

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Electric Reliability Organization Event Analysis Process Version 3.1

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RELIABILITY | ACCOUNTABILITY



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Introduction

The Electric Reliability Organization (ERO) Event Analysis Process (EAP) document is intended to be used as a guideline to promote a structured and consistent approach to performing event analyses in North America. This document outlines a process that will facilitate greater communication and information exchange between registered entities, Regional Entities (REs), and NERC.

The primary reason for participating in an event analysis is to determine if there are lessons to be learned and shared with the industry. The analysis process involves identifying what happened, why it happened, and what can be done to prevent reoccurrence. Identification of the sequence of events answers the “what happened” question and determination of the root cause of an event answers the “why” question. It also allows for events to have cause codes or characteristics and attributes assigned, which can then be used by the Event Analysis Subcommittee (EAS) to identify trends. Trends may identify the need to take action, such as a NERC Alert, or may support changes to Reliability Standards.

The NERC Operating Committee (OC) will maintain the EAP document under the existing ERO documentation process. The document will be reviewed and updated by the EAS as needed. The NERC OC will solicit comments from industry during the review process.

The EAP does not exempt the registered entity from mandatory reporting requirements governed by regulatory authorities or NERC Reliability Standards.¹

¹ The purpose of the voluntary EAP is to determine the how, what, and why of an event vs. the notification process required in NERC Standard EOP-004-2. This difference in the purpose of the EAP vs. EOP explains the similar but different reporting criteria in part. Reporting (notification) under EOP is mandatory, immediate, and brief, and is intended to notify other entities that an event has taken place on the Bulk Electric System (BES) or BES control facilities. Reporting through the EAP is intentional, analytic, methodic, and detailed.

Process Overview

- Step 1. The registered entity assesses an event, determines the event category, and notifies the RE.
- Step 2. A planning meeting or coordination call is held between the registered entity and the RE when possible.
- Step 3. The registered entity submits a Brief Report (Appendix C) to the RE.
- Step 4. The registered entity submits an Event Analysis Report (EAR) to the RE, if needed.
- Step 5. Lessons learned documents are developed and shared with industry as appropriate.
- Step 6. The EAP is closed.

ERO Event Analysis Process

Categorizing Events (Step 1)

When a registered entity experiences an event, that entity will recommend an initial category for the event as outlined in the Categorization of Events section. The categories listed in the Categorization of Events section do not cover all possible events. The need for analysis may be discussed by all affected registered entities, the appropriate REs, and NERC.

Registered entities that reside in multiple RE footprints should notify all relevant REs of an event that spans those Regions. NERC and the REs will determine a lead RE for the event, and further communication will take place between the registered entity and the lead RE.

If a weather-related occurrence falls within any of the categories, it should be communicated to the RE. The affected registered entities should focus on restoration efforts.

For Category 3 and above weather-related occurrences, the RE will collaborate with affected registered entities to determine if any additional information or event analysis steps are needed for the purposes of learning from these events.

Qualifying events are assigned to one of five categories based on reliability impact to the BES. The event categories are intended to allow the registered entity and RE to objectively identify event thresholds. The highest category that characterizes an event should be used.

The categories listed in this section do not cover all possible events. NERC encourages registered entities to report events of significance in an effort to share experiences and lessons learned with the industry.

Category 1: An Event that Results in One or More of the Following:

- a. An unexpected outage that is contrary to design of three or more BES Facilities² caused by a common disturbance:
 - i. The sustained outage of a combination of three or more BES Facilities
 - ii. The outage of an entire generation station of three or more generators (aggregate generation of 500 MW to 1,999 MW); each combined-cycle unit is counted as one generator
- b. Intended and controlled system separation by the proper operation of a Special Protection System (SPS) or Remedial Action Scheme (RAS) in New Brunswick or Florida from the Eastern Interconnection
- c. Failure or misoperation of a BES SPS/RAS
- d. System-wide voltage reduction of three percent or more that lasts more than 15 continuous minutes due to a BES emergency
- e. Unintended BES system separation that results in an island of 100 MW to 999 MW. This excludes BES radial connections and non-BES (distribution) level islanding
- f. ~~Unplanned evacuation from a control center facility with BPS SCADA functionality for 30 minutes or more.~~ Retired on January 1, 2016
- g. In ERCOT, unintended loss of generation of 1,000 MW to 1,999 MW

² As defined in the Event Category Guidance document posted on <http://www.nerc.com/pa/rrm/ea/Pages/EA-Program.aspx> under Reference Materials for Event Analysis

- h. Loss of monitoring or control at a Control Center such that it significantly affects the entity's ability to make operating decisions for 30 continuous minutes or more.

