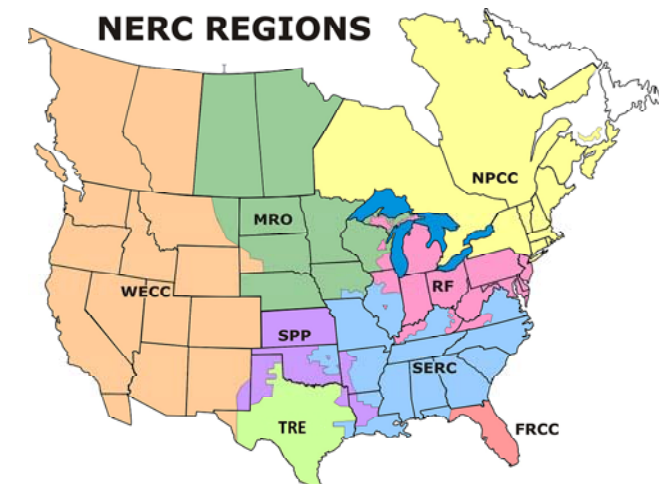


NERC CCAP Cause Code Quick Reference

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<u>A1 Design/Engineering</u>	<u>A2 Equipment/Material</u>	<u>A3 Individual Human Performance</u>	<u>A4 Management / Organization</u>	<u>A5 Communication</u>	<u>A6 Training</u>	<u>A7 Other</u>	<u>A8 (Open)</u>
B1 DESIGN INPUT LTA	B1 CALIBRATION FOR INSTRUMENTS LTA	B1 SKILL BASED ERROR	B1 MANAGEMENT METHODS LTA	B1 WRITTEN COMMUNICATIONS METHOD OF PRESENTATION LTA	B1 NO TRAINING PROVIDED	B1 EXTERNAL PHENOMENA	<u>AX Overall Configuration</u> B1 INSTALLATION/DESIGN CONFIGURATION LTA B2 MAINTENANCE/MODIFICATION CONFIGURATION LTA
B2 DESIGN OUTPUT LTA	B2 PERIODIC/ CORRECTIVE MAINTENANCE LTA	B2 RULE BASED ERROR	B2 RESOURCE MANAGEMENT LTA	B2 WRITTEN COMMUNICATION CONTENT LTA	B2 TRAINING METHODS LTA	B2 RADIOLOGICAL/ HAZARDOUS MATERIAL PROBLEM	
B3 DESIGN/ DOCUMENTATION LTA	B3 INSPECTION/ TESTING LTA	B3 KNOWLEDGE BASED ERROR	B3 WORK ORGANIZATION & PLANNING LTA	B3 WRITTEN COMMUNICATION NOT USED	B3 TRAINING MATERIAL LTA	B3 VENDOR OR SUPPLIER PROBLEM	
B4 DESIGN/ INSTALLATION VERIFICATION LTA	B4 MATERIAL CONTROL LTA	B4 WORK PRACTICES LTA	B4 SUPERVISORY METHODS LTA	B4 VERBAL COMMUNICATION LTA			
B5 OPERABILITY OF DESIGN/ENVIRONMENT LTA	B5 PROCUREMENT CONTROL LTA	B4 WORK PRACTICES LTA	B5 CHANGE MANAGEMENT LTA				
	B6 DEFECTIVE, FAILED, OR CONTAMINATED						
	B7 EQUIPMENT INTERACTIONS LTA						



AZ – Information to determine cause LTA

- B1 UNABLE TO IDENTIFY SPECIFIC ROOT CAUSE
- B2 REPORT STOPS AT FAILURE/ERROR MODE (WHAT HAPPENED, NOT WHY IT HAPPENED)
- B3 OTHER PARTIES INVOLVED IN EVENT
- B4 CROSS-REFERENCE REQUIRED FOR OTHER SOURCES OF INFORMATION

AN – No causes found

Level A nodes are underlined
Level B nodes are in ALL CAPS
Level C nodes are in "sentence case"
LTA = Less Than Adequate

Disclaimer: This NERC Event Analysis document is a working document used for analyzing events in order to identify reliability risk to the North American Bulk Power System, to ensure and continuously improve reliability. This document cannot be used for compliance monitoring or enforcement purposes. Any statements or conclusions on this document will not prejudice the outcome of an event analysis or a potential compliance review associated with the same facts or circumstances. This document makes no findings regarding compliance with Reliability Standards.

