

Midwest Reliability Organization Procedure For NERC PRC-012

A. Introduction – The following procedure developed by the MRO Protective Relay Subcommittee (PRS) and Transmission Assessment Subcommittee (TAS) is considered a technical guideline and should be followed as good utility practice.

- 1. Title: Special Protection System (SPS) Review**
- 2. Reference:** NERC Standard PRC-012-0
- 3. Purpose:** To ensure that NERC Standard PRC-012-0 is implemented within the MRO Region; to obtain and review documentation on the design, performance, coordination, maintenance and testing of Special Protection Systems; to ensure SPS operations and misoperations are properly analyzed and that corrective action plans are developed.
- 4. Applicability:** Midwest Reliability Organization (MRO)
- 5. Background:**

NERC Reliability Standard PRC-015-0 requires that a Transmission Owner, Generator Owner, or Distribution Provider that owns an SPS within the MRO region shall have evidence that it reviewed new or functionally modified SPS in accordance with the MRO's procedure for NERC PRC-012 prior to being placed into service. Furthermore, NERC Reliability Standard PRC-015-0 also states that these same entities must also provide the MRO with documentation of SPS data and study results that demonstrate that new or functionally modified SPSs are compliant with NERC Reliability Standards and MRO regional guidelines.

NERC Reliability Standard PRC-014-0 requires that the MRO shall assess the operation, coordination, and effectiveness of all SPSs installed in the MRO Region at least once every five years.

- 6. Most Recent Update:** June 7, 2011
- 7. Effective Date:** April 1, 2009

B. Requirements

R1. If a Transmission Owner, Generator Owner, or Distribution Provider owns, or is planning to own or install an SPS, they shall be considered an SPS owner for the purposes of this procedure. This procedure applies to SPS owners who are:

- Planning to install a new SPS.
- Planning to modify an existing SPS.
- Planning to retire an existing SPS.
- Scheduled for a review of an existing SPS.

The SPS Owner that meets the above conditions shall submit a report containing the necessary information to support the requirements below. The MRO shall review the data contained within the report to determine if the SPS meets the requirement of the NERC Reliability Standards.

R1.1. The following submittal process shall be followed by SPS owners:

- R1.1.1** For a new or functionally modified SPS, the SPS owner shall submit a report to the MRO, at least 90 calendar days prior to installation or modification going into service.

- R1.1.2** For an existing SPS, the SPS owner shall submit a report to the MRO, within 90 calendar days following an MRO request for review.
- R1.1.3** For an existing SPS, the SPS owner shall submit a report to the MRO, at least 90 days prior to the end of the fifth year following the previous review, or at least 90 days prior to an MRO scheduled review date, whichever comes first.
- R1.1.4** For the retirement of an existing SPS, the SPS owner shall notify the MRO of the planned retirement, state the reason for the retirement, and provide the planned date of the retirement at least 30 calendar days prior to the retirement.
- R1.2.** The SPS owner shall provide to the MRO for review, data which describes the design, operation, and modeling of an SPS. This data shall include the following:
- R1.2.1** Block Diagram of the SPS.
- R1.2.2** Detailed description of the modeling assumptions used for the SPS.
- R1.2.3** Analysis detailing acceptable system performance as defined in NERC Reliability Standards TPL-001-0, TPL-002-0, and TPL-003-0.
- R1.3.** The SPS owner shall provide to the MRO for review, data which demonstrates that the SPS is designed so that a single SPS component failure, when the SPS intends to operate, does not prevent the interconnected transmission system from meeting the performance requirements defined in NERC Reliability Standards TPL-001-0, TPL-002-0, and TPL-003-0.
- R1.4.** The SPS owner shall provide to the MRO for review, data which demonstrates that the inadvertent operation of the SPS shall meet the same performance requirement (TPL-001-0, TPL-002-0, and TPL-003-0) as that required of the contingency for which it was designed, and not exceed TPL-003-0.
- R1.5.** The SPS owner shall provide to the MRO for review, data which demonstrates that the existing or proposed SPS will coordinate with other protection and control systems and applicable MRO and Reliability Coordinator emergency procedures. The data shall include the following:
- R1.5.1** Details of how the SPS interacts with other SPSs.
- R1.5.2** Details of how the SPS interacts with other system protection and control schemes.
- R1.6.** The SPS owner shall reference the definition of a misoperation in Section C of this procedure when providing data for Requirement R1.7.
- R1.7.** To fulfill the requirements for the MROs review of existing SPSs and to comply with NERC Reliability Standard PRC-016-0, the SPS owners shall provide to the MRO on a quarterly basis, no later than the end of the following calendar month, documentation of the analysis of all SPS misoperations and the associated corrective action plans.
- SPS owners shall also provide to the MRO on a quarterly basis, no later than the end of the following calendar month, documentation of all normal SPS operations.
- The SPS Owner shall submit its documentation of SPS normal operations and misoperations in accordance with MRO procedures.
- R1.8.** The review of SPSs is the joint responsibility of the MRO Protective Relay Subcommittee and MRO Transmission Assessment Subcommittee. The MRO PRS and MRO TAS have delegated this responsibility to an SPS Review Team consisting of members designated by each group and

