Task Force on System Protection Revision Review Record

December 27th, 2007

July 9th, 2013

Adopted by the Members of the Northeast Power Coordinating Council Inc., this December 27, 2007, based on recommendation by the Reliability Coordinating Committee, in accordance with Section VIII of the NPCC Amended and Restated Bylaws dated July 24, 2007 and as amended to date.

Revision History

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<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Action</th>
<th>Change Tracking (New, Errata or Revisions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>12/27/07</td>
<td>Effective Date</td>
<td>New</td>
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<tr>
<td>1</td>
<td>7/09/13</td>
<td>TFSP review insure consistency w/D#4; add Compliance Requirements; retire /modify SPS.</td>
<td>Revisions</td>
</tr>
<tr>
<td>2</td>
<td>3/31/2015</td>
<td>Insert Applicability of NPCC Criteria</td>
<td>New</td>
</tr>
</tbody>
</table>
# Table of Contents

1.0 Introduction ........................................................................................................... 1  
  1.1 Title ............................................................................................................. 1  
  1.2 Directory Number ......................................................................................... 1  
  1.3 Objective ....................................................................................................... 1  
  1.4 Effective Date ............................................................................................... 1  
  1.5 Background ................................................................................................... 1  
  1.6 Applicability .................................................................................................. 1  
2.0 Terms Defined in this Directory .......................................................................... 4  
3.0 NERC ERO Reliability Standard Requirements ................................................. 4  
4.0 NPCC Regional Reliability Standard Requirements ........................................... 4  
5.0 NPCC “Full Member”, More Stringent Criteria ................................................. 4  
6.0 Compliance Requirements .............................................................................. 11  
7.0 Compliance Monitoring Process ...................................................................... 12  
Appendix A Guidance for Consideration in SPS Design .................................. 14  
Appendix B Procedure for the Review of a Special Protection Systems ... 19  
Appendix C Procedure for Reporting to TFSP New and Modified Special Protection Systems (SPS) .................................................. 26

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1.0 Introduction

1.1 Title Special Protection Systems

1.2 Directory Number 7

1.3 Objective

This Directory provides the basic criteria for Special Protection Systems (SPSs) such that the Bulk Power System in NPCC Inc. member Areas is operated reliably. It is not a design specification nor is it applicable to Type III SPSs.

1.4 Effective Date: December 27th, 2007

Compliance Guidance Statement Protection system designs submitted to the TFSP prior to the date of this revision are not subject to the submittal requirements described in Section 7, Compliance Requirements R1, R2, and R3.

1.5 Background

This Directory establishes the basic protection system design criteria and review processes for SPSs.

Guidance for consideration in the implementation of these criteria is provided in Appendix A, and the procedure for reviewing new and revised SPSs is provided in Appendix B and Appendix C.

1.6 Applicability

The requirements of an NPCC Directory apply only to those facilities defined as NPCC bulk power system elements as identified through the performance based methodology of NPCC Document A-10, “Classification of Bulk Power System Elements,” the list of which is maintained by the NPCC Task Force on System Studies and approved by the NPCC Reliability Coordinating Committee.

Requirements to abide by an NPCC Directory may also reside in external tariff requirements, bilateral contracts and other agreements between facility owners and/or operators and their assigned Reliability Coordinator, Planning Coordinator, Transmission Operator, Balancing Authority and/or Transmission Owner as applicable and may be enforceable through those external tariff requirements, bilateral contracts and other agreements. NPCC will not enforce compliance to the NPCC Directory requirements in this document on any entity that is not an NPCC Full Member.
1.6.1 Functional Entities

Transmission Owners

Generator Owners

Distribution Providers

1.6.2 Facilities

1.6.2.1 New Facilities

The criteria stipulated in this Directory apply to all new Type I and Type II SPSs as defined below. In the application of Type II SPSs, security is the prime concern (see Section 5.3.1 of this document). As such, Sections 5.2.1, 5.6.3, 5.7.2, 5.10 and 5.12 in this document do not apply to Type II. Each new Type I or Type II Special Protection System shall be reported to the Task Force on System Protection. It is recommended that this reporting be in accordance with the procedure stipulated in Appendix C of this Directory using the appropriate portion of the “Protection System Review Form” (formerly C-22 forms), for review and disposition by the TFSP, or in a form consistent with the intent of the procedure.

