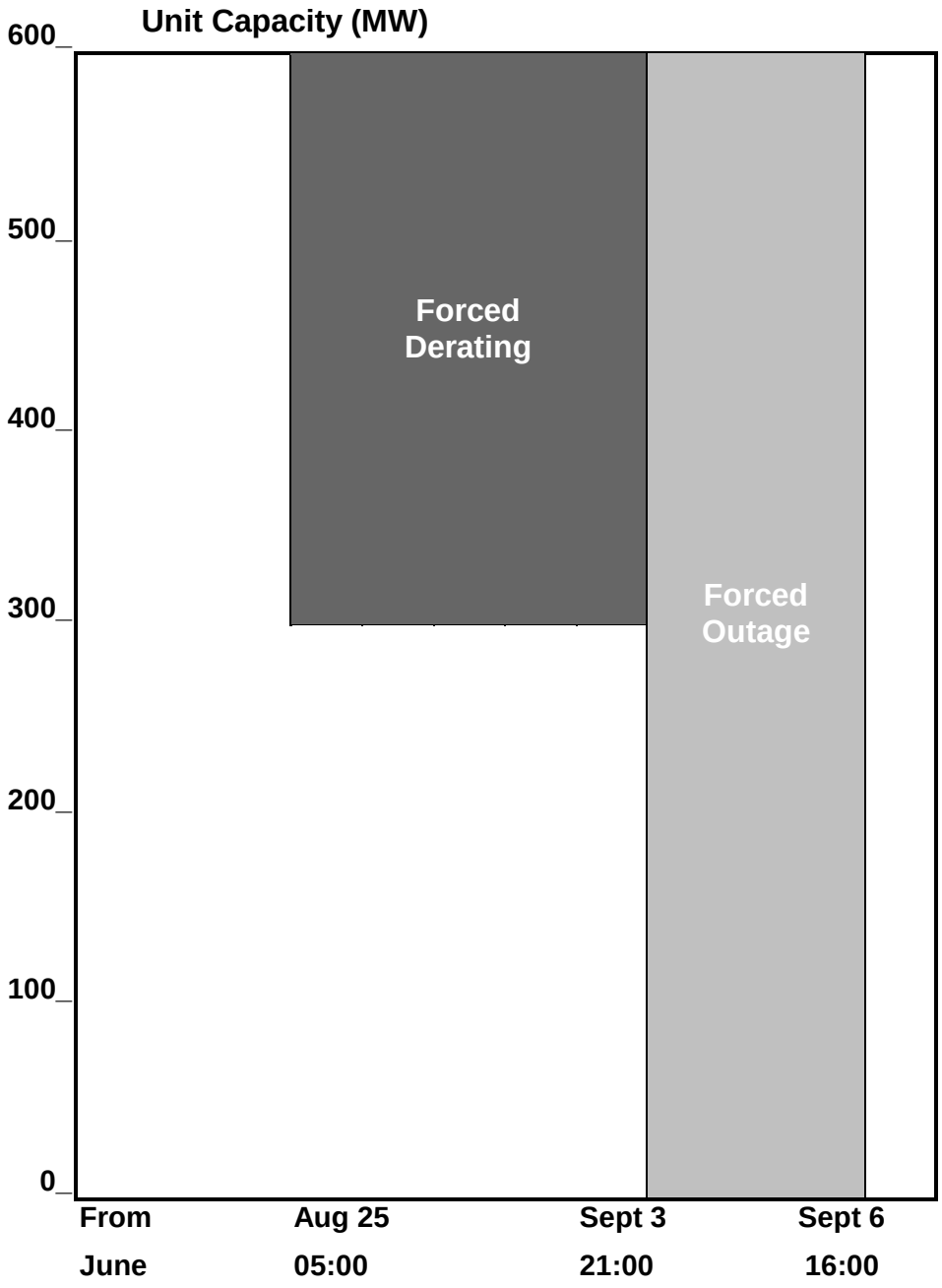


Figure G-8 — Fuel Conservation

Example 9: Transitions - U2 to RS to SF

Description of Events

After experiencing several hours of excessive scrubber ID fan vibration, Riverglenn was taken off line for repair on December 3 at 3:30 p.m. After pinpointing the problem, repairs were made. The unit was ready to begin its normal 15-hour startup cycle by 21:30 p.m. on December 5. However, due to low demand, Riverglenn entered the reserve shutdown state. Startup began at 2:30 a.m. the following morning. Several waterwall tubes burst during the startup, requiring immediate repair. The tube problem occurred at 9:00 a.m. on December 6. After repairing the tubes and a successful startup, Riverglenn synchronized on December 9 at 5:00 p.m.

Report the following on Records 01, 02 and 03 of Event Report (07):

Event Number:	0023	
Event Type:	U2	
Start of Event:	December 3 at 15:30	
End of Event:	December 5 at 21:30	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	8262	
Time: Work Started:	December 3 at 16:00	
Time: Work Completed:	December 5 at 06:30	
Man Hours Worked:	72	Records 02/03
Event Number:	0024	
Event Type:	RS **	
Start of Event:	December 5 at 21:30	
End of Event:	December 6 at 09:00	
Dominant Derating Column	(blank)	Record 01
Event Number:	0025	
Event Type:	SF	
Start of Event:	December 6 at 09:00	
End of Event:	December 9 at 17:00	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	1000	
Time: Work Started:	*	
Time: Work Completed:	*	
Event Contribution Code:	1	Records 02/03

Effect on Unit Availability

In this sequence of events — U2 to RS to SF — Riverglenn's availability is affected for 54.00 actual hours due to ID fan problems and 80.00 actual hours due to the water wall tube failure.

Component Repair

The scrubber ID fan is charged with 38.50 repair hours, and the water wall tubes with 80.00 repair hours.

*** Reporting a primary cause of event for Reserve Shutdowns is optional. In this example, Records 02/03 were omitted.*

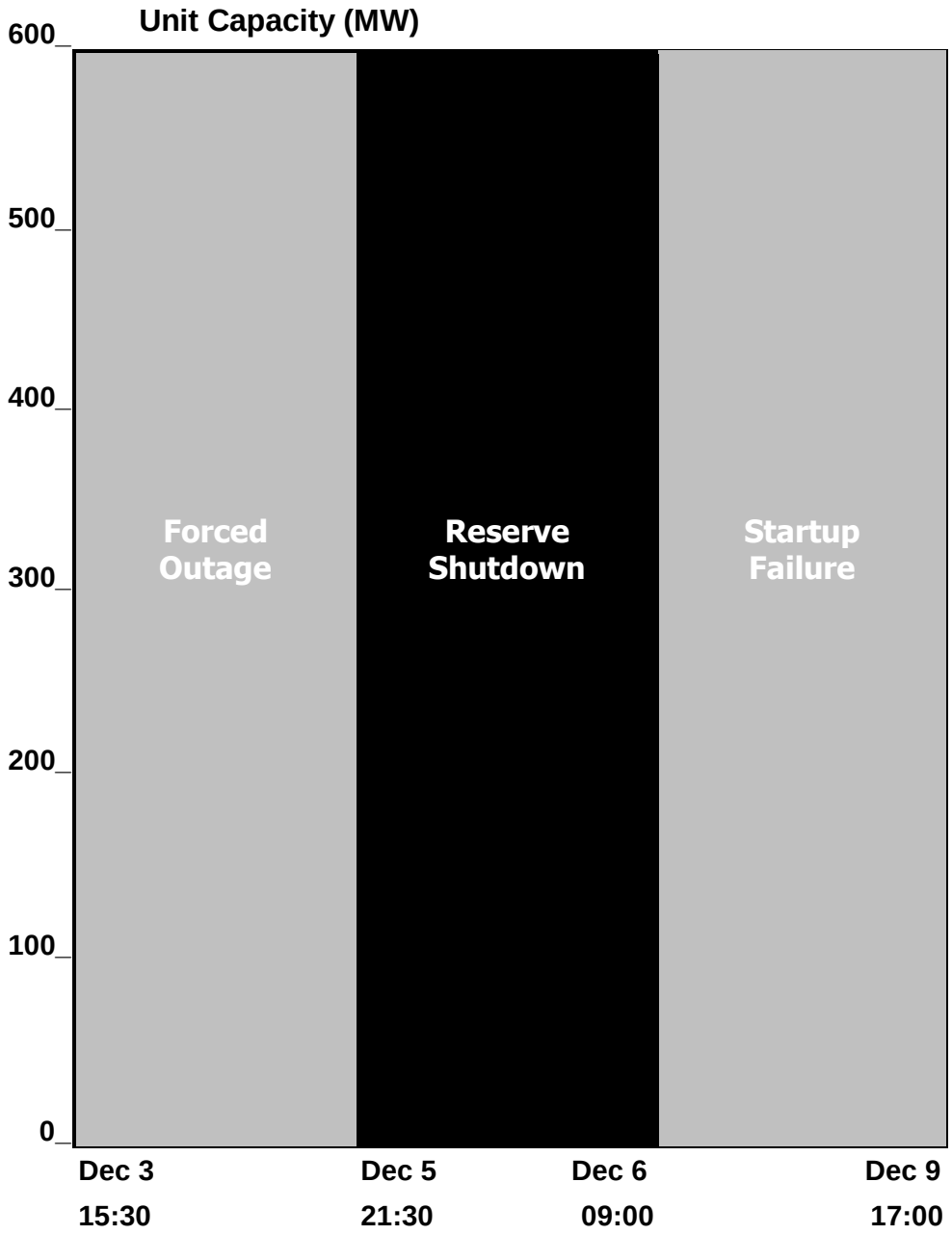


Figure G-9 — Event Transitions U2 to RS to SF

Appendix H: Failure Mechanism Codes

GADS	
Codes	**Description**
F010	Alignment/clearance not within limits – axial
F020	Alignment/clearance not within limits – radial
F030	Arced/flashover – electrical
F040	Balance, not within limits
F050	Binding – radial related contacts (use F670 if contact is in axial direction)
F060	Broken
F070	Burned/fire damage – initiated by component (ex. burned motor)
F080	Burned/fire damage – not initiated by component (ex. pump fire damage due to motor fire)
F090	Calibration, not within limits
F100	Carbon, covered
F110	Chemical excursion damage
F120	Clogged
F130	Closed
F140	Condensation – oil
F150	Condensation – water
F160	Connection, loose
F170	Contaminated – liquid fluids (use F320 for air contamination)
F180	Contaminated – metals and solids
F190	Cooling, inadequate – liquid
F200	Cooling, inadequate – air
F210	Corrosion – general
F220	Corrosion – caustic
F230	Corrosion – fatigue
F240	Corrosion – high temperature coal ash
F250	Corrosion – high temperature oil ash
F260	Corrosion – low temperature
F270	Corrosion – waterwall fire-side
F280	Cracked
F290	Creep, high temperature
F300	Damaged, foreign object
F310	Damaged, insulation
F320	Dirty (use for air contamination or particulate/dirt buildup)
F330	Disengage, failed to
F340	Engage, failed to
F350	Erosion – coal particle
F360	Erosion – falling slag
F370	Erosion – soot blower
F380	Erosion – fly ash
F390	Erosion – cause unknown
F400	Erratic or unexplained operating behavior
F410	Erratic, circuit
F420	Error, operator
F430	Error, wiring
F440	Explosion damage – initiated by the component (ex. pump explosion)
F450	Explosion damage – not initiated by the component (ex. pipe damage due to pump explosion)

GADS	
Codes	**Description**
F460	Flameout
F470	Foaming
F480	Frozen (temperature related)
F490	Grounded electrical component
F500	Hydrogen damage
F510	Impact damage
F520	Indication, false
F530	Inspection
F540	Leaks
F550	Loose
F560	Lubrication – excessive
F570	Lubrication – lack of
F580	Maintenance – cleaning damage
F590	Maintenance – general
F600	Material defects
F610	Modification(s)
F620	Noisy
F630	Open
F640	Overload
F650	Pitting (localized corrosion)
F660	Pressure, not within limits
F670	Rubbing damage – axial related contacts (use F050 if contact is in radial direction)
F680	Secondary damage
F690	Seized (not moving)
F700	Shorted electrical component
F710	Short-term overheating
F720	Sticking
F730	Stress corrosion cracking
F740	Temperature – compressor discharge, not within limits
F750	Temperature – exhaust, not within limits
F760	Temperature – oil, not within limits
F770	Temperature – wheel spacers, not within limits
F780	Temperature – general, not within limits
F790	Testing
F800	Thermal fatigue
F810	Torn
F820	Tripped/shutdown component – automatic controls
F830	Tripped/shutdown component – manual
F840	Unknown – investigation underway (change this code once failure mechanism is determined)
F850	Vibration, not within limits
F860	Vibration fatigue, leading to failure
F870	Voltage, not within limits
F880	Welded relay contacts
F890	Weld failure – broken weld
F900	Weld failure – dissimilar metals
F910	Weld failure – weld defects
F920	Wiped

GADS	
Codes	**Description**
F930	Worn, excessively
FA00	Silica restriction
FC00	Cleaning
FD00	Water Induction
FE00	Emission/environmental restrictions
FF00	Fouling
FP00	Personnel error
FR00	Fire
FS00	Slagging
FU00	Parts Unavailable
FV00	Vibration
FW00	Wet coal/frozen coal/debris
FX00	External equipment malfunction (outside plant management control)

Appendix I: GADS Data Release Guidelines

Data Release Guidelines

Unless expressly permitted in the following sections, or section 1500 of the NERC Rules of Procedure data by power generator, pool, Region, or specific unit will be provided only with the authorization of the appropriate power generator, pool, or Region. ("Power generators" are any owners or operators of electric generating units owned/operated by investor-owned, independent power producer (IPP), municipals, cooperative, federal, state, and all other groups of electric providers.) Special reports or studies which describe or rank power generators, pools, or regions by performance or other attributes – and in which specific units, power generators, pools, or regions are identifiable either by inclusion or exclusion – will be provided only with the authorization of the appropriate power generators, pools, or regions. Obtaining these approvals is the responsibility of the requester.

Appendix J: Cause Code Amplification Codes

The purpose of the amplification code is to further identify the cause of an outage by describing the failure mode. The amplification code is two alpha-numeric characters following the cause code (see Page III-25). Failure modes are leaks, corrosion, personnel error, fire, etc. They are almost identical to the GADS Failure Mechanism Codes (see *Appendix H*) except the Cause Code Amplification Code is just two-characters. Some existing cause codes contain these amplification codes as part of their description. The Cause Code Amplification Code allows all cause codes to be described with the set of failure modes without increasing the number of cause codes. It will also allow analysts to further explore the common causes of outages.

There are a few cases where the amplification code is limited to specific event types or conditions. The table below captures the specific limits. "None" means that the amplification codes can be used with any event types.

