

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Reporting Event Details

Data Reporting Instructions – Section III

Module 08 - GADS Data Reporting Workshops

RELIABILITY | ACCOUNTABILITY



- The 07 event data file has four (4) sections

A - Event identification

C - Primary Cause of Event

B - Event magnitude

D - Additional Work During Event (up to 48)

Record Code	07 Event Data File Format		Record Number
	One (1) Event on One (1) Unit = 3 records + 2 Per Additional Work During Event = 99 Records Max		
07	Section A - Event Identification, col 1 - 19	Section B - Event Magnitude, col 20 - 82	01
07	Section A - Event Identification, col 1 - 19	Section C - Primary Cause of Event, col 20 - 82	02
07	Section A - Event Identification, col 1 - 19	Section C - Primary Cause of Event, col 20 - 82	03
07	Section A - Event Identification, col 1 - 19	Section D - Additional Work During Event, col 20 - 82	04
07	Section A - Event Identification, col 1 - 19	Section D - Additional Work During Event, col 20 - 82	05

- Section A - 7 data fields
- Section B - 6 data fields
- Section C - 9 data fields (Even), 3 data fields (Odd)
- Section D - 9 data fields (Even), 3 data fields (Odd)
- Even/Odd = Record Numbers for Sections C/D which have two records each, one even, one odd, up to 99 max

- Only the 07 event data file format is accepted by webE-GADS
 - To see if your program is using the correct format
 - Open the event file with Notepad
 - If the first two digits of the file are 07 you have the right file format
 - If the first two digits of the file are 97 then update your software

073873812017	370MB01010000		12312400	0	01
073873812017	370MB9991	1	0	Mothballed	02
073873822017	240MB01010000		12312400	0	01
073873822017	240MB9991	1	0	Mothballed	02
073873832017	200MB01010000		12312400	0	01
073873832017	200MB9991	1	0	Mothballed	02

- All event data files must be text files and have the file extension “txt” or it will not upload to webE-GADS
- Data is due 45 days after the end of each quarter
- Monthly or year-to-date data is accepted by webE-GADS
 - Monthly: Q1 = Jan thru Mar, Q2 = Apr thru Jun
 - Year-To-Date: Q1 = Jan thru Mar, Q2 = Jan thru Jun (recommended)

- The DRI contains rules about the data you are required to collect
 - These rules must be followed when collecting the GADS data
 - Example:
 - Outages can never overlap
 - An outage that starts during another outage will cause an error
- The DRI also contains rules about the format the data must be in to be submitted to GADS
 - These rules must be followed when creating the files you submit to GADS
 - Example:
 - The format in Section B of the 05 performance data file assumes two decimals in each of the six unit generation performance values reported in it
 - Data: 1234567.8 ends in .8, one decimal
 - File: 123456780 no decimal point, zero added for 2 decimals
- The two sets of rules are mutually exclusive

- Problem: Unit A completes a planned outage. The critical path involved replacing the generator but there were 40 other items worked on during the outage and your boss wants you to include them for the record
- Question: How many 07 event data file records will be required for the planned outage event plus the additional 40 items?
 - A. 41
 - B. 43
 - C. 83
 - D. 81

07 Event Data File: Section A - Event Identification, Record 01

Data Field	Columns	07						
Record Code	01-02							
Utility (Company) Code	03-05							
Unit Code	06-08							
Year	09-12							
Event Number	13-16							
Report Revision Code	17							
Event Type	18-19							

Required
Voluntary
Blank

- Section A is used to identify the event
 - Which utility-unit did the event occur on?
 - What type of event was it?
- There are seven (7) data fields per record as shown above

- Required fields:
 - Record Code
 - The 07 record code uniquely identifies the data as an event data file record
 - Utility (Company) Code
 - Three character alpha-numeric code identifying the reporting organization
 - Assigned by OATI for NERC
 - Unit Code
 - Three-digit code identifying the unit reported
 - Code distinguishes one unit from another in a utility
 - Code range is restricted by the unit type
- The combination of utility and unit codes uniquely identifies a unit in the GADS database
 - Example: 840331 Utility=840, Unit=331