1.6.2.2 Existing Facilities

It is the responsibility of individual companies to assess their existing SPSs and to make modifications which are required to meet the intent of these criteria as follows:

1.6.2.2.1 Planned Renewal or Upgrade to Existing Facilities

It is recognized that there may be SPSs, which existed prior to each TO’s, GO’s, and DP’s adoption of the Special Protection System Criteria, that do not meet these criteria. If any SPSs or sub-systems of these facilities are replaced as part of a planned renewal or upgrade to the facility and do not comply with all of these criteria, then an assessment shall be conducted for those criteria that

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are not met. The result of this assessment shall be reported to TFSP. It is recommended that this reporting be in accordance with the procedure stipulated in Section 4.0 of Appendix C of this Directory using the appropriate portion of the “Protection System Review Form” (formerly C-22 forms), for review and disposition by the TFSP, or in a form consistent with the intent of the procedure.

1.6.2.2.2 SPS Re-classified to Type I or Type II

These criteria apply to all existing SPSs which are reclassified as Type I or Type II due to system changes. A mitigation plan shall be submitted to TFSP for review to bring such an SPS into compliance with these criteria.

For Type I SPS, where the owner of the SPS has determined that the cost and risks involved to implement physical separation, as per Section 5.12, cannot be justified, the reason for this determination and an assessment shall be reported to the TFSP. It is recommended this reporting be in accordance with the procedure stipulated in Appendix C of this Directory using the appropriate portion of the “Protection System Review forms” (formerly C-22 forms), for review and disposition by the TFSP, or in a form consistent with the intent of the procedure.

1.6.2.2.3 Intentionally left blank.

1.6.2.2.4 In-kind Replacement of SPS Equipment

If a component of an SPS is replaced “in-kind” as a result of an un-planned event, then it is not required to upgrade the associated protection system to comply with these criteria.

1.6.3 Classification of Special Protection Systems

SPSs are sub-divided into three types. Reference can be made to the NPCC Design and Operation of the Bulk Power System (Directory #1), where design criteria contingencies, operating criteria contingencies, and extreme contingencies are described.
Type I An SPS which recognizes or anticipates abnormal system conditions resulting from design and operating criteria contingencies, and whose misoperation or failure to operate would have a significant adverse impact outside of the local area. The corrective actions taken by an SPS along with the actions taken by other protection systems are intended to return power system parameters to a stable and recoverable state.

Type II An SPS which recognizes or anticipates abnormal system conditions resulting from extreme contingencies or other extreme causes, and whose misoperation or failure to operate would have a significant adverse impact outside of the local area.

Type III An SPS whose misoperation or failure to operate results in no significant adverse impact outside the local area. The practices contained in this document for a Type I SPS should be considered but are not required for a Type III SPS. It should be recognized that a Type III SPS may, due to system changes, become Type I or Type II.

2.0 Terms Defined in this Directory

The definitions of terms found in this Directory appearing in bold typeface, can be found in NPCC Glossary of Terms.

3.0 NERC ERO Reliability Standard Requirements

The NERC ERO Reliability Standards containing Requirements that are associated with this Directory include, but may not be limited to:

3.1 PRC-012-0 — Special Protection System Review Procedure

3.2 PRC-013-0 Special Protection System Database

3.3 PRC-014-0 — Special Protection System Assessment

3.4 PRC-015-0 — Special Protection System Data and Documentation

3.5 PRC-016-0 — Special Protection System Misoperations

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3.6  **PRC-017-0 - Special Protection System Maintenance and Testing**

4.0  **NPCC Regional Reliability Standard Requirements**

None at this time.

5.0  **NPCC “Full Member”, More Stringent Criteria**

These Criteria are in addition to, more stringent than, or more specific than NERC or any Regional Reliability standard requirements.

5.1  **General Criteria**

An SPS shall be designed to recognize the specific power system conditions associated with its intended function.