Some examples that should be considered for EA reporting include but are not limited to the following:

- i. Loss of operator ability to remotely monitor or control BES elements
- ii. Loss of communications from SCADA Remote Terminal Units (RTU)
- iii. Unavailability of ICCP links, which reduces BES visibility
- iv. Loss of the ability to remotely monitor and control generating units via AGC
- v. Unacceptable state estimator or real time contingency analysis solutions

Category 2: An Event that Results in One or More of the Following:

- a. Complete loss of Interpersonal Communication and Alternative Interpersonal Communication capability affecting its staffed BES control center for 30 continuous minutes or more.
- b. ~~Complete loss of SCADA, control or monitoring functionality for 30 minutes or more.~~ Retired on January 01, 2016 refer to Category 1h
- c. Voltage excursions within a Transmission Operator's footprint equal to or greater than 10 percent, lasting more than 15 continuous minutes
- d. Complete loss of off-site power (LOOP) to a nuclear generating station per the Nuclear Plant Interface Requirement
- e. Unintended system separation that results in an island of 1,000 MW to 4,999 MW
- f. Unintended loss of 300 MW or more of firm load for more than 15 minutes
- g. Interconnection Reliability Operating Limit (IROL) Violation for time greater than T_v

Category 3: An Event That Results in One or More of the Following:

- a. Unintended loss of load or generation of 2,000 MW or more.
- b. Unintended system separation that results in an island of 5,000 MW to 10,000 MW
- c. Unintended system separation (without load loss) that islands Florida from the Eastern Interconnection

Category 4: An Event that Results in One or More of the Following:

- a. Unintended loss of load or generation from 5,001 MW to 9,999 MW
- b. Unintended system separation that results in an island of more than 10,000 MW (with the exception of Florida, as described in Category 3c)

Category 5: An Event that Results in One or More of the Following:

- a. Unintended loss of load of 10,000 MW or more
- b. Unintended loss of generation of 10,000 MW or more

Event Analysis Planning Meeting/Coordination Call (Step 2)

Following an event, a planning meeting or coordination call may be held between the registered entity(ies) and the applicable RE when possible. More than one planning meeting may be needed based on the registered entity's experience level with the EAP, the scope of the event, or the number of registered entities involved.

The planning meeting should:

1. confirm the event category;
2. determine the level of analysis;³
3. identify the roles for the registered entity(ies), REs, and NERC;
4. establish milestones and target dates for completing reports, lessons learned, and other necessary analysis for events requiring detailed analysis, or the analysis itself would take longer to complete than the target dates set in the appendices. Should additional time be needed beyond the target dates to complete the analysis, this can be granted by the RE on a case-by-case basis as necessary;
5. identify the need for a data retention hold; and
6. identify data and information confidentiality issues.

Registered entities should capture relevant data for the event analysis. REs will formally send a Data Retention Hold Notice for events in Category 3 or higher.

The Appendix B: Planning Meeting Scope Template can be used as an outline in the planning meeting.

Event Analysis Process Reports (Steps 3 and 4)

Time frames for submitting the requisite reports are found in Appendix A: Target Time Frames for Completion of Brief Reports, EARs, and Lessons Learned.

The Brief Report is prepared by impacted registered entities for all qualifying events. It is sent to the applicable RE for review. The RE then forwards it to NERC. A Brief Report includes items identified in Appendix C: Brief Report Template. The Brief Report template may also be used for non-qualifying events that produce useful lessons learned for the industry.

An EAR is required for more significant events (Category 3 and above) and may be requested for lower-level events. An EAR is prepared by the impacted entity, a group of impacted entities, or relevant members of an event analysis team as defined in the planning meeting. It addresses in detail the sequence of events as they happened, the identified causal factors, and the appropriate corrective actions. Appendix D: Event Analysis Report Template can be used as a guideline. Once completed, the EAR is sent to the applicable REs for review. These documents are sent to NERC upon completion.

In the Brief Report or EAR, registered entities are encouraged to include one-line diagrams or other diagrams and representations of the facility(ies) involved in the event.