GADS Amplification Code	Description	Event Type Limits
01	Alignment/clearance not within limits – axial	None
02	Alignment/clearance not within limits – radial	None
03	Arced/flashover – electrical	None
04	Balance, not within limits	None
05	Binding – radial related contacts (use F670 if contact is in axial direction)	None
06	Broken	None
07	Burned/fire damage – initiated by component (ex. burned motor)	None
08	Burned/fire damage – not initiated by component (ex. pump fire damage due to motor fire)	None
09	Calibration, not within limits	None
10	Carbon, covered	None
11	Chemical excursion damage	None
C0	Cleaning	None
12	Clogged	None
13	Closed	None
14	Condensation - oil	None
15	Condensation - water	None
16	Connection, loose	None
17	Contaminated – liquid fluids (use F320 for air contamination)	None
18	Contaminated – metals and solids	None
20	Cooling, inadequate – air	None
19	Cooling, inadequate – liquid	None
22	Corrosion – caustic	None
23	Corrosion – fatigue	None
21	Corrosion – general	None
24	Corrosion – high temperature coal ash	None
25	Corrosion – high temperature oil ash	None
26	Corrosion – low temperature	None
27	Corrosion – waterwall fire-side	None
28	Cracked	None

GADS Amplification Code	Description	Event Type Limits
29	Creep, high temperature	None
30	Damaged, foreign object	None
31	Damaged, insulation	None
32	Dirty (use for air contamination or particulate/dirt buildup)	None
33	Disengage, failed to	None
E0	Emission/Environmental Restriction	None
34	Engage, failed to	None
35	Erosion – coal particle	None
36	Erosion – falling slag	None
38	Erosion – fly ash	None
37	Erosion – soot blower	None
39	Erosion – cause unknown	None
40	Erratic or unexplained operating behavior	None
41	Erratic, circuit	None
42	Error, operator	None
43	Error, wiring	None
44	Explosion damage – initiated by the component (ex. pump explosion)	None
45	Explosion damage – not initiated by the component (ex. pipe damage due to pump explosion)	None
X0	External equipment malfunction (outside plant management control)	None
R0	Fire	None
46	Flameout	None
47	Foaming	None
F0	Fouling	None
48	Frozen (temperature related)	None
FR	Fuel related	None
49	Grounded electrical component	None
50	Hydrogen damage	None
51	Impact damage	None
52	Indication, false	None
53	Inspection	None
54	Leaks	None
55	Loose	None
56	Lubrication – excessive	None
57	Lubrication – lack of	None
58	Maintenance – cleaning damage	None
59	Maintenance – general	None
60	Material defects	None
61	Modification(s)	None
62	Noisy	None
NF	No Fuel	None
63	Open	None

GADS Amplification Code	Description	Event Type Limits
NW	No Water – Run of River	Hydro only
64	Overload	None
U0	Parts unavailable	None
P0	Personnel error	None
65	Pitting (localized corrosion)	None
66	Pressure, not within limits	None
67	Rubbing damage – axial related contacts (use F050 if contact is in radial direction)	None
68	Secondary damage	None
69	Seized (not moving)	None
71	Short-term overheating	None
70	Shorted electrical component	None
A0	Silica restriction	None
S0	Slagging	None
ST	Steam transfer	None
72	Sticking	None
73	Stress corrosion cracking	None
H0	Temperature – high, not within limits	None
74	Temperature – compressor discharge, not within limits	None
75	Temperature – exhaust, not within limits	None
78	Temperature – general, not within limits	None
76	Temperature – oil, not within limits	None
77	Temperature – wheel spacers, not within limits	None
79	Testing	None
80	Thermal fatigue	None
81	Torn	None
82	Tripped/shutdown component – automatic	Deratings only
83	Tripped/shutdown component – manual	Deratings only
T1	Tripped/shutdown grid separation – automatic	In-service U1 outage only
T2	Tripped/shutdown grid separation – manual	In-service U1 outage only
84	Unknown – investigation underway (change this code once failure mechanism is determined)	In-service U1 outage only
V0	Vibration (other)	None
86	Vibration fatigue, leading to failure	None
85	Vibration, not within limits	None
87	Voltage, not within limits	None
D0	Water induction	None
89	Weld failure – broken weld	None
90	Weld failure – dissimilar metals	None
91	Weld failure – weld defects	None
88	Welded relay contacts	None
W0	Wet coal/frozen coal/debris	None
92	Wiped	None
93	Worn, excessively	None

Appendix K: Outside Management Control

Following this introduction of Outside Management Control (OMC) guidelines, we have listed those cause codes that GADS recognizes as being outside plant management control. At the end of this Appendix are guidelines for removing OMC events from standard calculations. Annex D of IEEE 762, quoted below, sets the standard for defining and handling OMC events. For more comments on OMC events, please refer to Section I-2 and III-13 of these GADS Data Reporting Instructions.

Annex D: Outside of Plant Management Control
The electric industry in Europe and other parts of the world has made a change to examine losses of generation caused by problems with and outside plant management control. After reviewing the work used by others, the following is provided as guidelines for determining what is and is not outside plant management control:

There are a number of outage causes that may prevent the energy coming from a power generating plant from reaching the customer. Some causes are due to the plant operation and equipment while others are outside plant management control.

The standard sets a boundary on the generator side of the power station (see Figure K-1, below) for the determination of equipment "outside management control".

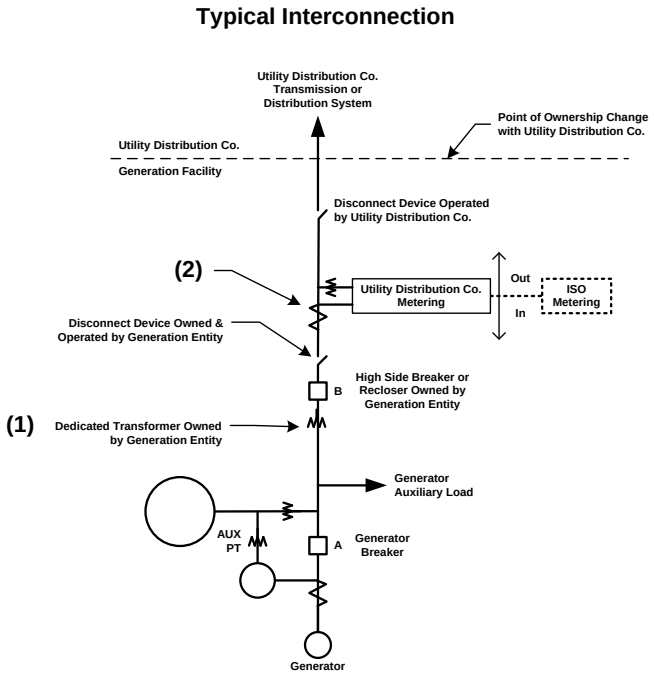


Figure K-1: The Physical Boundary of Outside Management Control

As shown in Figure K-1, a generating unit includes all equipment up to (in preferred order) (1) the high-voltage terminals of the generator step-up (GSU) transformer and the station service transformers; (2) the GSU transformer (load) side of the generator-voltage circuit breakers; or (3) at such equipment boundary as may be reasonable considering the design and configuration of the generating unit.

It may be assumed that all problems within the power station boundary are within plant management control; however that is not always the case. Therefore, there is a need for some additional clarification as to what is and what is not under plant management control.

It is easier to identify those actions outside plant management control than to identify the responsibilities of plant management. Therefore, the following are considered to be outside (external) of plant management control. All other items are considered within their jurisdiction and are the responsibility of the plant management for calculating power plant performance and statistics.

- Energy losses due to the following causes should not be considered when computing the unit controllable performance because these losses are not considered to be under the control of plant management:
- Grid connection or substation failure. This reason relates to problems with transmission lines and switchyard equipment outside the boundaries of the plant as specified by the "boundary of plant responsibility" shown in Figure K-1 on this Annex.
- Acts of nature such as ice storms, tornados, winds, lightning, etc are not under plant management control, whether inside or outside the plant boundary.
- Terrorist attacks on the generating/transmission facilities or transmission operating/repair errors are not under plant management control.
- Special environmental limitations such as low cooling pond level, or water intake restrictions that could not be prevented by operator action. These are acts of nature such as high ambient temperatures where the equipment is working within design specifications. However, if the equipment is not maintained by the plant such as opacity out of limits or NOx out of control, etc, then plant management should be penalized. These are equipment problems and are within plant management control.
- (9130) Failure of fuel supplier to fulfill contractual obligations or a pre-arranged deal due to physical fuel disruptions or operational impairments (e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)

  This cause code is considered outside of management control. Examples of this would include:

  Firm pipeline gas transportation segment interrupted causing disruption or reduction in the flow of natural gas

  Physical damage to pipeline or cyber disruption

  Routine pipeline maintenance (e.g. pigging)

  Commodity supplier fails to deliver firm gas to primary pipeline receipt point

  (9131) Lack of fuel – due to contractual or tariff provisions that allow for service interruption or price fluctuations during peak demand periods.

  This cause code is not considered outside of management control. Examples of this would include:

  Company's fuel supply group allocates limited firm fuel to other fleet sites

  Interruptible pipeline transportation interrupted

  Pipeline issues Operational Flow Order

  Pipeline enforces ratable takes provision to tariff levels

  LDC confiscates or interrupts fuel scheduled for delivery to plant gate

  Plant fuel buyer rejects gas at implied delivered price (possibly including penalties)
- Labor strikes. Outages or load reductions caused by labor strikes are not normally under the direct control of plant management. These strikes may be company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.

However, direct plant management grievances that result in a walkout or strike are under plant management control and are included as penalties against the plant. If a labor strike is caused by plant management/worker problems during an outage, any outage extensions are included as energy losses as long as the unit is incapable of being restarted because of equipment failures, maintenance, overhauls, or other activities.

- Other weather related problems such as seasonal variations in gross dependable capacity due to cooling water temperature variations are not within plant management control.

GADS Cause Codes Outside Plant Management Control

(As of January 1, 2006)

3600	Switchyard transformers and associated cooling systems - external (OMC)
3611	Switchyard circuit breakers - external (OMC)
3612	Switchyard system protection devices - external (OMC)
3619	Other switchyard equipment - external (OMC)
3710	Transmission line (connected to powerhouse switchyard to 1st Substation)
3720	Transmission equipment at the 1st substation (see code 9300 if applicable)
3730	Transmission equipment beyond the 1st substation (see code 9300 if applicable)
9000	Flood
9001	Drought
9010	Fire including wildfires, not related to a specific component
9020	Lightning
9025	Geomagnetic disturbance
9030	Earthquake
9031	Tornado
9035	Hurricane
9036	Storms (ice, snow, etc)
9040	Other catastrophe
9130	Failure of fuel supplier to fulfill contractual obligations or a pre-arranged deal due to physical fuel disruptions or operational impairments (e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)
9135	Lack of water (hydro)
9150	Labor strikes company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.
9200	High ash content (OMC)
9210	Low grindability (OMC)
9220	High sulfur content (OMC)
9230	High vanadium content (OMC)
9240	High sodium content (OMC)
9250	Low BTU coal (OMC)
9260	Low BTU oil (OMC)
9270	Wet coal (OMC)
9280	Frozen coal (OMC)
9290	Other fuel quality problems (OMC)
9300	Transmission system problems other than catastrophes (do not include switchyard problems in this category; see codes 3600 to 3629, 3720 to 3730)
9320	Other miscellaneous external problems
9500	Regulatory (nuclear) proceedings and hearings - regulatory agency initiated
9502	Regulatory (nuclear) proceedings and hearings - intervenor initiated

9504	Regulatory (environmental) proceedings and hearings - regulatory agency initiated
9506	Regulatory (environmental) proceedings and hearings - intervenor initiated
9510	Plant modifications strictly for compliance with new or changed regulatory requirements (scrubbers, cooling towers, etc.)
9520	Oil spill in Gulf of Mexico (OMC)
9590	Miscellaneous regulatory (this code is primarily intended for use with event contribution code 2 to indicate that a regulatory-related factor contributed to the primary cause of the event)

Policy on Handling Outside Management Control (OMC) Events and their Equations in GADS

(As of December 9, 2004)

Background

The IEEE 762 "Definitions for Reporting Electric Generating Unit Reliability, Availability and Productivity" (Annex D) is the basis for the OMC work. In part, Annex D states that:

> *"There are a number of outage causes that may prevent the energy coming from a power generating plant from reaching the customer. Some causes are due to the plant operation and equipment while others are outside plant management control."*

This Appendix K lists a number of cause codes that is universally accepted as those outside the control of management by the GADS program. It also identifies certain conditions under which those specific cause codes would be applied. The list may change with time and some additional clarifications may be added.

The list of cause codes shown hereafter should be reviewed from time to time to insure the latest cause codes are used in the OMC equations.

It is also VERY important that all cause codes (including all OMC cause codes) be reported to GADS. Some companies may wish to exclude a forced outage or change it to a non-curtailing event if it fits into the OMC category. THAT IS NOT RIGHT! The event should be reported as a forced outage and the OMC calculations will show the events without the FO.

Handling OMC Events

OMC events will come in two forms: outages or deratings. The OMC event types can be either forced, maintenance or planned but it is expected that the majority will be forced outage events.

For all existing GADS equation calculations, the OMC events will be treated as a standard event, i.e., a forced outage, forced derate, etc. The calculation will not change and will follow the calculations shown in Appendix F of the GADS DRI.

In calculating equations without OMC events, it is important to remember that the objective of the removal of OMC events is to affect the availability of the unit. To that end, we handle outages differently than derates. In removing a particular event from a unit's event records we are faced with the question of what to put in place of the missing event. In the case of an outage, there is no sure way of knowing in what state a unit should be considered. The only sure thing is our objective of returning those hours to an available state. That is exactly what we do and that is all we do. Assuming that the unit is in reserve or in service during the time of the removed OMC outage event, and so, adding to either service or reserve hours presents a fictional summary of the unit's

performance. In viewing the available hours we temporarily recalculate AH as (Service + Reserve + Synchronous Condensing + Pumping + OMC).

In the case of a derating event, however, we know for certain the state of the unit at the time of the removed event. Whenever an event is removed it is necessary to look for any derating events that may have been shadowed by or overlapping the removed event. Those overlapping hours must be accounted for by the software processing the OMC event. It isn't enough to simply recalculate Equivalent Availability by adding the sum of the removed OMC events because we need to now take into account the effect of the newly uncovered (un-overlapped) derating events.

Before we begin defining the methods there is an important assumption that needs to be made as to the processing of the data. Since the removal of the OMC outage event is seen as an adjustment, we'll assume that outage events have been processed as normal and that OMC removal is acting on clean data and that performance totals have already been summed for the unit. Also, in the case of derate events, that loss attributed to an event has been calculated particularly in the case of overlapping and shadowed events.