- Required fields:
 - Year
 - The year the event occurred
 - Event Number
 - Unique for each event on a unit in a given year
 - Need not be sequential
 - Recommend they be chronological
- Events start when they start and end when they end - events that continue through multiple months/years should be tracked as one long event and not ended/re-started each month/year
- The combination of Utility Code, Unit Code, Year, and Event Number uniquely identifies an event in the GADS database
 - Example: 8403311995137 Utility=840, Unit=331, Year=1995, Event=137

- Report Revision Code (voluntary)
 - Shows changes to the event record
 - Original Reports (0)
 - Additions or corrections (1, 2,...9)
 - Even if just one record is revised resubmit all of the records for the revised time period
- Event Type Code (required)
 - Identifies the state experienced by the unit
 - Inactive State - divided into three (3) event types
 - Active State - divided into seventeen (17) event types

- Problem: Section A of the 07 event data file contains the event identification information
- Question: Which of the following is not required in Section A?
 - A. Record Code, col 1 - 2
 - B. Revision Code, col 17
 - C. Event Type, col 18 - 19
 - D. Utility Code, col 3 - 5
 - E. Event Number, col 13 - 16

07 Event Data File: Section B - Event Magnitude, Record 01

Data Field	Columns	Required	Voluntary	Blank
Start of Event	20-27	Required	Voluntary	Blank
Blank Columns	28-47	Blank	Blank	Blank
End of Event	48-55	Required	Voluntary	Blank
Gross Available Capacity	56-61	Required	Voluntary	Blank
Net Available Capacity	62-67	Required	Voluntary	Blank
Blank Columns	68	Blank	Blank	Blank
Dominant Derating Code	69	Required	Voluntary	Blank
Blank Columns	70-80	Blank	Blank	Blank
Record Number	81-82	Required	Voluntary	Blank