Start
Here

A1 Design/Engineering

B1 DESIGN INPUT LTA

- C01 Design input cannot be met
- C02 Design input obsolete
- C03 Design input not correct
- C04 Necessary design input not available

B2 DESIGN OUTPUT LTA

- C01 Design output scope LTA
- C02 Design output not clear
- C03 Design output not correct
- C04 Inconsistent design output
- C05 Design input not addressed in design output
- C06 Drawing, specification, or data error
- C07 Error in equipment or material selection
- C08 Errors not detectable
- C09 Errors not recoverable

B3 DESIGN/DOCUMENTATION LTA

- C01 Design / documentation not complete
- C02 Design /documentation not up-to-date
- C03 Design/documentation not controlled

B4 DESIGN/INSTALLATION VERIFICATION LTA

- C01 Independent review of design / documentation LTA
- C02 Testing of design / installation LTA
- C03 Independent inspection of design / installation LTA
- C04 Acceptance of design / installation LTA

B5 OPERABILITY OF DESIGN/ ENVIRONMENT LTA

- C01 Ergonomics LTA
- C02 Physical environment LTA
- C03 Natural environment LTA

AN – No causes found

AZ – Information to determine cause LTA

B1 UNABLE TO IDENTIFY SPECIFIC ROOT CAUSE

- C01 Multiple, parallel causal sequences exist
- C02 Context out-of-scope of analysis
- C03 No cause uncovered after exhaustive testing

B2 REPORT STOPS AT FAILURE/ERROR MODE

- C01 Apparent Cause Analysis only
- C02 No causal sequence established or identified
- C03 Attributed to weather beyond initiating cause

B3 OTHER PARTIES INVOLVED IN EVENT

- C01 Other entity cited as involved in event
- C02 Vendor or contractor cited as involved in event

B4 CROSS-REFERENCE REQUIRED FOR OTHER SOURCES OF INFORMATION

- C01 Requires secondary review once appropriate reports are received
- C02 Requires secondary review once additional outside investigative report is received

A2 Equipment/Material

B1 CALIBRATION FOR INSTRUMENTS LTA

- C01 Calibration LTA
- C02 Equipment found outside acceptance criteria
- C03 Coordinated tuning or adjustment of Instrumentation LTA

B2 PERIODIC/ CORRECTIVE MAINTENANCE LTA

- C01 Preventive maintenance for equipment LTA
- C02 Predictive maintenance LTA
- C03 Corrective maintenance LTA
- C04 Equipment history LTA

B3 INSPECTION/ TESTING LTA

- C01 Start-up testing LTA
- C02 Inspection / testing LTA
- C03 Post-maintenance / Post-modification testing LTA

B4 MATERIAL CONTROL LTA

- C01 Material handling LTA
- C02 Material storage LTA
- C03 Material packaging LTA
- C04 Material shipping LTA
- C05 Shelf life exceeded
- C06 Unauthorized material substitution
- C07 Marking / labeling LTA

B5 PROCUREMENT CONTROL LTA

- C01 Control of changes to procurement specification / purchase order LTA
- C02 Fabricated item did not meet requirements
- C03 Incorrect item received
- C04 Product acceptance requirements LTA

B6 DEFECTIVE, FAILED, OR CONTAMINATED

- C01 Damaged, defective or failed part
- C02 Defective or failed material
- C03 Defective weld, braze, solder joint, crimp, hinge, or other connection
- C04 End-of-life failure
- C05 Electrical or instrument noise
- C06 Contaminant
- C07 Software failure