representation from the regional Reliability Coordinator. The MRO Procedure for SPS Review shall be reevaluated by the MRO PRS and MRO TAS at least every five years.

Modification and approval of this procedure is the responsibility of the MRO Planning Committee and MRO Operating Committee.

R1.9. In accordance with NERC Reliability Standard PRC-017-0, SPS owners shall have system maintenance and testing program(s) in place. The SPS owner shall provide documentation of the program(s) and its implementation to the MRO within 30 calendar days of request.

R2. The MRO shall provide affected Regional Reliability Organizations and NERC with documentation of its SPS review procedure on request and within 30 calendar days.

C. Definitions

Special Protection System (SPS) – The NERC definition of an SPS shall apply when determining the existence of an SPS in the MRO region.

The NERC definition of an SPS is:

“An automatic protection system designed to detect abnormal or predetermined system conditions, and take corrective actions other than and/or in addition to the isolation of faulted components to maintain system reliability. Such action may include changes in demand, generation (MW and MVar), or system configuration to maintain system stability, acceptable voltage, or power flows. An SPS does not include (a) underfrequency or undervoltage load shedding or (b) fault conditions that must be isolated or (c) out-of-step relaying (not designed as an integral part of an SPS). Also called Remedial Action Scheme.”

Misoperation –The following conditions shall apply when determining if an event is a misoperation:

- Failure to Operate – Any failure of operation when it is required.
- Incorrect Operation – Any operation performed by the SPS that was not as the system design intended.
- Slow Operation – SPS operates slower than the system design intended.
- Unnecessary Operation – Any operation for system conditions for which the SPS was not required to operate.

These events do not include operations caused by human error during system installation and maintenance (not considered an indication of deficiency in the SPS).

Appendix A

MRO Procedure for Special Protection System Review

In accordance with MRO Procedure for NERC PRC-012, the MRO will perform a review on all new or functionally modified SPS in its region. The MRO will also review all SPS in its region on a five year basis in accordance with the MRO Procedure for NERC PRC-014. The retirement of an SPS will be handled as a special case whereas no review shall be performed. Lastly, the MRO reserves the right to review any SPS in its region at any time for the purposes of assessing regional reliability or for event analysis research. Any scheduled date of a review will allow for at least 90 days for the SPS Owner to prepare an SPS information package.

For the review of a Special Protection System (SPS), the review process shall be:

- The SPS Owner prepares an SPS information package containing the necessary information to support Requirements R1.1 through R1.5 of the MRO Procedure for NERC PRC-012. The attached checklist can serve as a guide for the SPS Owner to compile their SPS information package.
- The SPS Owner submits the SPS information package electronically to the MRO.
 - For new or functionally modified SPS, the SPS information package must be submitted at least 90 calendar days prior to the expected in-service date.
 - For a scheduled review, the SPS information package must be submitted at least 90 calendar days prior to the scheduled date of review.
- MRO review of the SPS information package has been delegated to an SPS Review Team. The composition of this review team is described in R1.8 of the MRO Procedure for NERC PRC-012. MRO staff will provide administrative support for the SPS Review Team and serve as coordinator with the group and the SPS Owner.
- The SPS Review Team will hold a conference call within 14 days of receiving the SPS information package submittal to review the material for completeness.
- After the SPS information package is determined to contain the necessary information to support requirements R1.1 through R1.5 of the MRO Procedure for NERC PRC-012, the SPS Review Team will schedule a meeting, if necessary, with the SPS owner no later than 45 calendar days after the SPS information package was submitted. The purpose of this meeting will be to give the SPS Owner an opportunity to present the SPS to the review team and to answer any questions the review team members may have.
- Once the SPS review is completed, the SPS Review Team will prepare and submit a summary report to the MRO PRS and MRO TAS.
- Once the SPS Review Team's review is endorsed by the MRO PRS and MRO TAS, MRO staff will notify the SPS Owner that the SPS review process has been completed in accordance with MRO Procedure for NERC PRC-012.