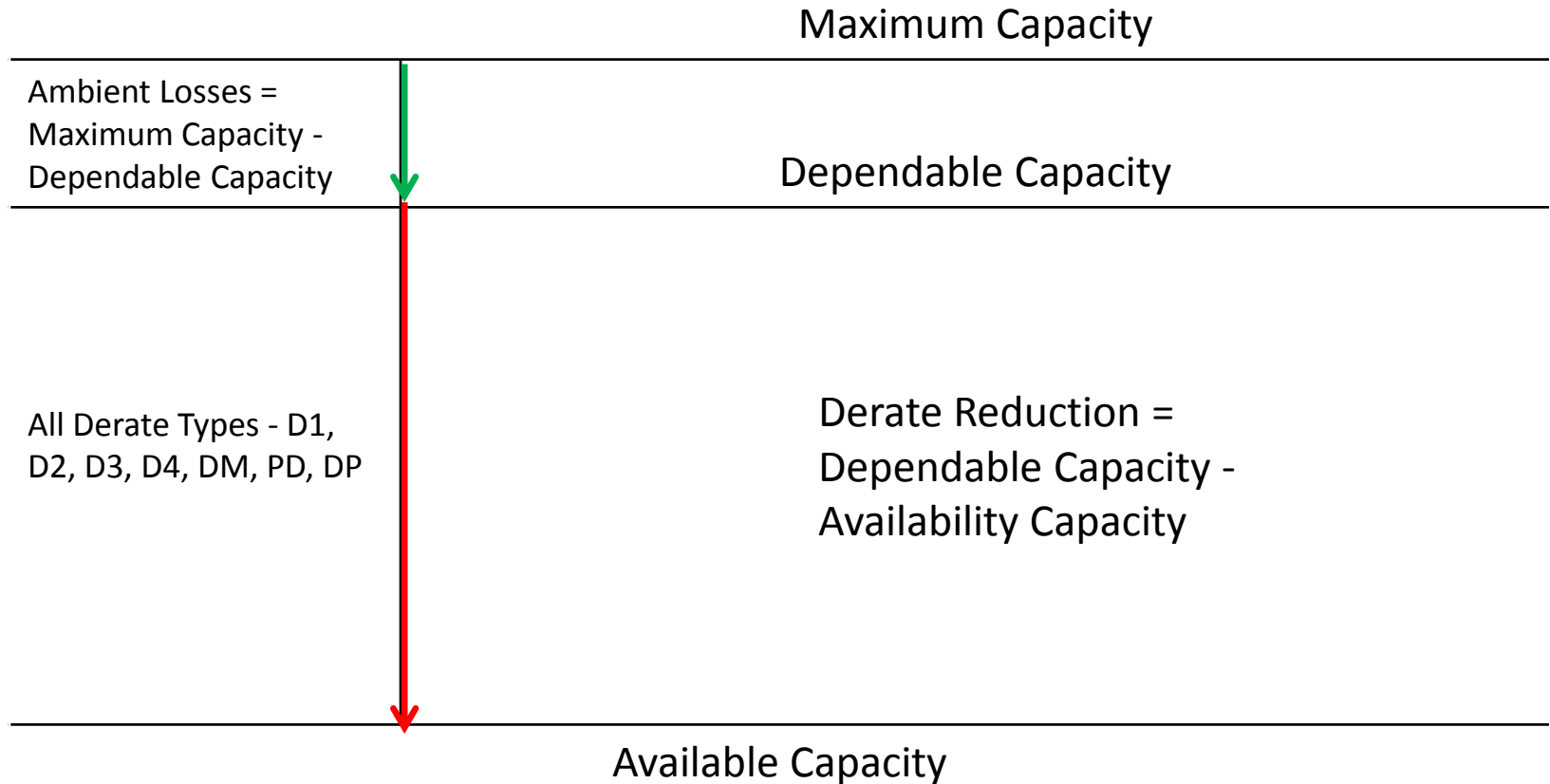
- Section B is used to describe the impact of the event
 - How long did the event last?
 - How large an impact did the event have on unit capacity?
- There are six (6) data fields per record as shown above

- Start of Event (required)
 - Start month, day, hour, minute
- Outages start when the unit
 - Is desynchronized
 - Enters a new outage state
- Reserve Shutdowns start when the unit
 - Is desynchronized
 - Enters the reserve shutdown state from another state
- Derates start when
 - A major component or piece of equipment is taken out of service
 - The unit experiences a problem preventing it from making full load
 - Small boiler tube leak
- Use a 24-hour clock when reporting the start of event to GADS

- End of Event (required by year's end)
 - End month, day, hour, minute
- Outages end when the unit
 - Is synchronized
 - Enters another appropriate unit state
- Reserve Shutdowns end when the unit
 - Is synchronized
 - Enters another appropriate unit state
- Derates end when
 - A major component or piece of equipment is available for service
 - A problem that had prevented the unit from running at full load is fixed
 - Fuel oil gun finally goes in service
- Use a 24-hour clock when reporting the end of event to GADS

- If the event starts at midnight, use:
 - 0000 as the start hour and start time
- If the event ends at midnight, use:
 - 2400 as the end hour and end time
- This is a data file formatting rule
 - Your in-house GADS system may not use a 24 hour clock. In that case your system must reformat the end time of the event when recorded in the 07 event data file using a 24 hour clock format as shown above
 - This will not end your event at the end of a year; GADS will connect both pieces of an event spanning the end of a year back together
 - The reason each event must end at the end of the year in the data file you submit to GADS is because you only enter the month, day, hour, and minute for the start/end times on the events in Section B. The year is in Section A, as a single value, which is used for both the start and end of the event, so the event can't cross years in data file itself.