Due consideration shall be given to dependability and security. The relative effect on the bulk power system due to a failure of an SPS to operate when desired versus an unintended operation shall be weighed carefully in selecting design parameters as follows in Sections 5.2, 5.3, and 5.4:

5.2  **Criteria for Dependability**

5.2.1  To enhance dependability, an SPS shall be designed with redundancy such that the SPS is capable of performing its intended function while itself experiencing a single failure. Multiple protection groups that are used to obtain redundancy within an SPS shall not share any of the same components. (These criteria do not apply to Type II SPSs.)

5.3  **Criteria for Security**

5.3.1  A Type II SPS shall be designed to avoid false operation while itself experiencing a single component failure.

5.4  **Criteria for Dependability and Security**

5.4.1  The thermal capability of all SPS components shall be rated to withstand the maximum short time and continuous loading of the associated protected elements.

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5.4.2 Communication link availability, critical control switch, test switch positions, and trip circuit integrity shall be annunciated to a 24-hour Operations center so that operating personnel can be notified and can initiate appropriate actions.

5.5 Criteria for Operating Time and Arming

5.5.1 An SPS shall be designed to take corrective action(s) within times determined by studies with due regard to security, dependability, and selectivity.

5.5.2 An SPS shall be equipped with means to enable its arming and to independently verify its arming.

5.5.3 Status of SPS arming shall be annunciated to a 24-hour Operations center so that operating personnel can respond and can initiate appropriate actions.

5.6 Current Transformer Criteria

Current transformers (CTs) associated with an SPS shall have adequate steady-state and transient characteristics for their intended function as follows:

5.6.1 The output of each current transformer secondary winding shall be designed to remain within acceptable limits for the connected burdens under all anticipated currents, including fault currents, to ensure correct operation of the SPS.

5.6.2 The thermal and mechanical capabilities of the CT at the operating tap shall be adequate to prevent damage under maximum fault conditions and normal or emergency system loading conditions.

5.6.3 For protection groups to be independent, they shall be supplied from separate current transformer secondary windings. (This criterion does not apply to Type II SPSs.)

5.6.4 Interconnected current transformer secondary wiring shall be grounded at only one point.

5.7 Voltage Transformer and Potential Device Criteria

Voltage transformers and potential devices associated with an SPS shall have
adequate steady-state and transient characteristics for their intended function as follows:

5.7.1 Voltage transformers and potential devices shall have adequate volt-ampere capacity to supply the connected burden while maintaining their rated accuracy over their specified primary voltage range.

5.7.2 If an SPS is designed to have multiple protection groups at a single location for redundancy, each of the protection groups shall be supplied from separate voltage sources.

The protection groups may be supplied from separate secondary windings on one transformer or potential device, provided all of the following criteria are met: (This Section does not apply to Type II SPS.)

5.7.2.1 Complete loss of that voltage transformer or potential device does not prevent both protection groups from performing the intended function;
5.7.2.2 Each secondary winding has sufficient capacity to permit fuse protection of the circuit;
5.7.2.3 Each secondary winding circuit is adequately fuse protected.

5.7.3 The wiring from each voltage transformer secondary winding shall not be grounded at more than one point.

5.8 Battery and Direct Current (dc) Supply Criteria

DC supplies associated with an SPS shall be designed to have a high degree of dependability as follows:

5.8.1 If an SPS is designed to have multiple protection groups at a single location for redundancy, no single battery or dc power supply failure shall prevent the independent protection groups from performing the intended function. Each battery shall be provided with its own charger. Physical separation shall be maintained between the two station batteries or dc power supplies used to supply the independent protection groups. (This section does not apply to Type II SPS.)

5.8.2 Each battery shall have sufficient capacity to permit operation of an SPS, in the event of a loss of its battery charger or the ac supply source, for the period of time necessary to transfer the load to the other battery or re-establish the supply source. Each station battery and its associated charger shall have sufficient capacity to supply the total dc load of the station.

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5.8.3 A transfer arrangement shall be provided to permit connecting the total dc load to either station battery without creating areas where, prior to failure of either a station battery or a charger, a single event can disable both dc supplies.