OMC Process Methods by Event Type

1. **Outage Events** – In simple terms, when an OMC outage event is encountered, the total associated hours would be reduced as well as the number of occurrences. In order to help keep our numbers in balance, we'll add these hours to an OMC Hours category. Notice that in each example below we are increasing available hours and not service hours even though we are reducing outage hours.

    a. **Forced Outage** – Regardless of whether it is a U1, U2, U3 or SF, removing an OMC_FO event would cause a decrease in Forced Outage hours and Forced Outage Occurrences and an increase in Available Hours.

    b. **Planned Outage** – Removing an OMC_PO event would cause a decrease in Planned Outage hours and Planned Outage Occurrences and an increase in Available Hours.

    c. **Maintenance Outage** – Removing an OMC_MO event would cause a decrease in Maintenance Outage hours and Maintenance Outage Occurrences and an increase in Available Hours.

    d. **Derate Event shadowed by an OMC outage** – If the removed OMC outage event shadows a derating event, the equivalent hours shadowed by the outage needs to be added into the equivalent outage hours so that it can be reflected in the equivalent availability.

2. **Derate Events** – In removing OMC derate events, it is important to keep in mind that the loss of capacity (a.k.a. reduction) originally calculated and attributed to an event is maintained when the OMC event is removed. The removal of the OMC event then properly affects the available capacity of the unit rather than increasing the losses attributed to the surrounding / overlapping derating events. Illustrations are included below in order to aid the explanations.

    a. **A simple OMC derate** – When there are no overlapping derating events, the equivalent hours of the OMC event can be removed from the total equivalent hours and the associated event occurrences can also be reduced by 1. The number of derate hours also is reduced by the duration of the event.

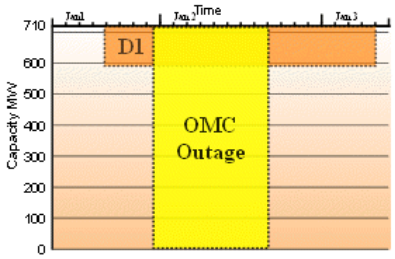
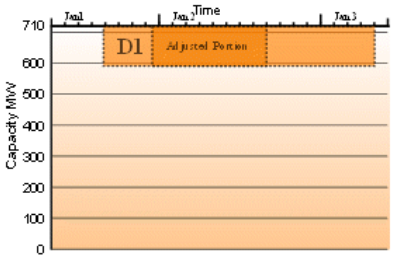
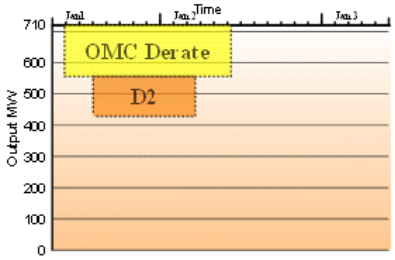
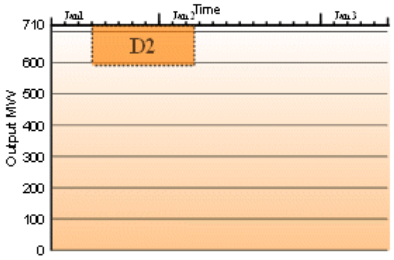
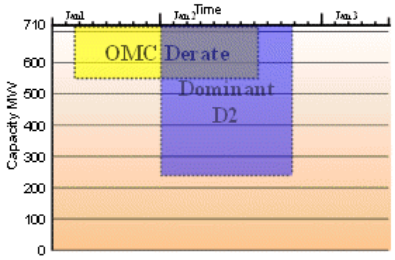
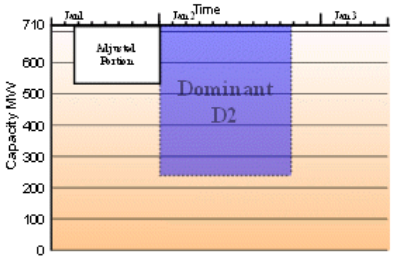
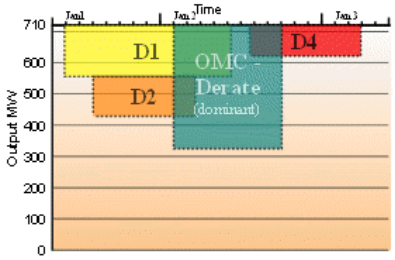
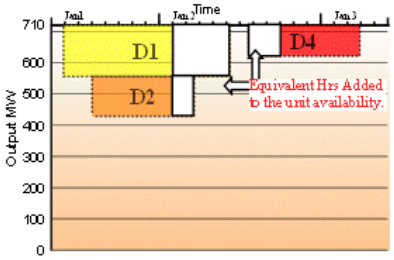
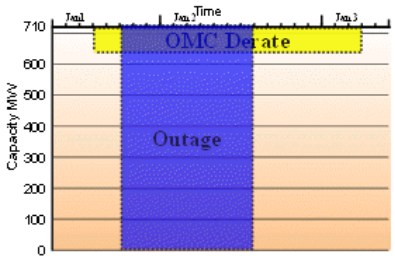
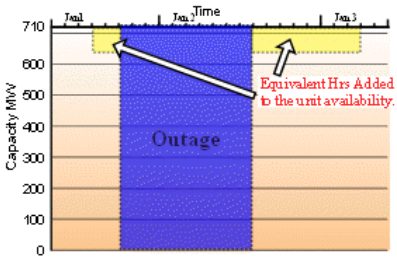
    b. **An OMC derate event overlapped by another derate** – If an OMC event is removed and there is another overlapping derate event, the OMC is removed and totals are adjusted just as in case 'a' above. The NAC of the unit at the start of the overlapping event is increased, but the loss attributed to that event remains constant. (Normal derate events are considered loss-constant throughout their duration)

    c. **OMC derate event which is shadowed by a dominant derate** – In this case, the overlapping derate is dominant and so, is considered to be capacity-constant. This means that removing the OMC event has

no effect on the available capacity within the dominant overlapping derate. The adjustment to the unit performance stats would be limited to the duration and equivalent hours of that portion of the OMC event that exists outside the dominant derate.

d. **A dominant OMC derate overlaps another derate** – When the OMC derate event is marked as dominant, multiple adjustments may be necessary. The first adjustment is to take care of the total duration and equivalent hours of the OMC derate event. Once the OMC derate event affect is removed, the overlapped derate event(s) need to be accounted for by adding those portions of the event(s) that were overlapped by the OMC event to the equivalent hours total as well as any total durations. The number of derate event occurrences would not need to be adjusted.

e. **OMC derate event is shadowed by an outage** – Since an outage effectively truncates the derate event, only the portion of the OMC derate that extends outside the overlapping outage needs to be accounted for and removed.

Example#	Before OMC event removal	After OMC event removal
1-d - Derate Event shadowed by an OMC outage		
	OMC Outage (any type) is removed from shadowed derate.	Unit available hours increase by the outage duration. Equivalent hours are adjusted upward by the overlapped portion when derate D1 is now accounted for at its actual value.
2-b - An OMC derate event overlapped by another derate		
	OMC Derate is removed from above D2	Loss attributed to D2 remains unchanged. NAC of the unit increases
2-c - OMC derate event which is wholly or partially shadowed by a dominant derate		
	OMC Derate is removed from inside D2	The effect of removing the OMC event is to increase availability by the portions which extend beyond the dominant derate.
2-d – Dominant OMC derate overlaps other derates		
	Dominant OMC Derate is removed.	Events D1, D2 and D4 are extended and totalled at their original values.
2-e - OMC derate event is shadowed by an outage		
	OMC Derate is removed from being shadowed by an outage (any type)	The effect of removing the OMC event is to increase availability by the portions which extend beyond the outage.

New OMC Equations

Please note that all equations that include OMC events be calculated in the same methods and have the same names as that in IEEE 762 and Appendix F of the GADS DRI. In other words, those equations will not change at all but will be the benchmark as to what the unit was able to provide under all circumstances.

Please note also that any equation that excludes OMC events be calculated in the same methods as that in IEEE 762 and Appendix F of the GADS DRI but the names are modified to show they exclude OMC events. These equations will be used against the benchmark calculations to show what the unit *could* have done without OMC events. Both numbers will be provided by GADS and either number can be used based on the needs and the reports.

Equations 95-141 in Appendix F are for calculating the performance statistics without OMC events. Please note that they are the same as the equations for calculating the performance statistics with OMC events except that their names have an "X" in front of them.

Table K-1 below shows how the event based performance statistics can be affected by excluding OMC events. Two statistics, Starting Reliability (SR) and Seasonal Derating Factor (SEDF), do not have without OMC definitions. XSR is not defined because IEEE 762 does not adjust the actual/attempted starts when OMC events are removed, and although SEDF is based on available hours (AH), a without OMC version is not defined by NERC. Service Factor (SF) is not affected because it is only based on service hours (SH), which are not affected by removing OMC events. Because only AH is adjusted when excluding OMC events the performance statistics do, on rare occasions, exceed 100%. That is inherent with the concept of OMC events because the objective of their removal is to affect the availability of the unit and nothing else.

Table K-1: Comparison of OMC Affect on Performance Statistics in Appendix F

DESCRIPTION	CALC No.	NAME w/ OMC	CALC No.	NAME w/o OMC	AFFECTED BY OMC?	NUMERATOR FORMULA	DENOMINATOR FORMULA
Starting Reliability	62	SR	**	n/a	FALSE *	ACTSU	ATTSU
Forced Outage Factor	3	FOF	97	XFOF	TRUE	FOH	PH
Maintenance Outage Factor	4	MOF	98	XMOF	TRUE	MOH	PH
Planned Outage Factor	1	POF	95	XPOF	TRUE	POH	PH
Unplanned Outage Factor	2	UOF	96	XUOF	TRUE	FOH + MOH	PH
Scheduled Outage Factor	5	SOF	99	XSOF	TRUE	POH + MOH	PH
Unavailability Factor	6	UF	100	XUF	TRUE	FOH + MOH + POH	PH
Availability Factor	7	AF	101	XAF	TRUE	PH - FOH - MOH - POH	PH

Table K-1: Comparison of OMC Affect on Performance Statistics in Appendix F							
DESCRIPTION	CALC No.	NAME w/ OMC	CALC No.	NAME w/o OMC	AFFECTED BY OMC?	NUMERATOR FORMULA	DENOMINATOR FORMULA
Service Factor	8	SF	102	XSF	FALSE ***	SH	PH
Seasonal Derating Factor	9	SEDF	**	n/a	TRUE	ESEDH	PH
Unit Derating Factor	10	UDF	103	XUDF	TRUE	EFDH + EMDH + EPDH	PH
Equivalent Unavailability Factor	11	EUF	104	XEUF	TRUE	POH + MOH + FOH + EFDH + EMDH + EPDH	PH
Equivalent Availability Factor	12	EAF	105	XEAF	TRUE	PH - FOH - MOH - POH - EFDH - EMDH - EPDH - ESEDH	PH
Equivalent Maintenance Outage Factor	17	EMOF	106	XEMOF	TRUE	MOH + EMDH	PH
Equivalent Planned Outage Factor	18	EPOF	107	XEPOF	TRUE	POH + EPDH	PH
Equivalent Forced Outage Factor	19	EFOF	108	XEFOF	TRUE	FOH + EFDH	PH
Equivalent Scheduled Outage Factor	20	ESOF	109	XESOF	TRUE	MOH + POH + EMDH + EPDH	PH
Equivalent Unplanned Outage Factor	21	EUOF	110	XEUOF	TRUE	MOH + FOH + EFDH + EMDH	PH
Forced Outage Rate	22	FOR	111	XFOR	TRUE	FOH	FOH + SH + SYNCHRS + PUMPHRS
Forced Outage Rate demand	23	FORd	112	XFORd	TRUE	f*FOH	SH + SYNC + f*FOH
Equivalent Forced Outage Rate	24	EFOR	113	XEFOR	TRUE	FOH + EFDH	FOH + SH + SYNCHRS + PUMPHRS + EFDHRS
Equivalent Forced	25	EFORd	114	XEFORd	TRUE	f*FOH + p*EFDH	SH + SYNC + f*FOH

Table K-1: Comparison of OMC Affect on Performance Statistics in Appendix F							
DESCRIPTION	CALC No.	NAME w/ OMC	CALC No.	NAME w/o OMC	AFFECTED BY OMC?	NUMERATOR FORMULA	DENOMINATOR FORMULA
Outage Rate demand							
Equivalent Planned Outage Rate	26	EPOR	115	XEPOR	TRUE	POH + EPDH	POH + SH + SYNCHRS + PUMPHRS + EPDHRS
Equivalent Maintenance Outage Rate	27	EMOR	116	XEMOR	TRUE	MOH + EMDH	MOH + SH + SYNCHRS + PUMPHRS + EMDHRS
Equivalent Unplanned Outage Rate	28	EUOR	117	XEUOR	TRUE	MOH + FOH + EFDH + EMDH	FOH + MOH + SH + SYNCHRS + PUMPHRS + EFDHRS + EMDHRS
Notes: * IEEE 762 does not recommend adjusting actual/attempted starts when removing OMC events. ** Not defined by NERC. * SH is not affected by OMC events; only AH is affected.**							

Appendix L1: Calculating Combined Cycle and Co-Generation Block Data Using the Synthesis Event and Performance Method

Overview

This document will explain the synthesis method for collecting combined-cycle data on a unit-level basis and creating combined-cycle block statistics from the unit-level event and performance information.

This document applies only to reporters who wish to report event and performance data for each generating unit individually. This document does not apply to reporters wishing to continue reporting combined-cycle data to GADS as a 'single unit' (or traditional method). GADS will still accept the traditional method but it is not favored over the reporting of each generating unit within the block.

***Please Note**: The majority of this document is the same as the fleet-type roll up method. The basic data gathering process on a unit-level basis is **identical** in all respects. The differences are in creating block statistics from the unit level data.*

IEEE 762 does not address reporting separate units and bringing the components together to create combined-cycle block statistics. Therefore, this document establishes a NERC methodology for creating new combined-cycle block event and performance records based on reported unit level event and performance records.

Terms

To insure proper documentation, some terms must be agreed on to eliminate some of the ambiguity concerning combined-cycle blocks in general.

Combined-Cycle Block (also known in the industry as a "Block") – By definition, a combined cycle is a process for generating energy (either electricity or steam) constituted by the marriage of a Brayton Cycle (expand hot gas to turn a gas turbine) with a Rankine Cycle (use heat to boil water to make steam to turn a steam turbine). A combined-cycle block employs electric generating technology in which electricity and process steam is produced from otherwise lost waste heat exiting from one or more combustion turbines. In most situations, the exiting waste heat is routed to a conventional boiler or to a heat recovery steam generator (HRSG) for use by a steam turbine in the production of electricity. Therefore, the combined-cycle block consists of one or more gas turbines/jet engines, one or more steam turbines, and balance-of-plant equipment supporting the production of electricity or steam energy.

There may be more than one combined-cycle block at a plant site. Our discussion relates to each individual combined-cycle block reporting, not the process of reporting several combined-cycle blocks as one plant site.