- Problem: Your software package does not use a 24-hour clock. If an event starts at midnight on 06/10/19 you can enter 06/10/19 00:00 AM which is OK. But if the event ends at midnight you can enter 06/10/19 11:59 PM at best or 06/11/19 00:00 AM, which is the same thing as 2400, but the day has changed.
- Question: What kind of rule is it that requires you to use a 24-hour clock?
 - A. Data collection rule
 - B. Data formatting rule for the file you submit to GADS



Available capacities are to be expressed on either a gross or net basis

- **Gross Available Capacity (voluntary)**
 - This is the level of gross generation the unit can achieve while being derated
- **Net Available Capacity (required)**
 - This is the level of net generation the unit can achieve while being derated
- **Dominant Derate Code (voluntary)**
 - Enter a D to indicate that a derate is dominant
- **Record Number (required)**
 - 01 uniquely identifies it as the first record in the event data file

- If only GAC or NAC is reported during a derate the missing value will be estimated using a capacity estimation factor (CEF) for the unit type
 - Example: $GAC = NAC * (1 + CEF)$

Unit Type	Unit Code Range	CEF
Combined Cycle GT units	300-399, 700-799	2.00
Combined Cycle ST units	100-199, 600-649	5.00
CoGeneration GT units	300-399, 700-799	2.00
CoGeneration ST units	100-199, 600-649	5.00
CoGeneration Block	800-899	4.00
Combined Cycle Block	800-899	4.00
Fluidized Bed	650-699	5.00
Fossil-Steam	100-199, 600-649	5.00
Gas Turbine/Jet Engine (Simple Cycle Operation)	300-399, 700-799	2.00
Geothermal	800-899	4.00
Internal Combustion/Reciprocating Engines	400-499	0.00
Miscellaneous	800-899	4.00
Multi-boiler/Multi-turbine	800-899	4.00
Nuclear	200-299	5.00
Pumped Storage/Hydro	500-599, 900-999	2.00

- Problem: Section B of the 07 event data file contains the event magnitude information
- Question: For which event types should you report GAC/NAC?
 - A. All events
 - B. Only forced outage events
 - C. Derate events
 - D. Reserve Shutdowns

Allowable Event Type Changes

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	No	Yes	No	Yes	Yes		
ME – Maintenance Extension	Yes	No	No	Yes	Yes	No	No	No	Yes		
PE – Planned Extension	Yes	No	No	Yes	No	Yes	No	No	Yes		
RS – Reserve Shutdown	Yes	No	No	Yes	Yes	Yes	No	No	Yes		
D1 – Immediate	<i>IEEE Standard 762 does not recognize transition to/of deratings from/to other event types except as shown.</i>									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

- Yes - indicates an allowed transition from one event type to another
- No - indicates an illegal transition from one event type to another
- There are seven (7) general types of transitions
 - All outages can transition to U1 but not U2 or U3
 - All outages can transition to SF
 - All outages except PO and PE can transition to MO
 - All outages except ME can transition to PO
 - All outage extensions must follow outages of the same type
 - All outages can transition to RS
 - Derates may transition to their extensions only

- Problem: You are trying to enter your GADS data for the month and you keep getting a strange error. You have checked and verified that all of the data was typed in correctly. You dig deeper and find that the error is due to an invalid event transition which you fix by correcting an event type.
- Question: Which event type transition is invalid?
 - A. PO to PE
 - B. D4 to DM
 - C. RS to U2
 - D. U3 to U1

- Details the primary cause of event
 - What caused the event?
 - It may not always be the root cause
- There are two records in Section C as shown on the next slide
 - There are nine (9) data fields in the even numbered record (02)
 - There are three (3) data fields in the odd numbered record (03)
 - If the verbal description is less than 32 characters the second Section C record can be omitted

07 Event Data File: Section C - Primary Cause of Event, Record 02

Data Field	Columns										02
Cause Code	20-23										
Amplification Code	24-25										
Time Work Started	26-33										
Time Work Ended	34-41										
Blank Columns	42-43										
Event Contribution Code	44										
Problem Alert	45										
Man-hours Worked	46-49										
Verbal Description	50-80										
Record Number	81-82										

Required
Voluntary
Blank

07 Event Data File: Section C - Primary Cause of Event, Record 03

Data Field	Columns				03
Cause Code	20-23				
Blank Columns	24-25				
Verbal Description	26-80				
Record Number	81-82				