5.8.4 The battery chargers and all dc circuits shall be protected against short circuits.

5.8.5 DC battery systems shall be continuously monitored to detect abnormal voltage levels (both high and low), dc grounds, and loss of ac to the battery chargers. These conditions shall be annunciated to a 24-hour Operations center so that operating personnel can respond and can initiate appropriate actions.

5.8.6 DC supply to the SPS component shall be continuously monitored to detect loss of voltage and be annunciated to a 24-hour Operations center so that operating personnel can respond and can initiate appropriate actions.

5.9 Station Service ac Supply Criteria

If an SPS is designed to have multiple protection groups at a single location for redundancy, there shall be two sources of station service ac supply, each capable of carrying at least all the battery chargers associated with the SPS.

5.10 Circuit Breakers Criteria

5.10.1 Where SPS redundancy is achieved by the use of independent protection groups tripping the same circuit breakers without overarming, which is defined as providing for more corrective action than would be necessary if no failures are considered, each circuit breaker shall be equipped with two independent trip coils. (This dual trip coil criterion does not apply to Type II SPS.)

5.10.2 The design of a breaker with two trip coils shall be such that the breaker will operate if both trip coils are energized simultaneously. The relative polarity between the voltage applied to the two trip coils shall not affect proper breaker operation. The correct operation of this design shall be verified by tests and documented.

5.11 Teleprotection Criteria

5.11.1 Communication facilities required for teleprotection shall be designed to
have a level of performance consistent with that required of the SPS, and shall meet the following:

5.11.1 Where the design of an SPS is composed of multiple protection groups for redundancy and each group requires a communication channel:

5.11.1.1 The equipment for each group shall be separated physically on non-adjacent panels and designed to minimize the risk of more than one protection group being disabled simultaneously by a single event or condition.

5.11.1.2 The communication medium outside the substation/plant physical perimeter for each protection group shall be designed to minimize the risk of both protection groups being disabled simultaneously by a single event or condition. In addition, physical separation of the communication media outside the substation fence shall be three feet at a minimum. (Also, see Appendix A, Section 2.9.)

5.11.2 Teleprotection equipment shall be monitored to detect loss of equipment and/or channel and be annunciated to a 24-hour Operations center so that operating personnel can respond and can initiate appropriate actions.

5.11.3 Teleprotection equipment shall be provided with means to test for proper signal adequacy.

5.11.4 Teleprotection equipment shall be powered by the substation batteries or other sources independent from the power system. See Section 5.8, Battery and dc Supply Criteria.

5.11.5 Except as identified otherwise in these criteria, the two teleprotection groups shall not share the same component.

5.11.5.1 The use of a single communication tower for radio communication systems used by the
two protection groups of an SPS is permitted as long as diversity of the communication signals is achieved.

5.11.1.5.2 Where telecommunication route diversity cannot be achieved, overarming of the appropriate SPS trip outputs is an acceptable mitigation.

5.12 Environment (This Section does not apply to Type II SPS.)

5.12.1 If an SPS is designed to have multiple protection groups at a single location for redundancy, each individual protection group and teleprotection of the SPS shall be on non-adjacent vertical mounting assemblies or enclosures.

5.12.2 If an SPS is designed to have multiple protection groups at a single location for redundancy, wiring for each individual protection group and teleprotection of the SPS shall not be in the same cable.

5.12.3 If an SPS is designed to have multiple protection groups at a single location for redundancy:

- Cabling for individual protection groups and teleprotection of the SPS shall be physically separated. This can be accomplished via different raceways, trays, trenches, etc.
- Cable separation shall be achieved up to the breaker control cabinet.
- Cable separation shall be achieved up to the equipment control cabinet.

5.12.4 In the event a common raceway is used, cabling for individual protection groups of an SPS shall be separated by a fire barrier.

