



Critical Asset Determination Under CIP-002-1 Transmission Owner-Generation Owner Process

Background

NERC Critical Infrastructure Protection (CIP) Standard CIP-002-2 (<http://www.nerc.com/files/CIP-002-2.pdf>), *Critical Cyber Asset Identification*¹ calls for the identification of Critical Assets to include both Physical and Cyber facilities, systems and equipment, which, if destroyed, degraded, compromised (e.g. misused) or otherwise rendered unavailable, would affect the reliability or operability of the Bulk Electric System as a whole. The purpose of identifying Critical [Physical] Assets is to identify the Critical Cyber Assets.

Critical Cyber Assets are essential to the reliable operation of Critical Assets. CIP-002-1 requirement R1.2.X identifies specific items to be considered in the determination of critical assets (Control Centers, special protection systems, etc.). Credible contingencies for the purposes of Critical Asset determination should consider Common Mode Impact, which is defined as the impact on multiple components, systems, units or facilities with similar, same or related functions due to a single event. The Common Mode Impact can be a result of the compromise or failure of Electronic Control and Protection Systems (as an example, if a common support or control system span multiple generating units, then the units as a set should be defined as the facility or single contingency, because of the potential for Common Mode Impact). NERC Security Guidelines for Identifying Critical Cyber Assets can be reviewed by accessing the following link (<http://www.nerc.com/docs/cip/sgwg/Critical%20Cyber%20Asset%20ID%20V0%20R902%20for%20CIPC%20Review.pdf>).

In order to further identify critical assets, the Standard also requires that the registered entities/facility owners utilize a risk-based methodology that explains how they have identified whether they have any assets that could be deemed “critical”.

Members may consider using the definition of an “adequate level of reliability” as approved by the NERC Board of Trustees on February 12, 2008, as an input into their risk-based methodology used to determine Critical Assets (http://www.nerc.com/files/Adequate_Level_of_Reliability_Defintion_05052008.pdf).

¹ The work reflected in this document is based on CIP-002-1 as approved by the NERC Board of Trustees on May 2, 2006 with an effective date of June 1, 2006, or subsequent approved versions. If any modifications are directed by FERC as part of its review/approval process, this process will be reviewed and adjusted as necessary.



Generation Owners (GOs), as one of the responsible entities in CIP-002, are required to identify critical assets. GOs generally do not have access to the information they would need to assess the criticality of their units to the Bulk Electric System. The identification process and subsequent evaluation should be performed in consultation with system operators and planning engineers using system studies, analysis, simulations and/or historical experience. To address this issue, PJM formed a CIP Critical Asset Working Group to allow Transmission Owners (TOs) and GOs to work together to develop guidelines to be used in identifying an asset as critical. While this process addresses the interaction between TOs and GOs, it is the GO, as the asset owner, that has the ultimate responsibility to determine the criticality of its generation assets.

Discussion

The following issues were discussed in the development of these guidelines:

- TOs and GOs have developed an initial methodology for the identification of critical assets and are required to perform an annual review of such methodologies.
- This guideline is not intended to override the methodologies developed by TOs or GOs nor to impose additional requirements beyond those identified by the asset owners. The intent is to provide the ability for TOs and GOs to share information that may be useful for GOs to identify critical generation assets.
- Initially PJM, at the request of the Security Coordination Team, performed a high-level analysis of the transmission system and provided confidential information to each TO on substations that may be considered critical assets. Based on the initial analysis, PJM has not identified any generation assets as critical. However, generation assets may be identified based on analysis guidelines identified below.

The PJM EMS Security Analysis Programs analyze the loss of any single contingency every few minutes, including the loss of any single generator or multiple generators if a common mode of failure is identified. A common mode of failure generally results from a transmission equipment outage that places multiple generators on a common source.