- Cause Code (required)
 - 4-digit number
 - 1,700+ cause codes currently in GADS
 - Points to the equipment with a problem and/or cause of the event
 - Sets of cause codes are available for each type of unit
 - See DRI Appendices B01-15
 - Each appendices is indexed alphanumerically by system, component, and sub-component; some tables do not (yet) have sub-component data
 - The main index has a link to each table for easy access
 - Each table is indexed numerically by cause code
 - All System, Component, and Sub-Component names are standardized
 - Except for a few exceptions all cause code descriptions are standardized as well
 - Any applicable notes are located at the bottom of each table for easy reference
 - The entire document is searchable

- Sample cause code table
 - Unit Type Fossil Steam
 - Appendices B08
 - Table 16
 - System Balance of Plant
 - Component Condensate System
 - Sub-Component: Pumps, Piping, and Valves

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.

Unit Type	Unit Code Range	Appendix
Combined Cycle GT units	300-399, 700-799	B01
Combined Cycle ST units	100-199, 600-649	B02
CoGeneration GT units	300-399, 700-799	B03
CoGeneration ST units	100-199, 600-649	B04
CoGeneration Block	800-899	B05
Combined Cycle Block	800-899	B06
Fluidized Bed	650-699	B07
Fossil-Steam	100-199, 600-649	B08
Gas Turbine/Jet Engine (Simple Cycle Operation)	300-399, 700-799	B09
Geothermal	800-899	B10
Internal Combustion/Reciprocating Engines	400-499	B11
Miscellaneous	800-899	B12
Multi-boiler/Multi-turbine	800-899	B13
Nuclear	200-299	B14
Pumped Storage/Hydro	500-599, 900-999	B15

- Problem: A feral cat gets into the auxiliary bus room on Unit 2. While chasing a mouse it steps across two conductors creating a conductive path. While the electricians are tasked with cleaning up what's left of the cat and repairing the damage done to the auxiliary bus you are tasked with reporting the event to GADS.
- Question: Which cause code should you use?
 - A. 3662 4000-7000 volt conductors and buses
 - B. 3669 Other 4000-7000 volt problems
 - C. 9040 Other catastrophe
 - D. 9320 Other miscellaneous external problems
 - E. 9720 Other safety problems

- Two alpha character code used to describe the failure mode or reason for failure (Appendix J)
- Used by Canadian Electricity Association (CEA) and International Atomic Energy Agency (IAEA) as modifiers to codes for many years
- Increases the resources of cause codes without adding new codes
- Many Amplification Codes are the same as the Failure Mechanism codes (Appendix H)
- Only required for U1 events that occur from an online state; strongly recommended for all other events

Amplification Code		Failure Code	
03	Arced/flashover – electrical	F030	Arced/flashover – electrical
06	Broken	F060	Broken
12	Clogged	F120	Clogged
28	Cracked	F280	Cracked
42	Error, operator	F420	Error, operator
53	Inspection	F530	Inspection
55	Loose	F550	Loose
72	Sticking	F720	Sticking
81	Torn	F810	Torn
42	Error, operator	FP00	Personnel error
R0	Fire	FR00	Fire
V0	Vibration (other)	FV00	Vibration

- Problem: A feral cat gets into the auxiliary bus room on Unit 2. While chasing a mouse it steps across two conductors creating a conductive path. While the electricians are tasked with cleaning up what's left of the cat and repairing the damage done to the auxiliary bus you are tasked with reporting the event to GADS.
- Question: Which amplification code should you use?
 - A. 08 Burned/fire damage - not initiated by component
 - B. 10 Carbon, covered
 - C. 30 Damaged, foreign object
 - D. 45 Explosion damage - not initiated by the component
 - E. 49 Grounded electrical component