5.13 Grounding Criteria

Each TO, GO or DP shall have established as part of its substation/plant design procedures or specifications, a mandatory method of designing the substation/plant ground grid, which:

5.13.1 Can be traced to a recognized calculation methodology
5.13.2 Considers cable shielding
5.13.3 Considers equipment grounding

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5.14 Provision for Breaker Failure Criteria

Type I SPS shall include breaker failure protection for each circuit breaker whose operation is critical to the adequacy of the action taken by the SPS with due regard to the power system conditions this SPS is required to detect. The following are options for breaker failure protection:

5.15.1 A design which recognizes that the breaker has not achieved or will not achieve the intended function required by the SPS and which takes independent action to achieve that function. This provision needs not be duplicated and can be combined with conventional breaker failure schemes if appropriate.

5.15.2 Overarming the SPS such that adequate action is taken even if a single breaker fails.

5.15.3 The redundancy afforded by actions taken by other independent schemes or devices.

5.16 Design to Facilitate Testing and Maintenance

5.16.1 The design of an SPS both in terms of circuitry and physical arrangement shall facilitate periodic testing and maintenance.

5.16.2 Test facilities or test procedures shall be designed such that they do not compromise the independence of the redundant design aspects of an SPS.

5.16.3 If a segmented testing approach is used, test procedures and test facilities shall be designed to ensure that related tests properly overlap. Proper overlap is ensured if each portion of circuitry is seen to perform its intended function, such as operating a relay from either a real or test stimulus, while observing some common reliable downstream indicator.

5.17 Design to Facilitate Analysis of SPS Performance

5.17.1 Event recording capability shall be provided to permit analysis of the SPS’s performance.

5.18 Commissioning Testing

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An SPS shall be functionally tested when initially placed in service and when modifications are made.

6.0 Compliance Requirements

R1. An entity, proposing to install a new special protection system or a modification to an existing special protection system, shall submit documentation to TFSP. It is recommended that the form of this documentation is as per Sections 1.6.2.1 or 1.6.2.2, respectively.

R2. An entity, proposing to install a new special protection system or a modification to an existing special protection system, shall obtain a letter of acceptance by TFSP of the compliance statement accompanying the submittal in R1 prior to placing the special protection system in service.

R3. The entity shall provide within 30 days, upon request from the Regional Entity (Criteria Compliance Enforcement Program) documented evidence of the submittal and acceptance by TFSP, of any new or modified special protection system.

7.0 Compliance Monitoring Process

Compliance with the requirements set forth in this Directory will be in accordance with the NPCC Criteria Compliance and Enforcement Program (CCEP).

Measures and corresponding Levels of Non Compliance for these requirements are contained within the compliance templates associated with this Directory.

Prepared by: Lead Task Force- Task Force on System Protection

Review and Approval: Revision to any portion of this Directory will be posted by the lead Task Force in the NPCC Open Process for a 45 day review and comment period. Upon satisfactorily addressing all the comments in this forum, the Directory document will be sent to the remaining Task Forces for their recommendation to seek RCC approval.

Upon approval of the RCC, this Directory will be sent to the Full Member Representatives for their final approval if sections pertaining to the Requirements and Criteria portion have been revised. All voting and approvals will be conducted according to the most current "NPCC Inc. Bylaws” in effect at the time the
ballots are cast.

Revisions pertaining to the Appendices or any other portion of the document such as Links, Glossary Terms, etc., will only require RCC Member approval of the document. Errata may be corrected by the Lead Task Force at any time and provide the appropriate notifications to the NPCC Inc. membership.

This Directory will be updated at least once every three years and as often as necessary to keep it current and consistent with NERC Regional Reliability Standards and other NPCC documents.

References:

NPCC RRS PRC-XXX-X (Future NPCC Regional Standard)

Design and Operation of the Bulk Power System (Directory #1)

Emergency Operation (Directory #2)

Maintenance Criteria for Bulk Power System Protection (Directory #3)

NPCC Glossary of Terms
Appendix A
Guidance for Consideration in SPS Design

1.0 Introduction

This Appendix provides the guidance for consideration in the implementation of the Special Protection System (SPS) design criteria stipulated in Section 5 of this Directory.