Upon completion of the review process, MRO staff will update the MRO SPS database. This database is described in MRO Procedure for NERC PRC-013.

Before the review process is concluded, the SPS Review Team will establish the next review date for the SPS in question. This review date will be scheduled in accordance with the MRO Procedure for NERC PRC-014. The SPS Owner will be informed of this scheduled date when notified that the SPS review process has been completed.

For the retirement of an existing SPS, the process shall be:

- The SPS Owner shall inform the MRO of the planned retirement of an existing SPS at least 30 calendar days prior to the retirement. The SPS Owner shall include the reason for the retirement and the planned date of the retirement.
- The MRO will acknowledge the receipt of the planned retirement and update the MRO SPS database to record the retirement.

It is up to the SPS Owner to ensure that the system resulting from the retirement of an SPS remains in compliance with NERC Standards.

The review process laid out in this appendix shall not serve in lieu of reviews or review processes that may be performed by other organizations. If an SPS Owner must also obtain approval for the addition, modification or retirement of an SPS from their Planning Authority, Regional Transmission Organization or Regional Transmission Group, they will need to obtain this outside of this review process.

SPS Information Package Checklist

ITEMS	DESCRIPTION	SUPPORTING DOCUMENTS
Owner:	The name of the company which owns and maintains the SPS.	
Affected Parties:	The names of any other parties who maybe directly affected by the installation of the SPS.	
Location:	Where the SPS is located; generally a substation or power plant and included maps, substation drawings, etc. as necessary to ensure that the reader is able to understand the physical and electrical location of the SPS and related facilities.	
Date of installation:	Planned or scheduled in-service date.	
Description:	A brief narrative overview on how the SPS operates, such as intentional generator tripping and/or transmission bus sectionalizing, etc.; its design objectives; the contingencies and/or operating scenarios for which the SPS is intended to operate; a one-line diagram or sketch showing the associated facilities. Includes functional logic block diagram of the SPS.	
Separate VT secondary Sources:	A single SPS component failure, when the SPS was intended to operate, does not prevent the interconnected transmission system from meeting the performance requirements defined in TPL-001, TPL-002, and TPL-003.	
Separate CT secondary Sources:	A single SPS component failure, when the SPS was intended to operate, does not prevent the interconnected transmission system from meeting the performance requirements defined in TPL-001, TPL-002, and TPL-003.	
Redundant Logic Devices:	A single SPS component failure, when the SPS was intended to operate, does not prevent the interconnected transmission system from meeting the performance requirements defined in TPL-001, TPL-002, and TPL-003.	
Redundant Control Outputs:	A single SPS component failure, when the SPS was intended to operate, does not prevent the interconnected transmission system from meeting the performance requirements defined in TPL-001, TPL-002, and TPL-003.	
Redundant Communication Channels:	A single SPS component failure, when the SPS was intended to operate, does not prevent the interconnected transmission system from meeting the performance requirements defined in TPL-001, TPL-002, and TPL-003. Shall have physically separate communication paths.	
Coordination:	A description that shows how the SPS coordinates with other protection and control schemes. Are they coordination issues with other schemes?	
Study report summary demonstrating MRO and NERC compliance:	A brief narrative or executive summary of the results of planning studies demonstrating the need for the SPS; description of what will happen if the SPS operates when it shouldn't.	

Operating guides:	With the associated one line diagrams; functional drawings and descriptions.	
Summary description of functional testing:	With methods and schedules or a statement that this scheme is tested along with all other protective relays.	
SPS settings:	Existing and/or proposed settings that will control its operation including all intentional and operational delays and relay application documentation.	
Modeling information:	Allowing analysis of the scheme in power flow and dynamic stability evaluations.	
Detailed drawings:	Showing hardware and/or logical connections.	