B7 EQUIPMENT INTERACTIONS LTA

- C01 Communications path LTA
- C02 Data quality LTA
- C03 Supporting power system LTA
- C04 Undesirable operation of Coordinated Systems

A3 Individual Human Performance

B1 SKILL BASED ERROR

- C01 Check of work LTA
- C02 Step was omitted due to distraction
- C03 Incorrect performance due to mental lapse
- C04 Infrequently performed steps were performed incorrectly
- C05 Delay in time caused LTA actions
- C06 Wrong action selected based on similarity with other actions
- C07 Omission / repeating of steps due to assumptions for completion

B2 RULE BASED ERROR

- C01 Strong rule incorrectly chosen over other rules
- C02 Signs to stop were ignored and steps performed incorrectly
- C03 Too much activity was occurring and error made in problem solving
- C04 Previous success in use of rule reinforced continued use of rule
- C05 Situation incorrectly identified or represented resulting in wrong rule used

B3 KNOWLEDGE BASED ERROR

- C01 Attention was given to wrong issues
- C02 LTA conclusion based on sequencing of facts
- C03 Individual justified action by focusing on biased evidence
- C04 LTA review based on assumption that process will not change
- C05 Incorrect assumption that a correlation existed between two or more facts
- C06 Individual underestimated the problem by using past events as basis

B4 WORK PRACTICES LTA

- C01 Individual's capability to perform work LTA [Examples include: Sensory /perceptual capabilities LTA; Motor / physical capabilities LTA; and Attitude / psychological profile LTA]
- C02 Deliberate violation

A4 Management / Organization

B1 MANAGEMENT METHODS LTA

- C01 Management policy guidance or expectations are not well-defined, understood, or enforced
- C02 Job performance standards not adequately defined
- C03 Management direction created insufficient awareness of impact of actions on safety / reliability
- C04 Management follow-up or monitoring of activities did not identify problems
- C05 Management assessment did not determine causes of previous event or known problem
- C06 Previous industry or in-house experience was not effectively used to prevent recurrence
- C07 Responsibility of personnel not well-defined or personnel not held accountable
- C08 Corrective action responses to a known or repetitive problem was untimely
- C09 Corrective action for previously identified problem or event was not adequate to prevent recurrence

B2 RESOURCE MANAGEMENT LTA

- C01 Too many administrative duties assigned to immediate supervisor
- C02 Insufficient supervisory resources to provide necessary supervision
- C03 Insufficient manpower to support identified goal/objective
- C04 Resources not provided to assure adequate training was provided / maintained
- C05 Needed resource changes not approved / funded
- C06 Means not provided to assure procedures / documents / records were of adequate quality and up-to-date
- C07 Means not provided for assuring adequate availability of appropriate materials / tools
- C08 Means not provided for assuring adequate equipment quality, reliability, or operability
- C09 Personnel selection did not assure match of worker motivations and job descriptions
- C10 Means/method not provided for assuring adequate quality of contract services

B3 WORK ORGANIZATION & PLANNING LTA

- C01 Insufficient time for worker to prepare task
- C02 Insufficient time allotted for task
- C03 Duties not well-distributed among personnel
- C04 Too few workers assigned to task
- C05 Insufficient number of trained or experienced workers assigned to task
- C06 Planning not coordinated with inputs from Walk downs/Task analysis
- C07 Job scoping did not identify potential task interruptions &/or environmental stress
- C08 Job scoping did not identify special circumstances &/or conditions
- C09 Work planning not coordinated with all departments involved in task
- C10 Problem performing repetitive tasks &/or sub-tasks
- C11 Inadequate work package preparation