Units – Each generator set is considered a "unit." Typically in combined cycle, each gas turbine or jet engine and each steam turbine are considered a "unit." Each unit contributes to the total electric generation of the combined-cycle block.

Heat Recovery Steam Generator (HRSG) – There may be one or more HRSG or waste heat boilers in a combined-cycle block. Some units may have a single HRSG per GT/jet engine; others may have several GT/jet engines feeding a single HRSG. The HRSG does not contribute electricity to the output of the combined-cycle block and so, is considered a component rather than a unit.

Other Balance of Plant Equipment – These are the other pieces of equipment in the combined-cycle block used to support the production of electricity. They are not related to any specific part of the block and are also considered as components.

Combined-Cycle Block/Unit Numbering

The combined-cycle block and unit numbering system is straightforward and follows the usual guidelines. The combined-cycle block is identified by the range 800-899 and will be used to relate the individual units to the block level. The gas turbine/jet engine units will be numbered from 300-399 or 700-799. The steam turbine units will be numbered as Fossil Steam Turbines in the range of 100-199.

Impact on Design Data

It will be necessary for each generating company to provide new and/or additional design data for the combined-cycle blocks that it is submitting GADS data on to NERC. This new design data will allow NERC to identify the specific units that make up each combined-cycle block for the purposes of creating synthesized calculations of the unit level data that is submitted to NERC.

Units - The design data is reported as though each unit were a separate generator, this meaning that each unit would have its own unit number and design data as described in the NERC guidelines for each unit type. In addition to this, the unit would be marked as being part of a combined-cycle block by a field that would hold the Identifying 800 series unit code of the combined-cycle block.

Combined-Cycle Block – Balance of plant and other equipment not directly related to each unit is coded as described for the combined-cycle block.

Cause Codes

Since each unit of the combined-cycle block can affect the generation of the other units, it is possible to have a situation where a derate in a gas turbine or jet engine may have a steam turbine cause code. (See Example 2 below.) In other words, the cause codes for all units will be open to all task-force-approved cause codes for all units within the combined-cycle blocks.

Reporting Event Records

Report events on the unit level only. DO NOT REPORT COMBINED-CYCLE BLOCK EVENTS TO NERC! Since the design data links the units together with the combined-cycle block, the event records of the unit's data will be used to create event records of the combined-cycle block. The unit-level event data will be used by NERC to synthesize block-level data for use in calculating traditional industry statistics. All the normal methods/rules would apply with the exception of cause codes crossing over between dissimilar unit types.

Reporting Performance Records

Report performance records on a unit basis only. DO NOT REPORT COMBINED-CYCLE BLOCK PERFORMANCE RECORDS TO NERC! Since the design data links the units together to the combined-cycle block, the performance records of the individual units will be used by NERC to calculate traditional industry statistics using the synthesis method. The general procedure for combining unit performance records to form a combined-cycle block record will be explained later in this document.

Therefore, if you operate a combined-cycle block with two gas turbines and one steam turbine, you will report 36 performance records annually – one set of 12 performance records for each gas turbine unit and one set of 12 performance records for the steam turbine unit.

Effects on pc-GAR Peer Groups

Reporting the data on the units of a combined-cycle block allows those units to become part of other peer groups. In pc-GAR, the following options could be given when the peer group is created.

- Include units – ex: Create a gas turbine peer group that includes gas turbines in simple-cycle operation with those in combined-cycle blocks.
- Include units only – ex: view gas turbine units in combined-cycle blocks operation only.
- Combined-cycle blocks will be available for each of the three groups shown below or groups 1 and 2 **or** 1 and 3:
  - **Group 1**: Not rolled-up (neither syntheses nor fleet) but used only reported block data as supplied by the reporter (traditional data reporting).
  - **Group 2**: Creating block data using the synthesis event and performance method shown in this document.
  - **Group 3**: Creating block data using the fleet-type roll up method described in a separate document "Calculating Combined-Cycle Block Data Using a Fleet-type Roll up Method When Reporting Each Gas Turbine/Steam Turbine Unit."

Not everyone will wish to use some of these options. However, GADS is committed to providing options to all since the individual needs of GADS data users vary.

Special Rules Used in Calculating Synthesized Combined-Cycle Block Data from Unit-level Data

Some rules for calculating synthesized combined-cycle block data are necessary. The rules will insure uniformity in creating synthesized statistics from the unit-level data.

RULE #1: the outage for the combined-cycle block starts when the breaker of the last of the units is opened and ends when the breaker of the first unit is closed.

RULE #2: the number of attempted and actual starts for the combined-cycle block is determined when the first unit's breaker is closed. If the unit starts without a problem, then there is one attempted and one actual start for the combined-cycle block. If the first unit has a startup failure and a second unit is then started, then the combined-cycle block will have two attempted starts and one actual start.

RULE #3: A unit is on reserve shutdown when it is removed from service for economic reasons or the electricity is not needed on the system (standard RS definition).

The reserve shutdown may affect other units (for example a GT out on reserve shutdown will reduce the steam to the steam turbine). In cases where the steam turbine is still in operation, there would be no event reported because of the reduction in steam flow because the steam turbine is operating as if in load following and can return to full capacity as soon as the GT unit is returned to service.

RULE #4: A combined-cycle block is on reserve shutdown if one or more of the gas turbine/jet engine units are also on reserve shutdown and the combined-cycle block is not in operation. That means other units of the combined-cycle block may be on forced, maintenance, or planned outage, but the combined-cycle block still has the capability to produce electricity with the one or more units on reserve shutdown.

RULE #5: As reported for other unit types, coast down to outages is not reported to GADS. Therefore, the orderly removing of units towards an outage (standard outage procedure) is considered a coast down and is not reported as a penalty against the combined-cycle block (See Example #7).

Examples in Synthesizing Block Outages and Deratings from Reported Unit-level Data

In each example, the status of each unit is discussed. Some units are not impacted at all by an outage or derate. The only reason they are listed is to show they are not impacted and have no impact on available electricity production. In actual reporting, the unaffected units would not be reported or even mentioned.

Please Note: These examples are created to simply illustrate specific cause-and-effect relationships for discussion purposes only and may or may not be real world equipment designs, installations, configurations, or actual outage occurrences. The purpose of these examples is to illustrate how the outage of one unit affects other units and the entire combined-cycle block.

Our Example Combined-Cycle Block – Big Jumbo, the combined-cycle block, consists of two gas turbines, each with its own generator. Each GT has its own HRSG. The two GT/HRSG trains are connected through a manifold to a single steam turbine that also has its own generator. The total electrical combined capacity of this fictitious combination is 710 MW.

- Units – The units which make up the example combined-cycle block are as follows –
  - Two 225 MW Gas Turbines numbered 301 & 302
  - One 260 MW Steam Turbine numbered 101
- Combined-cycle block – The combined-cycle block is a 710 MW combined cycle numbered 801

Example 1 - Three Reserve Shutdowns (RS) on different units.

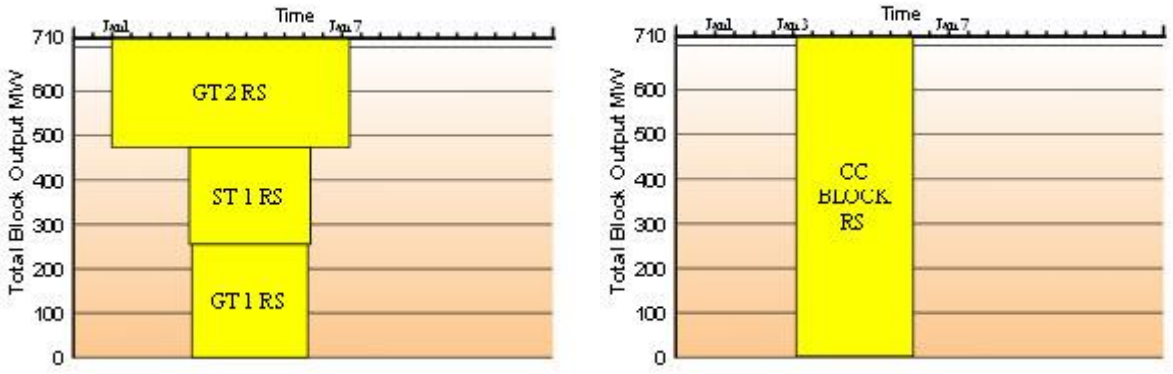
Unit Event Report

- GT #2 placed on RS from January 1 at 0000 until January 7 at 0315. GT #2 was capable of providing 225 MW during this period.
- ST #1 placed on RS from January 3 at 0010 to January 6 at 0230. The steam turbine was capable of providing 260 MW during this period.
- GT #1 placed on RS from January 3 at 0015 to January 6 at 0215. GT #1 was capable of providing 225 MW during this period.

Combined-Cycle Block Impact

- Big Jumbo Block placed on RS from January 3 at 0015 to January 6 at 0215. The combined-cycle block had the capability to provide 710 MW during this period.
- Please note that only three events were reported: one for each unit. During the RS outages, the combined-cycle block was not showing any derates because the block was still capable of generating the full 710 MW but was not required to do so. There were no equipment restrictions; there were only load requirements causing the reduced loading.

Diagrams of the units and combined-cycle block during this period are shown in Figure L1-1.



Combined Unit Event Single Block Event

Figure L1-1: Concurrent RS

Summary of Example #1:

- GT #1 on Reserve Shutdown for 74.00 hours.
- GT #2 on Reserve Shutdown for 147.25 hours.
- ST #1 on Reserve Shutdown for 74.33 hours.
- Combined-cycle block on Reserve Shutdown for 74.00 hours.

Example 2 – Single cause of derates on all units.

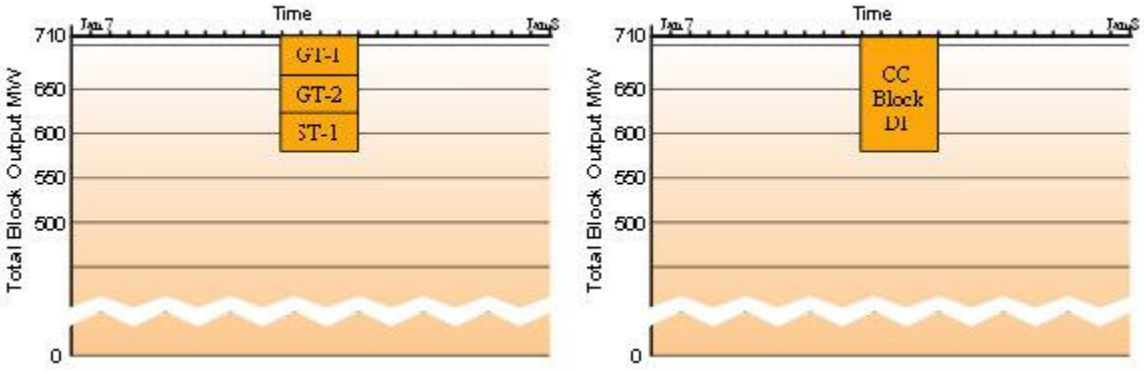
Unit Event Report

- GT #1 on D1 derate from January 7 at 1000 until January 7 at 1400. GT #1 was capable of providing 180 MW during this period. Cause code 3620 – Main Transformer.
- GT #2 on D1 derate from January 7 at 1000 to January 7 at 1400. GT #2 was capable of providing 180 MW during this period. Cause code 3620 – Main Transformer.
- ST #1 on D1 derate from January 7 at 1000 to January 7 at 1400. ST #1 was capable of providing 208 MW during this period. Cause code 3620 – Main Transformer.

Combined-Cycle Block Impact

- Big Jumbo Block was on D1 derate from January 7 at 1000 to January 7 at 1400. Cause code 3620 – Main Transformer. The combined-cycle block was capable of generating 568 MW.

Diagrams of the units and combined-cycle block during this period are shown in Figure L1-2.



Combined Unit Event Single Block Event

Figure L1-2: Single Cause of Derates

Summary of Example #2:

- GT #1 on forced derate for 4 hours (or 0.80 Equivalent Forced Derated Hours.)
- GT #2 on forced derate for 4 hours (or 0.80 Equivalent Forced Derated Hours.)
- ST #1 on forced derate for 4 hours (or 0.80 Equivalent Forced Derated Hours.)
- Combined-cycle block on forced derate for 4 hours (or 0.80 Equivalent Forced Derated Hours.)

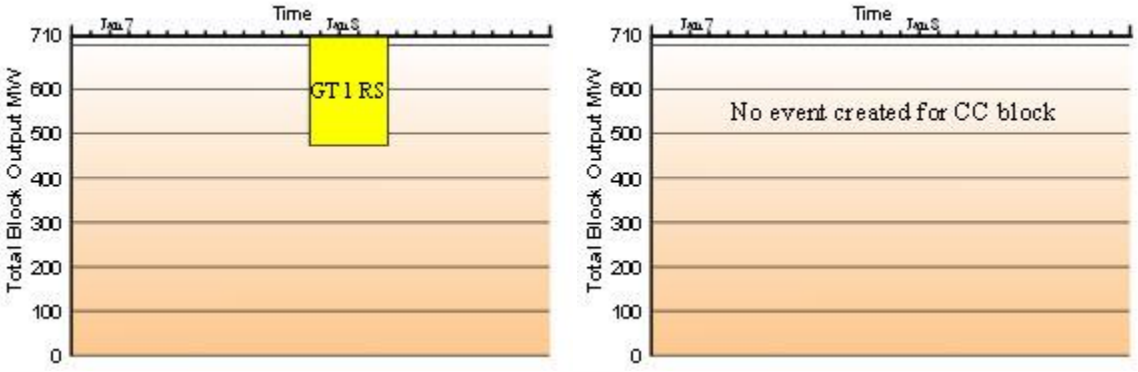
Example 3 – Single unit on Reserve Shutdown.

Unit Event Report

- GT #1 placed on RS from January 7 at 2115 to January 8 at 0500. GT #1 was capable of providing 225 MW during this period.

Combined-Cycle Block Impact

- No impact on Big Jumbo Block. The combined-cycle block was capable of generating 710 MW during the full period.
- Diagrams of the units and combined-cycle block during this period are shown in Figure L1-3:



Combined Unit Events CC Block Events

Figure L1-3: Single Unit on RS

Summary of Example #3:

- GT #1 on Reserve Shutdown 7.75 hours
- Combined-cycle block – no impact

Example 4 – Single unit on outage, affecting other units and then changing event types.