- Several participants indicated that they do not know who to contact at an affected GO or TO to discuss these issues. Refer to SOS-T/G Roster for current contact information:

SOS-Generation Roster: <http://www.pjm.com/committees-and-groups/subcommittees/~media/committees-groups/rosters/sos-gen-roster.ashx>

SOS-Transmission Roster: <http://www.pjm.com/committees-and-groups/subcommittees/~media/committees-groups/rosters/sos-trans-roster.ashx>

Guidelines

While TOs utilized different methodologies for identifying critical assets, there were two factors that were common to many TOs and were agreed to be a reasonable basis for identifying generation assets as critical to the transmission system:

1. A generator is identified as a blackstart unit (or equivalent) in a TO's restoration plan.²

² CIP-002-1FAQ #3 states: "While many units may be able to blackstart, the CIP standards only apply to blackstart units identified under EOP-007-0: Establish, Maintain and Document a Regional Blackstart Capability Plan. These



2. Load flow analysis performed by the TO shows that loss of the unit/plant/Common Mode Impact Contingency would result in a cascading event.³

TOs will utilize their own risk-based methodologies which may or may not result in identification of generation assets as critical. TOs are not required to utilize these factors, but these are two that were generally agreed upon as acceptable criteria.

While TOs may provide information to GOs on the potential impact of generation facilities to their transmission facilities, GOs should also consider other potential impacts that an individual TO may not be aware of such as a common control system that could impact multiple sites or multiple systems. Such Common Mode Impact contingencies should be communicated to the Transmission Owner and PJM through the PJM SOS-T representative for inclusion in the PJM OATF Maximum Credible Contingency analysis.

Designation of an asset as a *critical asset* is the responsibility of the asset owner. The asset owner will need to justify its determination to the appropriate Regional Reliability Organization (RRO).

Process

1. GO shall communicate Common Mode Impact contingencies to PJM/TO through the PJM System Operations Subcommittee Transmission (contacting PJM Chairman and Transmission Owner Representative) for inclusion in PJM Summer OATF Maximum Credible Contingency Analysis by April 1 of each year.
2. PJM shall communicate result of PJM Summer OATF Maximum Credible Contingency Analysis (Common Mode Impact contingencies) that are not survivable to the impacted asset owner by June 1 of each year.
3. In parallel, each TO, utilizing their own methodology, will develop a list of critical assets. If a generation asset appears on the TO's list of critical assets, the TO will notify the responsible GO, of the fact. The TO shall request information from the GO as needed in order to performing its assessment (e.g. common mode impact).
4. The GO may request additional information from the TO to substantiate the designation of the facility as critical. The TO will provide such information to the extent that it does not violate the FERC Standards of Conduct.
5. If after the TO has provided the information that it can, the GO is still not satisfied with the TO's assessment of the facility as critical, both parties can request PJM to facilitate additional discussions to try to build consensus.
6. If such a request is made, PJM will work with the TO and GO to facilitate discussion within the bounds of the Standards of Conduct. PJM may provide advice to either party but will not

generators are sometimes referred to as critical blackstart units.”

ftp://www.nerc.com/pub/sys/all_updl/standards/sar/Revised_CIP-002-009_FAQs_06Mar06.pdf

³ PJM and TO Staff perform Maximum Credible Sensitivity Analysis as part of the PJM Operations Analysis Task Force (OATF) Seasonal Assessments. The Maximum Credible Disturbance Sensitivities are performed, consistent with the Task Force Scope approved by the PJM System Operations Subcommittee (Transmission). Asset Owners can choose to consider the results of the seasonal study as part of their methodology in determining critical assets.



make a determination of the criticality of the asset. PJM will reference the latest Maximum Credible Disturbance Sensitivity that was performed based on the PJM OATF Seasonal Peak-load Study, reflecting Common Mode Impact contingencies, to determine their impact on voltage support, stability and frequency.

7. Once this facilitation is completed, the GO will make its determination regarding the critically of its assets.
8. If differences between the GO, TO and PJM remain, the matter will be referred to the RRO.

Note: It is recommended that communication within this process be verbal or via physical correspondence such as certified mail. Electronic communication may compromise Critical Energy Infrastructure Information (CEII).

For questions regarding this document or to request PJM's assistance with the process outlined above, send an e-mail to: regional_compliance@pjm.com.

Revision Tracking

Revision No.	Date	Changes Included in Revision
0	7/23/07	Original Version
1	8/30/07	Correct Dominion Generation contact information
2	9/6/07	Add telephone numbers to contact lists
3	7/21/09	PJM Operating Committee Approval (annual review)