

ORDER 754 - DATA REQUEST OUTLINE (11/29/2011)

The following items must be included in the data request per Rules of Procedure Section 1600.

1. (a) Description of the data or information to be requested.

Each Transmission Planner will collaborate with the protection engineers¹ in its Transmission Planning area to identify each Element² operated at greater than 200 kV (phase-to-phase) in their area of responsibility on which a three-phase (3Ø) fault accompanied by a failure of any Protection System component³ would result in instability; violations of applicable thermal or voltage ratings; unplanned or uncontrolled loss of demand or curtailment of firm transfers; or cascading outages.⁴

¹ It is recognized that planning staff and protection staff may not be in the same company or business unit.

² Applicable Elements are defined in the data request reporting template.

³ Protection System components of interest will be reported under the five component categories in the NERC Glossary of Terms definition of Protection System (NERC Board of Trustees on November 19, 2010), qualified as discussed in the SPCS technical reference document, [Protection System Reliability – Redundancy of Protection System Elements](#), November 2008.

Protective Relays

- The failure or removal of any single protective relay that is used to measure electrical quantities, sense an abnormal condition such as a fault, and respond to the abnormal condition.

Communications Systems

- The failure or removal of any single communication channel and/or any single piece of related communications equipment used for the Protection Systems when such communication between protective relays is needed to satisfy BES performance required in the TPL standards.

AC Current and Voltage Inputs

- The failure or removal of any single AC current source and/or related input to the Protection System excluding the loss of multiple CT secondary windings.
- The failure or removal of any single secondary AC voltage source and/or related input to the Protection System when such voltage inputs are needed excluding the complete loss of an entire CCVT, VT, or similar device with multiple secondary windings.

Station DC Supply

- The failure or removal of any single station battery, or single charger, or other single DC source, where such losses are not centrally monitored for low voltage and battery open.

DC Control Circuitry

- The failure or removal of any single element of the DC control circuitry that is used for the Protection System.
- The failure or removal of any single auxiliary relay that would prevent tripping or initiation of breaker failure protection.
- The failure or removal of any single breaker trip coil for any breaker operated by the Protection System.

⁴ The measure of system performance for this data request will be the same as the performance measure applied in TPL-003-0a for Category C contingencies.

ORDER 754 - DATA REQUEST OUTLINE (11/29/2011)

Rationales:

- **>200 kV:** Elements operated at >200 kV has been selected as the threshold for this data request. Limiting the data request to this subset of the Bulk Electric System will provide an expedient means to identify whether a reliability concern exists. Although single-points-of-failure on protection systems are more likely to exist on elements operated below 200 kV, the system response is expected to be less severe for delayed fault clearing at voltages below 200 kV. Also, the use of remote backup protection is more likely to limit the impact of delayed clearing to an isolated portion of the system. While this approach results in a more expedient approach, it is recognized that responses to this data request may identify that additional information is required for for elements connected at 100 kV to 200 kV.
- **Protection System components:** The protection system components of interest include any component that could be reasonably expected to result in delayed clearing of a fault due to a single protection system component failure. The [SPCS technical paper](#)⁵ document gained SPCS consensus as an appropriate list. Use of all components in the Protection System [NERC Glossary definition](#)⁶ was considered, but the SPCS technical paper⁷ provides appropriate distinctions for some components that limit the scope of concern. Limiting the scope to the relay types listed in [TPL-001-2](#)⁸ for the Table 1, P5 contingency was considered to restrict the components such that it will not identify all potential Westwing-type events. Although the data used to support the NERC Industry Alert was based on failures of auxiliary relays and lockout relays, it is not reasonable to rule out the potential for a failure of other protection system components. If the data request identifies that a risk does exist, requesting information regarding each Protection System component will make it possible to qualify whether a risk is limited to failure of a specific set of components.
- **Performance Measure:** The performance measure in the data request is the same used presently for assessing Category C contingencies under [TPL-003-0a](#)⁹. This is consistent with identifying the potential for a Westwing-type event.

⁵ Protection System Reliability – Redundancy of System Protection Elements, NERC System Protection & Control Task Force (SPCTF), November 2008.

(http://www.nerc.com/docs/pc/spctf/Redundancy_Tech_Ref_1-14-09.pdf)

⁶ NERC Glossary term “Protection System” approved by the NERC Board of Trustees on 11/19/2010.

(http://www.nerc.com/files/Glossary_of_Terms_2011October26.pdf)

⁷ Ibid.

⁸ NERC Reliability Standard, TPL-001-2, adopted by the NERC Board of Trustees on August 4, 2011, filed with FERC for approval on October 19, 2011. (http://www.nerc.com/files/Final_TPL-001-2%20Petition_20111019_complete.pdf)

⁹ NERC Reliability Standard, TPL-003-0a, System Performance Following Loss of Two or More Bulk Electric System Elements (Category C), Effective April 23, 2010

(<http://www.nerc.net/standardsreports/standardssummary.aspx>)

ORDER 754 - DATA REQUEST OUTLINE (11/29/2011)

- **Three Phase condition:** Limiting the data request to three-phase (3 \emptyset) faults provides a conservative method to identify potential Westwing-type events. Although conservative, this method is appropriate in that single-line-to-ground (SLG) faults with delayed clearing typically evolve to multi-phase faults. Simulating contingencies as three-phase (3 \emptyset) fault from inception, allows Transmission Planners to use existing simulations of three-phase (3 \emptyset) faults with Protection System failure ([TPL-004-0](#)¹⁰, Category D) and eliminates conjecture as to the timing and mechanism by which a single-line-to-ground (SLG) fault may evolve to a multi-phase fault. It is important to note that for the purpose of assessing the potential risk associated with Protection System single-points-of-failure this conservative approach evaluates Category D contingencies 1-4 (TPL-004-0) against Category C (TPL-003-0a) performance measurements.