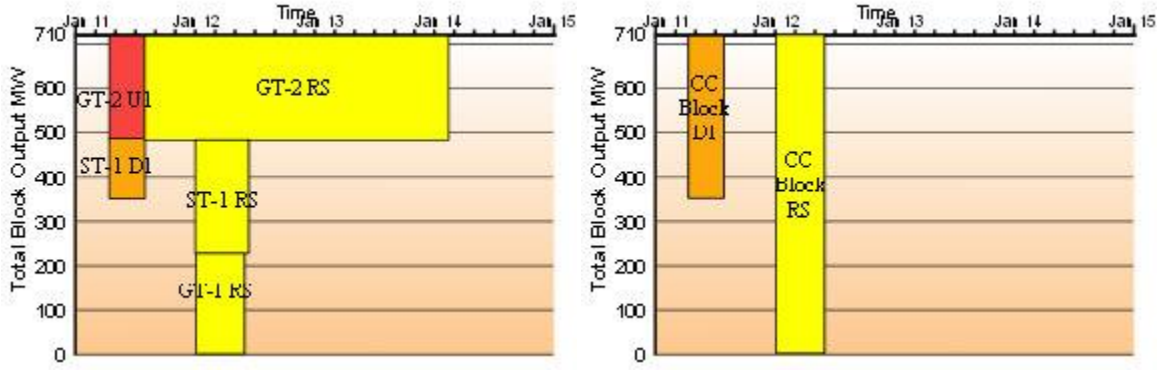
Unit Event Report

- GT #2 on Forced Outage (U1) from January 11 at 0700 to January 11 at 14:45 (cause code 5030 – supercharging fans). No supplemental firing of HRSG. GT #2 was capable of providing no MW during this period.
- As a result, ST #1 on forced derate (D1) from January 11 at 0700 to January 11 at 14:45 (cause code 5030 – supercharging fans). The steam turbine unit was capable of providing 130 MW during this period.
- GT #2 was placed on RS from January 11 at 1445 to January 14 at 0330. GT #2 was capable of providing 225 MW during this period.
- ST #1 was placed on reserve shutdown from January 12 at 0000 to January 12 at 11:20. ST #1 was capable of providing 260 MW during this period.
- GT #1 was placed on RS from January 12 at 0015 to January 12 at 0930. GT #1 was capable of providing 225 MW during this period.

Combined-Cycle Block Impact

- The combined-cycle block was on derate from January 11 at 0700 to January 11 at 14:45. The combined-cycle block was capable of generating 355 MW during the full period.
- The combined-cycle block was on RS from January 12 at 0015 until January 12 at 0930. The combined-cycle block was capable of generating 710 MW during the full period.

Diagrams of the units and combined-cycle block during this period are shown in Figure L1-4:



Combined Unit Events CC Block Events

Figure L1-4: Single Unit Outage, Other Events

Summary of Example #4:

- GT #1 on Reserve Shutdown for 9.25 hours.

- GT #2 on forced outage for 7.75 hours and on Reserve Shutdown for 60.75 hours.
- ST #1 on forced derate for 7.75 hours (or 3.88 Equivalent Forced Derated Hours) and on Reserve Shutdown for 11.33 hours.
- Combined-cycle block on forced derate for 7.75 hours (or 3.88 Equivalent Forced Derated Hours) and on Reserve Shutdown for 9.25 hours.

Example 5 – Reserve Shutdowns of unit followed by a startup failure of one unit.

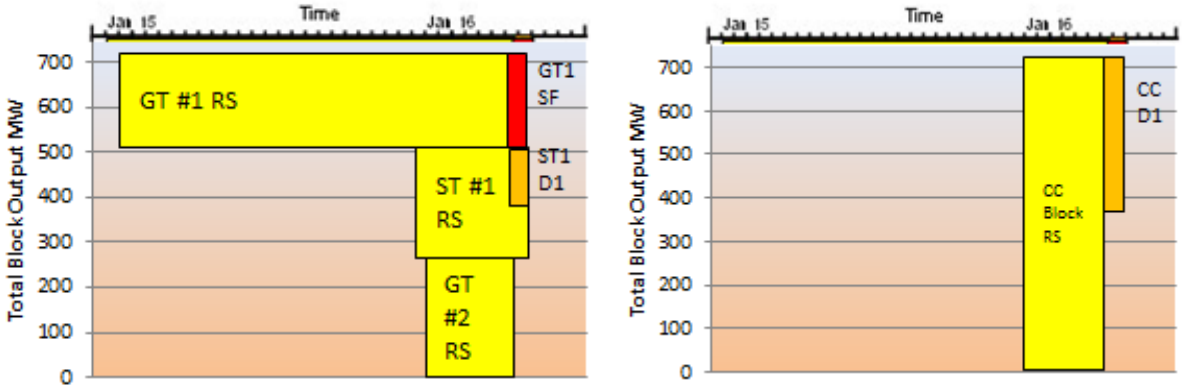
Unit Event Report

- GT #1 was placed on RS from January 14 at 2215 to January 16 at 0445. GT #1 was capable of providing 225 MW during this period.
- ST #1 was placed on reserve shutdown from January 15 at 2300 to January 16 at 0600. ST #1 was capable of providing 260 MW during this period.
- GT #2 was placed on RS from January 15 at 2310 to January 16 at 0545. GT #2 was capable of providing 225 MW during this period.
- GT #1 on Startup Failure outage (SF) from January 16 at 0445 to January 16 at 0600 (cause code 5030 – supercharging fans). No supplemental firing of HRSG. GT #1 was capable of providing no MW during this period.
- As a result of the GT #1 SF, ST #1 on forced derate (D1) from January 16 at 0445 to January 16 at 0600 (cause code 5030 – supercharging fans). ST #1 was capable of providing 130 MW during this period. (Note: ST #1 was on RS but it is treated as if it were in service.)

Combined-Cycle Block Impact

- The combined-cycle block was on RS from January 15 at 2310 until January 16 at 0445 (when GT #1 went on SF). The combined-cycle block was capable of generating 710 MW during the full period.
- The combined-cycle block was on derate from January 16 at 0445 to January 16 at 0600 caused by the SF of GT #1 and no potential steam flow to ST #1 (cause code 5030). The combined-cycle block was capable of generating 355 MW during the full period.

Diagrams of the units and combined-cycle block during this period are shown in Figure L1-5:



Combined Unit Events CC Block Events

Figure L1-5: RS Followed by SF

Summary of Example #5:

- GT #1 on Reserve Shutdown for 30.50 hours and on Forced Outage for 1.25 hours.
- GT #2 on Reserve Shutdown for 6.58 hours.
- ST #1 on Reserve Shutdown for 7.00 hours and on forced derate for 1.25 hours with a loss of capacity of 130MW (or 0.63 Equivalent Forced Derated Hours)
- Combined-cycle block on forced derate for 1.25 hours with a loss of capacity of 355MW (or 0.63 Equivalent Forced Derated Hours) and on Reserve Shutdown for 5.58 hours.

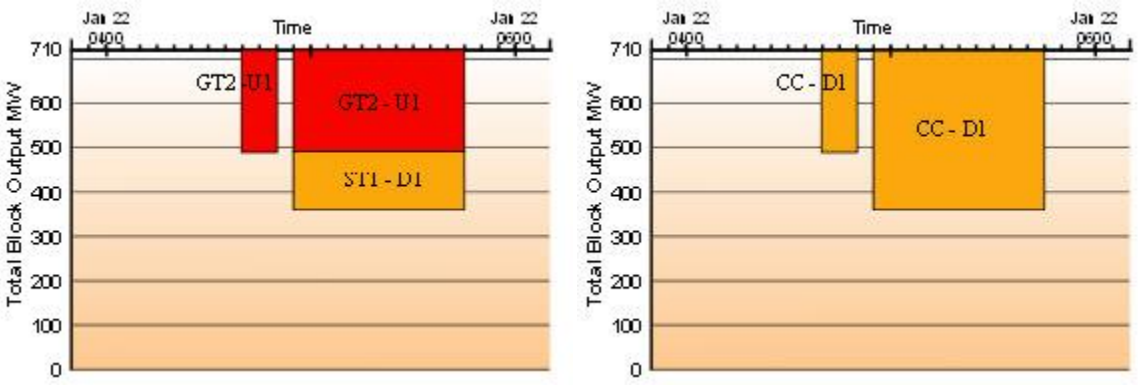
Example 6 – Unit outage to unit outage affecting other units.

Unit Event Report

- GT #2 on Forced Outage (U1) from January 22 at 0440 to January 22 at 0450 (cause code 5250 – Other Controls and instrumentation Problems).
- NOTE: Because the FO on GT#2 was so short, there was no loss of steam flow to ST #1. Therefore, ST #1 was capable of providing 260 MW during this period.
- GT #2 on Forced Outage (U1) from January 22 at 0455 to January 22 at 0545 (cause code 5250)
- As a result of GT #2 not providing steam service, ST #1 on forced derate (D1) from January 22 at 0455 to January 22 at 0545 (cause code 5250 – Other Controls and instrumentation Problems). ST #1 was capable of providing 130 MW during this period.

Combined-Cycle Block Impact

- The combined-cycle block was on derate (D1 – cause code 5250 – Other Controls and instrumentation Problems) from January 22 at 0440 until January 22 at 0450 (when GT #2 came on line). The combined-cycle block was capable of generating 485 MW during the full period.
- The combined-cycle block was on derate (D1 – cause code 5250 – Other Controls and instrumentation Problems) from January 22 at 0455 to January 22 at 0545 caused by the U1 of GT #2 and no steam for ST #1. The combined-cycle block was capable of generating 355 MW during the full period.



Combined Unit Events CC Block Events

Figure L1-6: Multiple Unit Outages

Summary of Example #6:

- GT #2 on forced outage for 1.00 hours (0.17 + 0.83 hours)
- ST #1 on forced derate for 0.83 hours (or 0.42 Equivalent Forced Derated Hours).
- Combined-cycle block on forced derate for 1.00 hour (0.17 + 0.83 hours or 0.47 [0.05 + 0.42] Equivalent Forced Derated Hours).

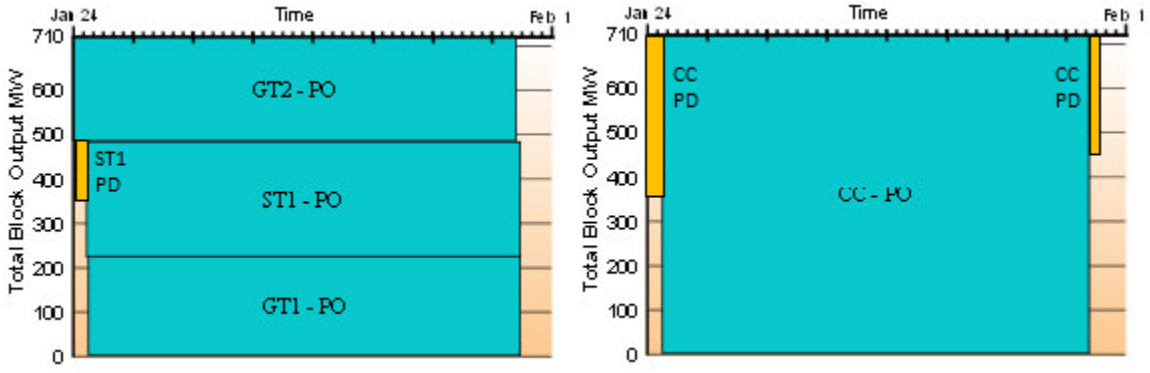
Example 7 – Combined-Cycle Block annual planned outage.

Unit Event Report

- GT #2 placed on Planned Outage from January 24 at 0000 until January 31 at 1000 (cause code 5260 – Major Gas Turbine Overhaul). GT #2 was not capable of providing power during this period.
- As a result of GT #2 not providing steam service, ST #1 on Planned Derate (PD) from January 24 at 0000 to January 24 at 0515 (cause code 5260). The steam turbine was capable of providing 130 MW during this period.
- ST #1 unit placed on Planned Overhaul from January 24 at 0515 to January 31 at 1130 (cause code 4240 – Low-pressure steam turbine bearings). The steam turbine was not capable of providing power during this period.
- GT #1 placed on Planned Outage January 24 at 0530 to January 31 at 1015 (cause code 5272 - Borescope inspection). GT #1 was not capable of providing power during this period.

Combined-Cycle Block Impact

- The combined-cycle block was placed on Planned Derate from January 24 at 0000 (when GT #2 came off-line) to January 24 at 0515 (cause code 5260). The combined-cycle block was capable of generating 355 MW during this period.
- The combined-cycle block was placed on Planned Derate from January 24 at 0515 to January 24 at 0530, when ST #1 was placed on Planned Outage (cause codes 5260 and 4240). The combined-cycle block was capable of generating 225 MW during this period.
- The combined-cycle block was placed on Planned Outage from January 24 at 0530 (when GT #1 came off-line) to January 31 at 1000 (when GT #2 came on line) (cause codes 5260, 4240, and 5272). The combined-cycle block has the capability to provide no power during this period.
- The combined-cycle block was placed on Planned Derate from January 31 at 1000 to January 31 at 1015, when GT #2 came on-line. The combined-cycle block was capable of generating 225 MW during this period.
- The combined-cycle block was placed on Planned Derate from January 31 at 1015 to January 31 at 1130, when GT #1 came on-line. The combined-cycle block was capable of generating 450 MW during this period.



Combined Unit Events CC Block Events

Figure L1-7: CC Block Annual Outage

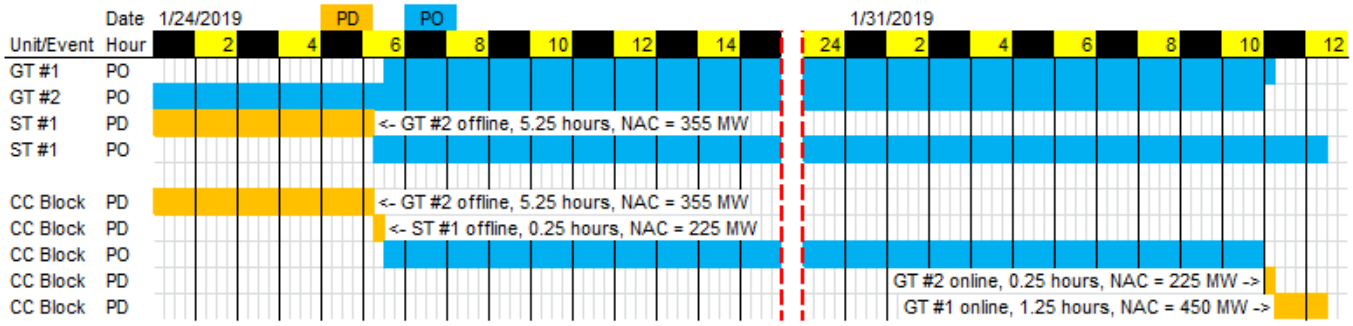


Figure L1-8: CC Block Annual Outage – Start/End Details
(0.25 hour PD too small to see in Figure L1-7: CC Block Events but shown here)

Summary of Example #7:

- GT #1 on Planned Outage for 172.75 hours.
- GT #2 on Planned Outage for 178.00 hours.
- ST #1 on Planned Derate for 5.25 hours.
- ST #1 on Planned Outage for 174.25 hours.
- Combined-cycle block on Planned Outage for 172.50 hours.
- Combined-cycle block on Planned Derating for 7.00 hours.