B4 SUPERVISORY METHODS LTA

- C01 Tasks and individual accountability not made clear to worker
- C02 Progress / status of task not adequately tracked
- C03 Appropriate level of in-task supervision not determined prior to task
- C04 Direct supervisory involvement in task interfered with overview role
- C05 Emphasis on schedule exceeded emphasis on methods / doing a good job
- C06 Job performance and self-checking standards not properly communicated
- C07 Too many concurrent tasks assigned to worker
- C08 Frequent job or task "shuffling"
- C09 Assignment did not consider worker's need to use higher-order skills
- C10 Assignment did not consider worker's previous task
- C11 Assignment did not consider worker's ingrained work patterns
- C12 Contact with personnel too infrequent to detect work habit / attitude changes
- C13 Provided feedback on negative performance but not on positive performance

B5 CHANGE MANAGEMENT LTA

- C01 Problem identification did not identify need for change
- C02 Change not implemented in timely manner
- C03 Inadequate vendor support of change
- C04 Risks / consequences associated with change not adequately reviewed / assessed
- C05 System interactions not considered or identified
- C06 Personnel / department interactions not considered
- C07 Effects of change on schedules not adequately addressed
- C08 Change-related training / retraining not performed or not adequate
- C09 Change-related documents not developed or revised
- C10 Change-related equipment not provided or not revised
- C11 Changes not adequately communicated
- C12 Change not identifiable during task
- C13 Accuracy / effectiveness of change not verified or not validated

A5 Communication

B1 WRITTEN COMMUNICATIONS METHOD OF PRESENTATION LTA

- C01 Format deficiencies
- C02 Improper referencing or branching
- C03 Checklist LTA
- C04 Deficiencies in user aids (charts, etc.)
- C05 Recent changes not made apparent to user
- C06 Instruction step / information in wrong sequence
- C07 Unclear / complex wording or grammar

B2 WRITTEN COMMUNICATION CONTENT LTA

- C01 Limit inaccuracies
- C02 Difficult to implement
- C03 Data / computations wrong / incomplete
- C04 Equipment identification LTA
- C05 Ambiguous instructions / requirements
- C06 Typographical error
- C07 Facts wrong / requirements not correct
- C08 Incomplete / situation not covered
- C09 Wrong revision used

B3 WRITTEN COMMUNICATION NOT USED

- C01 Lack of written communication
- C02 Not available or inconvenient for use

B4 VERBAL COMMUNICATION LTA

- C01 Communication between work groups LTA
- C02 Shift communications LTA
- C03 Correct terminology not used
- C04 Verification / repeat back not used
- C05 Information sent but not understood
- C06 Suspected problems not communicated to supervision
- C07 No communication method available

A6 Training

B1 NO TRAINING PROVIDED

- C01 Decision not to train
- C02 Training requirements not identified
- C03 Work incorrectly considered "skill of the craft"

B2 TRAINING METHODS LTA

- C01 Practice or hands-on experience LTA
- C02 Testing LTA
- C03 Refresher training LTA
- C04 Inadequate presentation

B3 TRAINING MATERIAL LTA

- C01 Training objectives LTA
- C02 Inadequate content
- C03 Training on new work methods LTA
- C04 Performance standards LTA

A7 Other

B1 EXTERNAL PHENOMENA

- C01 Weather or ambient conditions LTA
- C02 Power failure or transient
- C03 External fire or explosion
- C04 Other natural phenomena LTA
- C05 Copper Theft
- C06 Vandalism

B2 RADIOLOGICAL/HAZARDOUS MATERIAL PROBLEM

- C01 Legacy contamination
- C02 Source unknown

B3 VENDOR OR SUPPLIER PROBLEM

- C01 Follow-up LTA
- C02 Vendor corrective actions LTA
- C03 Extent-of-Condition communications LTA

A8 (Open)

AX Overall Configuration

B1 INSTALLATION/DESIGN CONFIGURATION LTA

B2 MAINTENANCE/MODIFICATION CONFIGURATION LTA

Level A nodes are underlined Level C nodes are in "sentence case"
Level B nodes are in ALL CAPS LTA = Less Than Adequate