The final EAR should address corrective actions and recommendations related to the event's causal factors and any identified lessons learned. Positive outcomes identified during an event should be documented.

If any applicable governmental authorities (AGAs) initiate a formal review process in conjunction with NERC,⁴ the decision on the composition of the event analysis team, the team lead, the information needed from affected registered entities, and the required scope of the analysis will be discussed and agreed upon by the AGAs and NERC executive staff.

³ Although the category of the event provides general guidance on the level of analysis needed, these guidelines may be adjusted by the EA team, based on the overall significance of the event and the potential for valuable lessons learned.

⁴ As specified in the ERO Rules of Procedure, Section 807.f, the NERC president and chief executive officer has the authority to determine whether any event warrants analysis at the NERC level. A Regional Entity may request that NERC elevate an analysis of a major event to the NERC level.

Lessons Learned from Events (Step 5)

Lessons learned as a result of an event analysis should be shared with the industry in accordance with timing, as referenced in Appendix A. Proposed lessons learned should be drafted by a registered entity utilizing Appendix E: Lessons Learned Template, and should be submitted to the applicable RE. The lessons learned should be detailed enough to be of value to others, but should not contain data or information that is deemed confidential. When possible, one-line diagrams or other representations should be included to enhance the information provided in the lessons learned. Vendor-specific information should not be included unless it is discussed and coordinated with the vendor. If dissemination of vendor-specific information is beneficial, it may be pursued outside the EAP.

Lessons learned will be reviewed by selected technical groups and NERC staff for completeness and appropriateness prior to posting.

Lessons Learned from Other Occurrences

Any occurrence on the BES may yield lessons of value to the industry. Lessons learned can include the adoption of unique operating procedures, the identification of generic equipment problems, or the need for enhanced personnel training. In such cases, an event analysis would not be required, but the ERO EAP encourages registered entities to share with their RE any potential lessons learned that could be useful to others in the industry.

Event Closure (Step 6)

Following the receipt of reports, NERC and the RE will evaluate and close the event within the time frames established in Appendix A: Target Time Frames for Completion of Brief Reports, EARs, and Lessons Learned. The RE will notify the registered entity(ies) involved that an event has been closed upon notification from NERC.

Confidentiality Considerations

Information and data designated as confidential by the entity supplying the data/information in the course of an event analysis shall be treated as confidential. In addition, all Critical Energy Infrastructure Information (CEII) shall be treated accordingly, and may be designated as CEII by the entity supplying the information or by NERC or its REs. By participating in the EAP, a United States entity acknowledges that any of its Brief Reports, EARs, or both may be disseminated to an AGA, upon request, in accordance with Section 1500 of the Rules of Procedure.

Appendices and Other Suggested References

The appendices may be found on the NERC website under the [EA Program](#). Or go to the [NERC website](#), click on the Program Areas & Departments tab at the top of the NERC home page, then Reliability Risk Management on the left side of the page, then EA Program under Event Analysis. The latest versions of the appendices may be found in the ERO Event Analysis Process – Version 3 Documents folder.

Appendix A: Target Time Frames for Completion of Brief Reports, EARs, and Lessons Learned

Appendix B: Planning Meeting Scope Template

Appendix C: Brief Report Template

Appendix D: Event Analysis Report Template

Appendix E: Lessons Learned Template

Other References:

- NERC Blackout and Disturbance Analysis Objectives, Analysis Approach, Schedule, and Status – Attachment D from Appendix 8 of NERC Rules of Procedure
- [Cause Analysis Methods for NERC, Regional Entities, and Registered Entities](#)

Reference documents may be found on the NERC website under the [EA Program](#), or follow the instructions in the appendices section above for another source.

Revision History

Rev.	Date	Reviewers	Revision Description
1	December 2011	Event Analysis Working Group (EAWG), NERC Management, Operating and Planning Committees.	Document endorsed by Operating and Planning Committees January 2012. Document endorsed by NERC Board of Trustees February 2012.
2	July 2013	Event Analysis Subcommittee (EAS), NERC Management, NERC Operating Committee.	Document endorsed by Operating Committees June 18, 2013.
3	September 2015	Event Analysis Subcommittee (EAS), NERC Management, NERC Operating Committee.	Document endorsed by Operating Committees September 16, 2015.
4	December 2016	Event Analysis Subcommittee (EAS), NERC Management, NERC Operating Committee.	Document endorsed by Operating Committees December 13, 2016.