Statistics from Unit Event and Performance Reports

There will be other outages, deratings and reserve shutdown periods at a real combined-cycle block. We could list more but they would just be a repeat of what is shown in the seven examples shown above. So to test the data collection methodology, we will calculate statistics for each unit and the combined-cycle block using the data from the seven examples.

The time period with be January 1 at 0000 to January 31 at 2400. This is a total of 744 hours during the month of January.

Table 1: Statistics from Unit Event and Performance Reports				
Statistic	**GT #1**	**GT #2**	**ST #1**	**CC Block**
Net Maximum Capacity	225	225	260	710
Period Hrs	744	744	744	744
Forced Outage Hrs	1.25	8.75	0.00	0.00
Planned Outage Hrs	172.75	178.00	174.25	172.50
Maintenance Outage Hrs	0.00	0.00	0.00	0.00
Reserve Shutdown Hrs	121.50	214.58	92.67	88.83
Service Hrs	448.50	342.67	477.08	482.67
Equiv. Forced Derated Hrs	0.80	0.80	5.72	5.77
EFDH During RS Hrs	0.00	0.00	0.63	0.00
Equiv. Planned Derated Hrs	0.00	0.00	2.63	3.42
Net Actual Generation	100,000	77,000	124,000	301,000.00
Attempted Starts	6.00	7.00	4.00	4.00
Actual Starts	5.00	7.00	4.00	4.00
Equiv. Availability Factor	76.51%	74.79%	75.46%	75.58%
Equiv. Forced Outage Rate	0.46%	2.72%	1.20%	1.20%
Forced Outage Factor	0.17%	1.18%	0.00%	0.00%
Forced Outage Rate	0.28%	2.49%	0.00%	0.00%
Scheduled Outage Factor	23.22%	23.92%	23.42%	23.19%
Net Capacity Factor	59.74%	46.00%	64.10%	56.98%
Starting Reliability	83.33%	100.00%	100.00%	100.00%

Table 2: Sample Data Summary								
Event #	**Unit**	**Event Type**	**Start Date**	**End Date**	**Duration**	**Loss MW**	**EDH**	**Example**
1	GT #2	RS	01/01/0000	01/07/0315	147.25	225		1
2	ST #1	RS	01/03/0010	01/06/0230	74.33	260		
3	GT #1	RS	01/03/0015	01/06/0215	74	225		
Syn. 1	CC	RS	01/03/0015	01/06/0215	74	710		
4	GT #1	D1	01/07/1000	01/07/1400	4	45	0.8	2
5	GT #2	D1	01/07/1000	01/07/1400	4	45	0.8	
6	ST #1	D1	01/07/1000	01/07/1400	4	52	0.8	
Syn. 2	CC	D1	01/07/1000	01/07/1400	4	142	0.8	
7	GT #1	RS	01/07/2115	01/08/0500	7.75	225		3
Syn. 3	CC	NC						
8	GT #2	U1	01/11/0700	01/11/1445	7.75	225		4
9	ST #1	D1	01/11/0700	01/11/1445	7.75	130	3.88	
10	GT #2	RS	01/11/1445	01/14/0330	60.75	225		
11	ST #1	RS	01/12/0000	01/12/1120	11.33	260		
12	GT #1	RS	01/12/0015	01/12/0930	9.25	225		
Syn. 4	CC	D1	01/11/0700	01/11/1445	7.75	355	3.88	
Syn. 5	CC	RS	01/12/0015	01/12/0930	9.25	710		
13	GT #1	RS	01/14/2215	01/16/0445	30.5	225		5
14	ST #1	RS	01/15/2300	01/16/0600	7	260		
15	GT #2	RS	01/15/2310	01/16/0545	6.58	225		

Table 2: Sample Data Summary								
Event #	**Unit**	**Event Type**	**Start Date**	**End Date**	**Duration**	**Loss MW**	**EDH**	**Example**
16	GT #1	SF	01/16/0445	01/16/0600	1.25	225		
17	ST #1	D1	01/16/0445	01/16/0600	1.25	130	0.63	
Syn. 6	CC	RS	01/15/2310	01/16/0445	5.58	710		
Syn. 7	CC	D1	01/16/0445	01/16/0600	1.25	355	0.63	
18	GT #2	U1	01/22/0440	01/22/0450	0.17	225		6
19	GT #2	U1	01/22/0455	01/22/0545	0.83	225		
20	ST #1	D1	01/22/0455	01/22/0545	0.83	130	0.42	
Syn. 8	CC	D1	01/22/0440	01/22/0450	0.17	225	0.05	
Syn. 9	CC	D1	01/22/0455	01/22/0545	0.83	355	0.42	
21	GT #2	PO	01/24/0000	01/31/1000	178	225		7
22	ST #1	PD	01/24/0000	01/24/0515	5.25	130	2.63	
23	ST #1	PO	01/24/0515	01/31/1130	174.25	260		
24	GT #1	PO	01/24/0530	01/31/1015	172.75	225		
Syn. 10	CC	PD	01/24/0000	01/24/0515	5.25	355	2.63	
Syn. 11	CC	PD	01/24/0515	01/24/0530	0.25	485	0.17	
Syn. 12	CC	PO	01/24/0530	01/31/1000	172.5	710		
Syn. 13	CC	PD	01/31/1000	01/31/1015	0.25	485	0.17	
Syn. 14	CC	PD	01/31/1015	01/31/1130	1.25	260	0.46	

Appendix L2: Calculating Combined Cycle and Co-Generation Block Data Using the Fleet-type Roll-up Method

Overview

This document will explain the fleet-type roll-up method for collecting combined-cycle data on a unit level basis and creating combined-cycle block statistics from the unit level event and performance information.

This document applies only to reporters who wish to report event and performance data for each generating unit individually. This document does not apply to reporters wishing to continue reporting combined-cycle data to GADS as a 'single unit' (or traditional method). GADS will still accept the traditional method, but this is not favored over the reporting of each generating unit within the block.

Please Note: *The majority of this document is the same as the synthesis method. The basic data gathering process on a unit level basis is* ***identical*** *in all respects. The differences will be in creating block statistics from the unit level data.*

IEEE 762 does not address reporting separate units and bringing the components together to create combined-cycle block statistics. Therefore, we are establishing a NERC methodology based on the generally accepted industry practice of fleet-type roll-up calculations for a group of units – in this case, the group of units consists of the individual generating units that make up the combined-cycle block.

Terms

To insure proper documentation some terms must be agreed on to eliminate some of the ambiguity concerning combined-cycle blocks in general.

- **Combined-cycle Block (also known in the industry as a "Block")** –By definition, a combined cycle is a process for generating energy (either electricity or steam) constituted by the marriage of a Brayton Cycle (expand hot gas to turn a gas turbine) with a Rankine Cycle (use heat to boil water to make steam to turn a steam turbine). A combined-cycle block employs electric generating technology in which electricity and process steam are produced from otherwise lost waste heat exiting from one or more combustion turbines. In most situations, the exiting waste heat is routed to a conventional boiler or to a heat recovery steam generator (HRSG) for use by a steam turbine in the production of electricity. Therefore, the combined-cycle block consists of one or more gas turbines/jet engines, one or more steam turbines, and balance of plant equipment supporting the production of electricity or steam energy.

There may be more than one combined-cycle block at a plant site. Our discussion relates to each individual combined-cycle block reporting, not the process of reporting several combined-cycle blocks as one plant site.

- **Units** – Each generator set is considered a "unit." Typically in combined cycle, each gas turbine or jet engine and each steam turbine are considered a "unit." Each unit contributes to the total electric generation of the combined-cycle block, and each unit has one or more of its own generators for providing electric power.
- **Heat Recovery Steam Generator (HRSG)** – There may be one or more HRSG or waste-heat boilers in a combined-cycle block. Some units may have a single HRSG per GT/jet engine; others may have several GT/jet engine feeding a single HRSG. The HRSG does not contribute electricity to the output of the combined-cycle block, so is considered a component rather than a unit.
- **Other Balance of Plant Equipment** – These are the other pieces of equipment in the combined-cycle block used to support the production of electricity. They are not related to any specific part of the block and are also considered as components.

Combined-Cycle block/Unit Numbering

The combined-cycle block and unit numbering system should be straightforward and follow the usual guidelines. The combined-cycle block is identified by the range 800-899 and is used to relate the individual units to the block level. The GT/jet engine units are numbered in the range 300-399 or 700-799. The steam turbine units are numbered in the range of 100-199.

Impact on Design Data

It will be necessary for each generating company to provide new and/or additional design data for the combined-cycle blocks that is submitting GADS data to NERC. This new design data will allow NERC to identify the specific units that make up each combined-cycle block for the purposes of creating fleet-type calculations of the unit level data that is submitted to NERC.

- **Units** - The design data is reported as though each unit were a separate generator, this meaning that each unit would have its own unit number and design data as described in the NERC guidelines for each unit type. In addition to this, the unit should be marked as being part of a combined-cycle block by a field that would hold the identifying 800 series unit code of the combined-cycle block.
- **Combined-Cycle block** – Balance of plant and other equipment not directly related to each unit should be coded as described for the combined-cycle block.

Cause Codes

Since each unit of the combined-cycle block can affect the generation of the other units, it is possible to have a situation where a derate in a gas turbine or jet engine may have a steam turbine cause code. (See Example 2 below). In other words, the cause codes for all units will be open to all task-force-approved cause codes for all units within the combined-cycle blocks.

Reporting Event Records

Report events on the unit level only. NO COMBINED-CYCLE BLOCK EVENTS ARE REPORTED TO NERC! Since the design data links the units together with the combined-cycle block, NERC will use the unit level to perform block-level roll-up statistics using the fleet-type (sum of hours) method to calculate traditional industry statistics. All the normal methods/rules would apply with the exception of cause codes crossing over between dissimilar unit types.

Reporting Performance Records

Report performance records on a unit basis only. YOU SHOULD NOT REPORT COMBINED-CYCLE BLOCK PERFORMANCE RECORDS TO NERC! Since the design data links the units together to the combined-cycle block, NERC will use the performance records of the individual units to calculate traditional industry statistics using the fleet-type roll-up method.

Therefore, if you operate a combined-cycle block with two gas turbines and one steam turbine, you will report 36 performance records annually – one set of 12 performance records for each gas turbine unit and one set of 12 performance records for the steam turbine unit.

Effects on pc-GAR Peer Groups

Exposing the data on the units of combined-cycle block allows those units to become part of other peer groups. In pc-GAR, the following options are given when the peer group is created.

- Include units of combined-cycle blocks – create a gas turbine peer group that includes gas turbines in simple cycle operation with those in combined-cycle blocks.

- Include units of combined-cycle blocks only – i.e. view gas turbine units in combined-cycle blocks operation only.
- Combined-cycle blocks are available for each of the three groups shown below or groups 1 and 2 **or** 1 and 3:
  - **Group 1:** Not rolled up (neither syntheses nor fleet) but used only reported block data as supplied by the reporter (traditional data reporting).
  - **Group 2:** Creating block data using the synthesis event and performance method shown in this document.
  - **Group 3:** Creating block data using the fleet-type roll-up method described in a separate document "Calculating Combined-cycle block Data Using a Fleet-type Roll-up Method When Reporting Each Gas Turbine/Steam Turbine Unit."

Not everyone will wish to use some of these options. However, GADS is committed to providing options to all since the individual needs of GADS data users also vary.

Calculating Fleet-type Combined-Cycle Block Statistics from the Unit Event & Performance Records

Do not report combined-cycle block event and performance records to NERC. NERC only needs the individual unit event and performance records.

Illustrated below are examples of how to create a block performance record using the fleet-type roll-up calculation. Please note that there is no double counting of penalties on the combined-cycle block; we are actually maintaining the impact of the problem of one unit on another unit. The addition of the two units affects the overall electric production of the block.

There will be times when the cause code of one unit (GT#1 for example) will also be shown on a second unit (the steam turbine for example). That is because the resultant outage of the GT affected the steam production on the steam turbine, resulting in the steam turbine's inability to provide full capacity. This may look as if it were "double" counting (see Example #2); however, the steam turbine itself is not in need of repairs and the cause of the reduction in steam-turbine production to the steam turbine points to a GT (doesn't say which GT, just "a" GT). Therefore, the GT gets two penalties against it: one for the outage (to the GT#1 itself) and another for the derate (to the steam turbine.) which may appear as a "double counting," but is not. This is because the GT actually caused the entire shortage. This type of event is called a concurrent derate.

Please note two things:

- When GT#1 is on outage, the outage time and cause is related to GT#1 via the event record (only the outage is related to GT#1), and
- The derate to the steam turbine is NOT related to GT#1 "directly" because the derate is shown to be caused by a GT cause code but not identifying which GT (assuming there is more than one GT unit). Therefore, when the computer calculates the statistics of GT#1, it only sees the outage, not the derate. When the computer calculates the statistics on the steam turbine, it sees the derate caused by a GT. Therefore, GT#1 is not penalized twice, but only the one time.

In the NERC performance statistics, you would see the following:

GT#1 EAF=…, EFOR=…., etc.
GT#2 EAF=…., EFOR = …., etc.

Steam Turbine EAF= …., EFOR = …., etc.

These values are calculated based only on the performance and event records directly attributed to each of the individual units. However, when you report on cause code based values, the entire effect of the outage will be taken into account. With the effect of the outage being attributed to the cause code and not the unit, the unit is not penalized.

Equivalent Fleet Roll-up Calculations

The equivalent-fleet-type roll-up of combine-cycle units is based on the energy generated or lost as a result of the time that the unit is available or unavailable. By weighting the hours of the time-based calculations by the capacity of each unit, you are able to add the energy of each unit to create the rolled-up statistics needed for the block. You can then use the roll-up of unit hours to determine the rates and factors of the block.

You do need to keep in mind that, when using the equivalent fleet roll-up method, you are working with energy in MWh and not capacity and hours as separate entities. In all calculations, we can substitute the energy based number for a particular statistic by multiplying the hours by the unit's maximum capacity (Net Maximum Capacity). So, for instance, service hours become service MWh.

As an example of this, consider this simple relationship:

Service Hours = Period Hours – Outage Hours – Reserve Shutdown Hours

This works for a single unit, but, if period hours are used for the block, the following relationship doesn't work –

$(SH_{unit1} + SH_{unit2}) = PH – (OH_{unit1} + OH_{unit2}) – (RSH_{unit1} + RSH_{unit2})$

The relationship of service hours to period and outage hours needs to remain constant for the individual unit and for the block when all units are added together. By multiplying each element by the capacity of the related unit, we keep the relationship stable.

So, for each unit in the block we have:

SMWh = SH x Capacity

PMWh = PH x Capacity

OHMWh = OH x Capacity

RSHMWh = RSH x Capacity

Now you can sum the MWh for all units to create the values for the block

$\Sigma(SMWh) = \Sigma(PMWh) - \Sigma(OHMWh) - \Sigma(RSHMWh)$

Special Rules Used in Calculating Combined-Cycle Block and Units Using Fleet-type Roll-up Method

There is a need to establish some rules for fleet-type combined-cycle blocks. The rules will insure uniformity in creating fleet-type statistics from the unit level data.