1. (b) How the data or information will be used.

The data request has been established with the objective of establishing an effective and efficient means of identifying whether a reliability concern exists while limiting the burden on registered entities. This approach is expedient for identifying whether a reliability concern exists, but may require an additional data request or additional analysis to quantify the extent of the risk.

1. (c) How the availability of the data or information is necessary for NERC to meet its obligations under applicable laws and agreements.

Under Section 215 of the Federal Power Act (16 U.S.C. § 824o), Congress entrusted FERC with the duties of approving and enforcing rules to ensure the reliability of the Nation's bulk power system, and with the duties of certifying an Electric Reliability Organization ("ERO") that would be charged with developing and enforcing mandatory Reliability Standards, subject to FERC approval. NERC was certified as the ERO on July 20, 2006. NERC's authority for issuing this survey is derived from Section 215 of the Federal Power Act, and from the following sources:

NERC is requesting this information in accordance with its authority provided in 18 C.F.R. §39.2(d), which provides:

¹⁰ NERC Reliability Standard, TPL-004-0, System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D), Effective June 18, 2007 (<http://www.nerc.com/files/TPL-004-0.pdf>)

ORDER 754 - DATA REQUEST OUTLINE (11/29/2011)

Each user, owner or operator of the Bulk-Power System within the United States (other than Alaska and Hawaii) shall provide the Commission, the Electric Reliability Organization and the applicable Regional Entity such information as is necessary to implement section 215 of the Federal Power Act as determined by the Commission and set out in the Rules of the Electric Reliability Organization and each applicable Regional Entity. The Electric Reliability Organization and each Regional Entity shall provide the Commission such information as is necessary to implement section 215 of the Federal Power Act.

Additionally, NERC Rules of Procedure Section 1600 provides:

1601. Scope of a NERC or Regional Entity Request for Data or Information

1603. Owners, Operators, and Users to Comply

1606. Expedited Procedures for Requesting Time-Sensitive Data or Information

2. A description of how the data or information will be collected and validated

NERC will make available a data template for each applicable entity. Each entity will enter the data based on the criteria of the data request for all applicable facilities. The data will be analyzed and validated by NERC staff. Entities will be required to submit data electronically to a specific email address.

3. Description of the entities (by functional class and jurisdiction) that will be required to provide the data or information (“reporting entities”).

The responsible entity for coordinating the fulfillment of the data request will be the Transmission Planner. Transmission and Generator Owners must comply with requests for assistance from the Transmission Planners.

To identify the risk of a Westwing-type event¹¹ requires information on both the susceptibility of the system to adverse performance if a protection system single-point-of-failure occurs and where protection systems contain single-points-of-failure. This requires participation by Transmission Planners, Transmission Owners,

¹¹ The Westwing disturbance resulted in resulting in the loss of approximately 5,000 MW of generation and the potential for collapse of the Western Interconnection. Additional information on this issue can be found in the NERC Industry Alert, [Protection System Single Points of Failure](http://www.nerc.com/fileUploads/File/Events%20Analysis/A-2009-03-30-01.pdf). (<http://www.nerc.com/fileUploads/File/Events%20Analysis/A-2009-03-30-01.pdf>)

ORDER 754 - DATA REQUEST OUTLINE (11/29/2011)

and Generator Owners. Since the inquiry is related to an approved interpretation of TPL-002-0b ([Order 754](#)¹²) the Transmission Planner has been designated as the responsible entity; however, Transmission and Generator Owners are required to support the data request.

4. The schedule or due date for the data or information.

The requested data will be due 12 months from date of the data request.^{13 & 14}

5. Description of any restriction on disseminating the data or information (e.g. “confidential,” “critical energy infrastructure information,” “aggregating”, or “identity masking”)

No restriction or confidential in nature or applicable with NERC Rules of Procedure Section 1600 which provides for:

1605. Confidentiality

If the approved data or information request includes a statement under Section 1602.1.1(v) that the requested data or information will be held confidential or treated as critical energy infrastructure information, then the applicable provisions of Section 1500 will apply without further action by a submitting entity. A submitting entity may designate any other data or information as confidential pursuant to the provisions of Section 1500, and NERC or the regional entity shall treat that data or information in accordance with Section 1500. NERC or a regional entity may utilize additional protective procedures for handling particular requests for data or information as may be necessary under the circumstances.

6. Estimate of the relative burden imposed on the reporting entities to accommodate the data or information request.

Does NERC have any idea how many protection systems are out there?

¹² FERC Website: http://www.nerc.com/filez/standards/order_754.html

¹³ A schedule will be developed to establish intermediate reporting dates to allow initial assessment of the potential risk prior to receiving all data.

¹⁴ Ibid. TPL-001-2, has a 12 month effective implementation following the first quarter after publishing in the Code Federal Register.