- Time: Work Started/Time: Work Ended (voluntary)
 - Use 24 hour clock
 - GADS uses the event start/end dates/times if not provided
- Event Contribution Code (voluntary)
 - Primary cause of event - 1
 - Forced outages have only one primary cause
 - PO and MO events can have multiple primary causes for PO and MO events
 - Contributed to primary cause of event - 2
 - Contributed but not primary
 - Work done during the event - 3
 - Worked on during event but did not initiate an event
 - After startup, delayed unit from reaching load point – 5
 - Used to track missed Ready For Load (RFL)

- **Problem Alert (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 (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

- Problem: High energy piping (HEP) failures are very rare. Less than ten have occurred since GADS started. One of your big coal units has just experienced its second HEP failure in two years. Both were due to the use of welded seam piping. Your company has repaired both failures with seamless pipe as a result.
- Question: What should you do to alert the industry to a potential problem?
 - A. Submit an event to GADS detailing the failure as much as possible
 - B. Use the appropriate cause and amplification codes
 - C. Place an X in the Problem Alert field

- Verbal Description (voluntary but encouraged)
 - The verbal description can be the most helpful piece of information you provide if it is completed correctly
 - Comparing the verbal description to the cause code description is the only way to verify that the cause code is correct
 - While the cause code will point to the equipment with the problem or its cause, the verbal description can actually describe the event in detail
 - Your in-house system may allow you to write a book for a verbal description but only the first 86 characters get sent to NERC
 - Include the common unit name/number of the equipment and a concise description of the problem in the first 86 characters
 - Example: 1A BFPBP outboard journal bearing failure – housing cracked

Method 1

- Cause Code 1000
- U1 Outage
- The unit was brought off line due to a leak

Method 2

- Cause Code 1000
- U1 Outage
- Water wall tube leak, level 6, front panel, tubes 21-23 eroded from stuck soot blower. Replaced tubes, soot blower lance

Section D - Additional Work During Event, col 20 - 82

04

Section D - Additional Work During Event, col 20 - 82

05

- Reporting additional work during the event is voluntary
- Same record layout as Section C, the primary cause of event
- Typically used to report
 - Factors contributing to the cause of the event
 - Additional work
 - Factors affecting startup/ramp down
- Also used to document other major equipment items worked on during outages
- Up to 48 additional work during event records allowed
 - Record Numbers would be from 04 to 99 max

07 Event Data File: Section C - Primary Cause of Event w/Expanded Reporting for GT/JE (*), Record 02

Data Field	Columns																	02
Cause Code	20-23																	
Amplification Code	24-25																	
Time Work Started	26-33																	
Time Work Ended	34-41																	
Blank Columns	42-43																	
Event Contribution Code	44																	
Problem Alert	45																	
Man-hours Worked	46-49																	
Failure Mechanism Code *	50-53																	
Trip Mechanism *	54																	
Cumulative Fired Hours *	55-60																	
Cumulative Engine Starts *	61-65																	
Verbal Description	66-80																	
Record Number	81-82																	

Required
Voluntary
Blank

- Expanded data reporting is available for owners/operators of gas turbine/jet engines. Four additional data fields as shown above by an asterisk (*) can be reported in Section C.

- Expanded data reporting is voluntary
- It is for gas turbines and jet engines only
 - Optional but strongly encouraged
- Failure mechanism code
- Trip mechanism (manual or auto)
- Cumulative fired hours at time of event
- Cumulative engine starts at time of event
- Note: the expanded reporting data fields take up extra space in Section C of the 07 event data file reducing the length of the verbal description for the primary cause of the event from 86 to 70 characters; the length of the verbal description for additional work during event records remains at 86 characters

- Problem: Your company has a lot of gas turbines and it decides to start submitting its GADS data to an outside company for more in depth analysis. The analysis involves breaking the NERC cause codes down into about 5X as many. After the initial files are sent you start getting a lot of emails and phone calls requesting more information about a lot of the events.
- Question: What is wrong with your data?
 - A. The company can't handle records for additional work during an event
 - B. You don't do expanded data reporting on your gas turbines
 - C. The verbal description is missing or very poor



Questions and Answers