- The number of attempted and actual starts for the combined-cycle block is determined by the sum of all attempted and actual starts of the units. Due to this, all unit events transfer directly to the block without interpretation to the cumulative status of the block. In other words, if a unit is on forced outage, the

forced outage event is also posted to the block even though the other units in the block may be producing power. In this way, a total count of all events that occur within the block can be maintained.

- A unit is on reserve shutdown when it is removed from service for economic reasons or the electricity is not needed on the system (standard RS definition.) The reserve shutdown may affect other units (for example a GT out on reserve shutdown will reduce the steam to the steam turbine). In such cases where the steam turbine is still in operation, there would be no concurrent event reported because of the reduction in steam flow because the steam turbine is operating as if in load-following and can return to full capacity as soon as the GT unit is returned to service.
- As reported for other unit types, coast down to outages is not reported to GADS. Therefore, the orderly removing of units towards an outage (standard outage procedure) is considered a coast down and is not reported as a penalty against the combined-cycle block. (See Example #7).

Examples in Fleet-Type Block Outages and Deratings from Reported Unit level Data

In each example, the status of each unit is discussed. Some units are not impacted at all by the outages or derates. The only reason they are listed is to show they are not impacted and have no impact on available electricity production. In actual reporting, the unaffected units would not be reported or even mentioned.

Please Note: *These examples are created simply to illustrate specific cause-and-effect relationships for discussion purposes only, and may or may not be real world equipment designs, installations, configurations or actual outage occurrences. The purpose of these examples is to illustrate how the outage of one unit affects other units and the entire combined-cycle block.*

Our example Combined-Cycle block – Big Jumbo, the combined-cycle block, consists of two gas turbines, each with its own generator. Each GT has its own HRSG. The two GT/HRSG trains are connected through a manifold to a single steam turbine that also has its own generator. The total electrical combined capacity of this fictitious combination is 710 MW.

- Units – The units which make up the example combined-cycle block are as follows –
  - Two 225 MW Gas Turbines numbered 301 & 302
  - One 260 MW Steam Turbine numbered 101
- Combined-cycle block – The combined-cycle block is a 710 MW combined cycle numbered 801

Example 1 – Three Reserve Shutdowns (RS) on Different Units.

Unit Event Report

- GT #2 placed on RS from January 1 at 0000 until January 7 at 0315. GT #2 was capable of providing 225 MW during this period.
- ST #1 placed on RS from January 3 at 0010 to January 6 at 0230. The steam turbine was capable of providing 260 MW during this period.
- GT #1 placed on RS from January 3 at 0015 to January 6 at 0215. GT #1 was capable of providing 225 MW during this period.

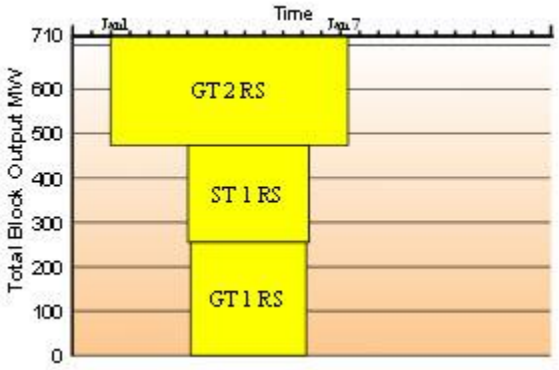


Figure L2-1: Concurrent RS

Summary of Example #1:

- GT #1 on Reserve Shutdown for 74.00 hrs x 225MW = 16,650 MWh.
- GT #2 on Reserve Shutdown for 147.25 hrs x 225 MW = 33,131.25 MWh.
- ST #1 on Reserve Shutdown for 74.33 hrs x 260 MW = 19.326.67 MWh.
- Combined-cycle block records 3 events:
  - RS of 16,650 MWh
  - RS of 33,131.25 MWh
  - RS of 19,326.67 MWh

Please note that only three events were reported: one for each unit. The block impact is the sum of each RS event by each of the three units. The equivalent block hours (69,107.92 MWh / 710MWh) are 97.34 hours.

Example 2 – Single Cause of Derates on All Units.

Unit Event Report

- GT #1 on D1 derate from January 7 at 1000 until January 7 at 1400. GT #1 was capable of providing 180 MW during this period. Cause code 3620 – Main Transformer.
- GT #2 on D1 derate from January 7 at 1000 to January 7 at 1400. GT #2 was capable of providing 180 MW during this period. Cause code 3620 – Main Transformer.
- ST #1 on D1 derate from January 7 at 1000 to January 7 at 1400. The steam turbine was capable of providing 208 MW during this period. Cause code 3620 – Main Transformer.

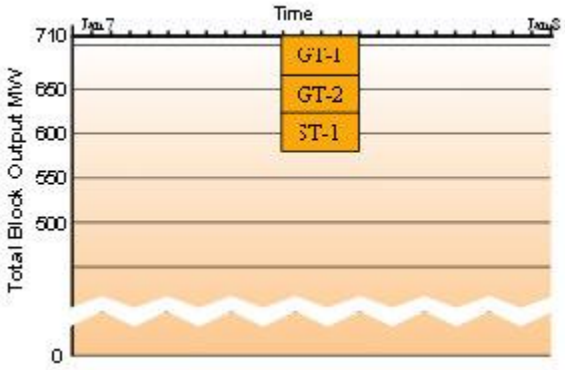


Figure L2-2: Single Cause of Derates

Summary of Example #2:

- GT #1 reports forced derate for 4Hrs x 45MW = 180 MWh.
- GT #2 reports forced derate for 4Hrs x 45MW = 180 MWh.
- ST #1 reports forced derate for 4Hrs x 52MW = 208 MWh.
- Combined-cycle block reports 3 overlapping derates:
  - Forced derate of 4hrs x 45MW = 180MWh
  - Forced derate of 4hrs x 45MW = 180MWh
  - Forced derate of 4hrs x 52MW = 208MWh

Total Block derated 568MWh (568 / 710 =0.80 Equivalent Hours)

Example 3 – Single Unit on Reserve Shutdown.

Unit Event Report

- GT #1 placed on RS from January 7 at 2115 to January 8 at 0500. GT #1 was capable of providing 225 MW during this period.

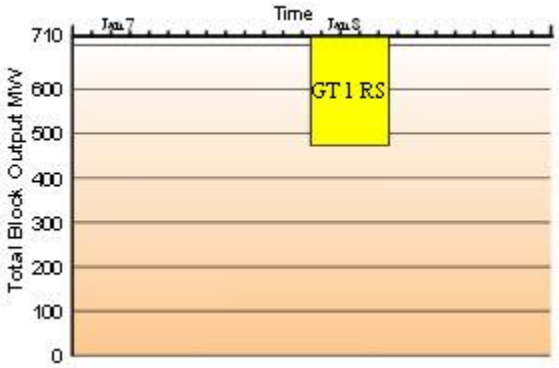


Figure L2-3: Single Unit on RS

Summary of Example #3:

- GT #1 on reserve shutdown 7.75 hours x 225MW = 1,743.75 MWh.
- Combined-cycle block reports reserve shutdown for 1,743.75 MWh (1,743.75 / 710 = 2.46 Equiv. Hours)

Example 4 - Single Unit on Outage, Affecting Other Units and Then Changing Event Types.

Unit Event Report

- GT #2 on Forced Outage (U1) from January 11 at 0700 to January 11 at 14:45 (cause code 5030 – supercharging fans). No supplemental firing of HRSG. GT #2 was capable of providing no MW during this period.
- As a result, ST #1 on forced derate (D1) from January 11 at 0700 to January 11 at 14:45 (cause code 5030 – supercharging fans). The steam turbine unit was capable of providing 130 MW during this period.
- GT #2 was placed on RS from January 11 at 1445 to January 14 at 0330. GT #2 was capable of providing 225 MW during this period.
- ST #1 was placed on reserve shutdown from January 12 at 0000 to January 12 at 11:20. The steam turbine unit was capable of providing 260 MW during this period.
- GT #1 was placed on RS from January 12 at 0015 to January 12 at 0930. GT #1 was capable of providing 225 MW during this period.

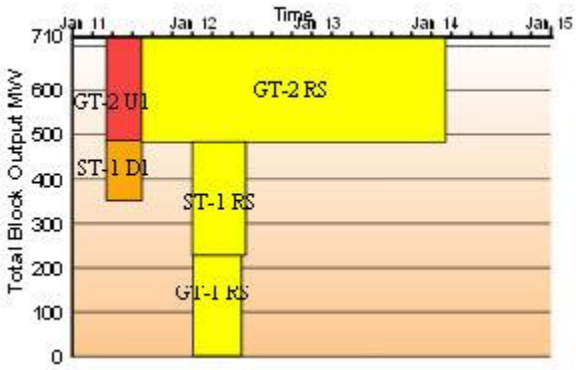


Figure L2-4: Single Unit Outage, Other Events

Summary of Example #4:

- GT #1 on Reserve Shutdown for 9.25 hrs x 225 MW = 2,081.25 MWh.
- GT #2 on forced outage for 7.75 hrs x 225 MW = 1,743.75 MWh.
- GT #2 on Reserve Shutdown for 60.75 hrs x 225 MW = 13,668.75 MWh.
- ST #1 on forced derate for 7.75 hrs x 130 MW = 1,007.50 MWh.
- ST #1 on Reserve Shutdown for 11.33 hrs x 260MW = 2,946.67 MWh.
- Combined-cycle block reports 5 events:
  - RS of 2,081.25 MWh
  - FO of 1,743.75 MWh
  - RS of 13,668.75 MWh
  - FO of 1,007.50 MWh
  - RS of 2,946.67 MWh

Example 5 – Reserve Shutdowns of unit followed by a startup failure of one unit.

Unit Event Report

- GT #1 was placed on RS from January 14 at 2215 to January 16 at 0445. GT #1 was capable of providing 225 MW during this period.
- ST #1 was placed on reserve shutdown from January 15 at 2300 to January16 at 0600. The steam turbine unit was capable of providing 260 MW during this period.
- GT #2 was placed on RS from January 15 at 2310 to January 16 at 0545. GT #2 was capable of providing 225 MW during this period.
- GT #1 on Startup Failure outage (SF) from January 16 at 0445 to January 6 at 0600 (cause code 5030 – supercharging fans). No supplemental firing of HRSG. GT #1 was capable of providing no MW during this period.
- As a result of the GT#1 SF, ST #1 on forced derate (D1) from January 16 at 0445 to January 16 at 0600 (cause code 5030 – supercharging fans). ST #1 was capable of providing 130 MW during this period. (Note: ST #1 was on RS but it is treated as if it were in service.)

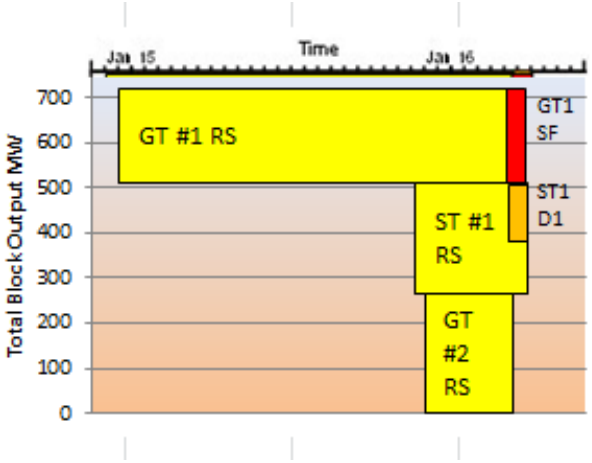


Figure L2-5: RS Followed by SF

Summary of Example #5:

- GT #1 on reserve shutdown for 30.50 hrs x 225 MW = 6,862.50 MWh.
- GT #1 on Forced Outage for 1.25 hrs x 225 MW = 281.25 MWh.
- GT #2 on reserve shutdown for 6.58 hrs x 225 MW = 1,481.25 MWh.
- ST #1 on reserve shutdown for 7.00 hrs x 260 MW = 1,820 MWh.
- ST #1 on forced derate for 1.25 hours with a loss of capacity of 130MW or 1.25 hrs x 130 MW = 162.50 MWh.
- Combined-cycle block reports the 5 events:
  - RS of 6,862.50 MWh
  - FO of 281.25 MWh
  - RS of 1,481.25 MWh
  - RS of 1,820.00 MWh

- D1 of 162.50 MWh

Example 6 – Unit outage to unit outage affecting other units.

Unit Event Report

- GT #2 on Forced Outage (U1) from January 22 at 0440 to January 22 at 0450 (cause code 5250 – Other Controls and instrumentation Problems).

Note: Because the FO on GT#2 was so short, there was no loss of steam flow to ST #1. Therefore, the steam turbine unit was capable of providing 260 MW during this period.

- GT #2 on Forced Outage (U1) from January 22 at 0455 to January 22 at 0545 (cause code 5250 – Other Controls and instrumentation Problems).
- As a result of GT #2 not providing steam service, ST #1 on forced derate (D1) from January 22 at 0455 to January 22 at 0545 (cause code 5250 – Other Controls and Instrumentation Problems). ST #1 was capable of providing 130 MW during this period.

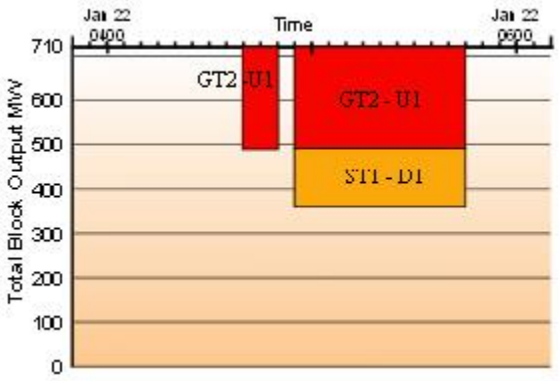


Figure L2-6: Multiple Unit Outages

Summary of Example #6:

- GT #2 reports 2 forced outages for 0.17 hrs x 225MW = 37.50 MWh. and 0.83 hrs x 225 MW = 187.50 MWh.
- ST #1 on forced derate for 0.83 hours (or 0.42 Equivalent Forced Derated Hours) or 0.83 hr x 130 MW = 108.33 MWh.
- Combined-cycle block reports the 3 events:
  - FO of 37.50 MWh
  - FO of 187.50 MWh
  - D1 of 108.33 MWh

Example 7 – Combined-Cycle Block Annual Planned Outage.

Unit Event Report

- GT #2 placed on Planned Outage from January 24 at 0000 until January 31 at 1000 (cause code 5260 – Major Gas Turbine Overhaul). GT #2 was not capable of providing power during this period.

- As a result of GT #2 not providing steam service, ST #1 was placed on Planned derate (PD) from January 24 at 0000 to January 24 at 0515 (cause code 5260 – Major Gas Turbine Overhaul). ST #1 was capable of providing 130 MW during this period.
- ST #1 placed on Planned Overhaul from January 24 at 0515 to January 31 at 1130 (cause code 4240 – low-pressure steam-turbine bearings). ST #1 was not capable of providing power during this period.
- GT #1 placed on Planned Outage January 24 at 0530 to January 31 at 1015 (cause code 5272 - Borescope inspection). GT #1 was not capable of providing power during this period.

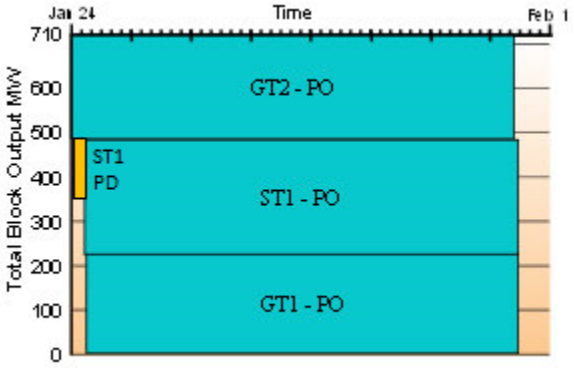


Figure L2-7: CC Block Annual PO

Summary of Example #7:

- GT #1 on Planned Outage for 172.75 hrs x 225 MW = 38,868.75 MWh.
- GT #2 on Planned Outage for 178.00 hrs x 225 MW = 40,050 MWh.
- ST #1 on Planned Derate for 5.25 hours with a loss of capacity of 130MW or 5.25 hrs x 130 MW = 682.50 MWh.
- ST #1 on Planned Outage for 174.25 hrs x 260 MW = 45,305 MWh.
- Combined-cycle block reports 4 events:
  - PO of 38,868.75 MWh
  - PO of 40,050 MWh
  - D1 of 682.50 MWh
  - PO of 45,305 MWh

Statistics from Unit Event and Performance Reports

There will be other outages, deratings, and reserve shutdown periods at a real combined-cycle block. We could list more, but they would just be repeats of the seven earlier examples. So to test the data collection methodology, we will calculate statistics for each unit and the combined-cycle block using the data from the seven examples.

The time period will be January 1 at 0000 to January 31 at 2400. This is a total of 744 hours during the month of January.

Net Actual Generation would be taken from the meters. Values stated here are for demonstration purposes only.

Table 1: Statistics from Unit Event and Performance Reports				
Statistic	**GT #1**	**GT #2**	**ST #1**	**CC Block**
Net Maximum Capacity	225	225	260	710
Period MWh	167,400	167,400	193,440	528,240.00
Forced Outage MWh	281.25	1,968.75	0	2,250.00
Planned Outage MWh	38,868.75	40,050.00	45,305.00	124,223.75
Maintenance Outage MWh	0	0	0	0.00
Reserve Shutdown MWh	27,337.50	48,281.25	24,093.33	99,712.08
Service MWh	100,912.50	77,100.00	124,041.67	302,054.17
Equiv. Forced Derated MWh	180.00	180.00	1486.33	1846.33
EFDH During RS MWh	0	0	162.50	162.50
Equiv. Plan. Derated MWh	0	0	682.50	682.50
Net Actual Generation	100,000	77,000	124,000	301,000.00
Attempted Starts	6	7	4	17.00
Actual Starts	5	7	4	16.00
Equiv. Availability Factor	76.51%	74.79%	75.46%	75.58%
Equiv. Forced Outage Rate	0.46%	2.72%	1.20%	1.36%
Forced Outage Factor	0.17%	1.18%	0.00%	0.43%
Forced Outage Rate	0.28%	2.49%	0.00%	0.74%
Scheduled Outage Factor	23.22%	23.92%	23.42%	23.52%
Net Capacity Factor	59.74%	46.00%	64.10%	56.98%
Starting Reliability	83.33%	100.00%	100.00%	94.12%

Table 2: Sample Data Summary									
Event #	**Unit**	**Event Type**	**Start Date**	**End Date**	**Duration**	**Loss MW**	**Loss MWh**	**Equiv. Blk Hrs**	**Example**
1	GT #2	RS	01/01/0000	01/07/0315	147:15:00	225	33,131.25	46.66	1
2	ST #1	RS	01/03/0010	01/06/0230	74:20:00	260	19326.67	27.22	
3	GT #1	RS	01/03/0015	01/06/0215	74:00:00	225	16,650.00	23.45	
4	GT #1	D1	01/07/1000	01/07/1400	4:00:00	45	180.00	0.25	2
5	GT #2	D1	01/07/1000	01/07/1400	4:00:00	45	180.00	0.25	
6	ST #1	D1	01/07/1000	01/07/1400	4:00:00	52	208.00	0.29	
7	GT #1	RS	01/07/2115	01/08/0500	7:45:00	225	1,743.75	2.46	3
8	GT #2	U1	01/11/0700	01/11/1445	7:45:00	225	1,743.75	2.46	4
9	ST #1	D1	01/11/0700	01/11/1445	7:45:00	130	1,007.50	1.42	
10	GT #2	RS	01/11/1445	01/14/0330	60:45:00	225	13,668.75	19.25	
11	ST #1	RS	01/12/0000	01/12/1120	11:20:00	260	2946.67	4.15	
12	GT #1	RS	01/12/0015	01/12/0930	9:15:00	225	2,081.25	2.93	
13	GT #1	RS	01/14/2215	01/16/0445	30:30:00	225	6,862.50	9.67	5
14	ST #1	RS	01/15/2300	01/16/0600	7:00:00	260	1,820.00	2.56	
15	GT #2	RS	01/15/2310	01/16/0545	6:35:00	225	1,481.25	2.09	
16	GT #1	SF	01/16/0445	01/16/0600	1:15:00	225	281.25	0.40	
17	ST #1	D1	01/16/0445	01/16/0600	1:15:00	130	162.50	0.23	
18	GT #2	U1	01/22/0440	01/22/0450	0:10:00	225	37.50	0.05	6
19	GT #2	U1	01/22/0455	01/22/0545	0:50:00	225	187.50	0.26	
20	ST #1	D1	01/22/0455	01/22/0545	0:50:00	130	108.33	0.15	

Table 2: Sample Data Summary									
Event #	Unit	Event Type	Start Date	End Date	Duration	Loss MW	Loss MWh	Equiv. Blk Hrs	Example
21	GT #2	PO	01/24/0000	01/31/1000	178:00:00	225	40,050.00	56.41	7
22	ST #1	PD	01/24/0000	01/24/0515	5:15:00	130	682.50	0.96	
23	ST #1	PO	01/24/0515	01/31/1130	174:15:00	260	45,305.00	63.81	
24	GT #1	PO	01/24/0530	01/31/1015	172:45:00	225	38,868.75	54.74	

Appendix M – Differences Between NERC-GADS and ISO-GADS Data Collection and Uses

There are a number of differences between the NERC GADS and the GADS run by Independent System Operators (ISOs), known as ISO GADS. Some of these differences are minor; others are not.

NERC GADS collects equipment outage data on a national basis. NERC GADS is an equipment outage system with a focus on plant reliability and assessments. The ISOs are charged with the reliability of the bulk electrical grid, dispatching generating units in an economical manner, and running their electric markets. In order to do this the ISO's, in some cases, follow their own definitions for things like OMC events, as specified in their market rules, which may differ from the way NERC GADS defines the same things. As a result, there are differences between the NERC GADS DRI and the various ISO GADS data reporting instructions as per their market rules. This means that reporting companies in some cases have to report their GADS data as per the ISO rules rather than the NERC rules. NERC will accept either with the understanding that generating unit histories reported under the ISO rules are inconsistent with those reported under NERC rules.

Listed below are brief descriptions on how certain ISOs utilize GADS data to support their marketing functions, reliability calculations, and specifically how their GADS procedures differ from those established by NERC.

PJM Interconnection (PJM) – Uses GADS data for ISO reliability studies and determining capacity payments to the Generator Owners. Significant features of the PJM GADS are:

- PJM uses the GADS data to determine capacity payments. These payments are based on the following equation:

  Capacity Payment = ICAP x Market Capacity Payment Price x (1 - EFORd of unit)

- Any generator that participates in the PJM Capacity Market must report GADS data irrespective of capability.
- PJM provides an optional service to report GADS data entered in the PJM eGADS application to OATI/NERC.
- Commencing June 1, 2018, PJM will not recognize any events as OMC. Although OMC event cause codes can be used, they will be treated as non-OMC in all calculations for the markets and reliability calculations. Data forwarded to OATI/NERC will include the original OMC cause codes.
- GADS data is reported and calculated against the unit's NET DEPENDABLE CAPACITY (NDC), not its NET MAXIMUM CAPACITY (NMC). Many companies ensure that their generator NET DEPENDABLE CAPCITY (NDC) is equal to the respective generator's PJM ICAP value and its NMC.
- Maintenance Outages and Derates (Event Types MO & D4) are limited to 9 days duration during the PJM Peak Maintenance Season. The PJM Peak Maintenance Season is defined in PJM Manual 10.
- Planned Outages and Derates (Event Types PO & PD) are prohibited during the PJM Peak Maintenance Season.
- All Planned and Maintenance Outages and Derates must be scheduled in advance per PJM Manual 10.
- MB and IR events must be approved by PJM and require removing the respective generators ICAP from the PJM Capacity Markets for the duration of the respective event. MB events are considered deactivations by PJM and have further market and reliability implications.
- Data must be submitted monthly to PJM on or before the 20th of the following month.
- Errors in a previously submitted month require access approval from PJM to correct data.

- Generator Owners must submit summer and winter capability verification tests twice a year via the PJM eGADS application. Winter and summer test periods are defined in PJM Manual 21. Hydroelectric and pumped storage generators are required to conduct and report one capability verification test per year in the summer period.

New York Independent System Operations (NYISO) – Uses GADS data for calculation of derating factors for the Installed Capacity (ICAP) Market, NYISO, the New York State Reliability Council's (NYSRC) Reliability Studies, and the determination of the Installed Reserve Margin (IRM) for the New York Control Area (NYCA). Differences between NERC GADS and NYISO generating unit reporting instructions include:

Item	NERC	NYISO	Implications
Weekend Definition	Friday at 2400 hours through Sunday at 2400 hours	Friday at 10:01:00 PM through Monday at 8:00:59 AM.	This impacts the determination of whether an event is categorized as a MO as opposed to a FO; EFORd
Plant boundary	High side of unit transformer	Generator Owner responsibility ends at the low side bushings of the generator step-up transformer	This impacts the applicability of the OMC code - 9300
Outside Management Control (OMC)		Exception permitted for equipment failure that involves equipment located on the electric network beyond the generator step-up transformer, and including the step-up transformer on the output side of the Generator (9300). This exception does not apply to fuel related outages or derates or other cause codes that might be classified as Outside Management Control (OMC) in the NERC GADS Data Reporting Instructions (DRI).	Only transmission related events (9300) are excluded from consideration in the EFORd calculation for ICAP
Maintenance Outage Definition (MO)	An outage that can be deferred beyond the end of the next weekend (Sunday at 2400 hours), but requires that the unit be removed from service, another outage state, or	An outage that received NYISO's approval (with minimum two days notice) and there are no reliability issues if the unit is removed from service.	

Item	NERC	NYISO	Implications
	Reserve Shutdown state before the next Planned Outage (PO). Characteristically, a MO can occur any time during the year, has a flexible start date, may or may not have a predetermined duration, and is usually much shorter than a PO.		
Planned Derate (PD)	A derating that is scheduled well in advance and is of a predetermined duration.	Planned/maintenance deratings must be coordinated by NYISO Operations with at least 2 days notice from unit's owner/operator.	
Maintenance Derating (D4)	A derating that can be deferred beyond the end of the next weekend but requires a reduction in capacity before the next Planned Outage (PO). A D4 can have a flexible start date and may or may not have a predetermined duration.	Approved by NYISO, and there are no reliability issues when the unit's output is reduced, flexible start time and does not require a predetermined duration	
Derate	Derates must be reported for capacity loss > 2% or capacity loss lasting more than 30 minutes	Derates must be reported for capacity loss > 3% or capacity loss lasting more than 15 minutes	
Event Contribution Code		NYISO only receives contribution code 1	
Submission requirements	Mandatory for 20 MW or larger conventional units in 2013	Required for ICAP suppliers	
Weekend Definition	Friday at 2400 hours through Sunday at 2400 hours	Friday at 10:01:00 PM through Monday at 8:00:59 AM.	This impacts the determination of whether an event is categorized as a MO as opposed to a FO; EFORd

Appendix N: GADS DRI Changes from 2020 to 2021

Introduction

- No major changes.

Table of Contents

- No major changes.

Section I – Introduction

- No major changes.

Section II – Data Scope and Transmittal

- No major changes.

Section III – Event Reporting

- Page 6 – The following paragraph was added under the Maintenance Outage definition:
  - There are cases when there are equipment issues and a unit could theoretically run past the next weekend, but the unit would not be run because of high risk for unit damage. If the risk is too high to run the unit, management is unwilling to run the unit, running the unit violates sound engineering practice or running the unit would invalidate your insurance, the outage is forced not maintenance. Examples are DC emergency equipment out of service or one ground on the generator.

Section IV – Performance

- No major changes.

Section V – Design Data Reporting

- No major changes.

Appendix A – Change in Unit Status Report Form

- No major changes.

Appendix B – Cause Codes

- The following cause codes have been added:
  - 9015 – Pandemic
    - Unit Types: All
  - 9138 – High Water Level in Tailrace (too much water)
    - Unit Type: 500
  - 5792 – Engine Overspeed Trip
    - Unit Type: 400
  - 5692 – Turbine Overspeed Trip Test – Jet Engine
    - Unit Types: 300, 800, 850, 851, 852, 860, 861, 862

- 5292 – Turbine Overspeed Trip Test – Gas Turbine
  - Unit Types: 300, 800, 850, 851, 852, 860, 861, 862

Appendix C – Utility and Unit Identification Codes

- No major changes.

Appendix D – Cause Code Cross Reference

- No major changes.

Appendix E – Unit Design Data Forms

- No major changes.

Appendix F – Performance Indexes and Equations

- No major changes.

Appendix G – Examples and Recommended Methods

- No major changes.

Appendix H – Failure Mechanism Codes

- No major changes.

Appendix I – GADS Data Release Guidelines

- No major changes.

Appendix J – Cause Code Amplification Codes

- No major changes.

Appendix K – Outside Management Control

- No major changes.

Appendix L1 – Calculating Combined-Cycle and Co-generation Block Data

- No major changes.

Appendix L2 – Calculating Combined-Cycle and Co-generation Block Data

- No major changes.

Appendix M – Differences Between NERC-GADS and ISO-GADS Data Collection and Uses

- No major changes.