2.0 Design Considerations

2.1 General Considerations

2.1.1 The general objective for any SPS is to perform its intended function (generator rejection, load rejection, etc.) in a dependable and secure manner. In this context, dependability relates to the degree of certainty that the SPS will operate correctly when required to operate. Security relates to the degree of certainty that the SPS will not operate when not required to operate.

2.1.2 The relative effects on the bulk power system of a failure to operate when desired versus an unintended operation should be weighed carefully in selecting design parameters. For example, the choice of duplication as a means of providing redundancy improves the dependability of the SPS but can also jeopardize security in that it may increase the probability of an unintended operation. This general objective can be met only if the SPS can dependably respond to the specific conditions for which it is intended to operate and differentiate these from other conditions for which action must not take place.

2.1.3 Close coordination should be maintained among system planning, design, operating, maintenance, and protection functions, since both initially and throughout their life cycle, SPSs are a multi-discipline concern.

2.1.4 Whenever changes are anticipated in generating sources, transmission facilities, or operating conditions, Generator Owners and Transmission Owners should review those SPS applications (i.e., settings, ac, and dc supplies) which can reasonably be expected to be impacted by those changes.

2.2 Issues Affecting Dependability

2.2.1 Dependability of an SPS can be provided by designing with redundancy.

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Redundancy is normally provided by duplication. Some aspects of duplication may be achieved by overarming, which is defined as providing for more corrective action than would be necessary if no failures are considered. The redundancy criteria for an SPS apply only with respect to its response to the conditions it is required to detect.

2.2.2 For an SPS that is composed of multiple protection groups, the risk of simultaneous failure of more than one protection group because of design deficiencies or equipment failure should be considered, particularly if identical equipment is used in each protection group. The extent and nature of these failures should be recognized in the design and operation of the SPS.

2.2.3 In addition to the separation criteria, areas of common exposure should be kept to a minimum to reduce the possibility of all groups being disabled by a single event such as fire, evacuation, water leakage, and other such incidents.

2.3 Issues Affecting Security

2.3.1 An SPS should be designed to operate only for conditions which require its specific protective or control actions.

2.4 Issues Affecting Dependability and Security

2.4.1 SPSs should be no more complex than required for any given application.

2.4.2 The components and software used in SPSs should be of proven quality, as demonstrated either by actual experience or by stringent tests under simulated operating conditions.

2.4.3 SPSs should be designed to minimize the possibility of component failure or malfunction due to electrical transients and interference or external effects such as vibration, shock and temperature.

2.4.4 SPSs, including intelligent electronic devices (IEDs) and communication systems used for protection, should comply with applicable industry standards for utility grade protection service. Utility Grade Protection System Equipment are equipment that are suitable for protecting transmission power system elements, that are required to operate reliably, under harsh environments normally found at substations. Utility grade equipment should meet the applicable sections of all or some of the following types of industry standards, to ensure their suitability for such
applications:
- IEEE C37.90.1 (oscillatory surge and fast transient)
- IEEE C37.90.1 (service conditions)
- IEC 60255-22-1 (1 MHz burst, i.e. oscillatory)
- IEC 61000-4-12 (oscillatory surge)
- IEC 61000-4-4 (EFT)
- IEC 60255-22-4 (EFT)
- IEEE C37.90.2 (narrow-band radiation)
- IEC 60255-22-3 (narrow-band radiation)
- IEC 61000-4-3 (narrow-band radiation)
- IEEE 1613 (communications networking devices in Electric power Substations)

2.4.5 SPS circuitry and physical arrangements should be carefully designed so as to minimize the possibility of incorrect operations due to personnel error.

2.4.6 SPS automatic self-checking facilities should be designed so as to not degrade the performance of the SPS.

2.4.7 Consideration should be given to the consequences of loss of instrument transformer voltage inputs to SPSs.

2.4.8 Consideration should be given to the effect of the means of arming on overall security and dependability of an SPS. Arming should have a level of security and dependability commensurate with the SPS Type.

2.5 Issues Affecting Performance

2.5.1 Control Cable, Wiring and Ancillary Control Device

Control cables and wiring and ancillary control devices should be highly dependable and secure. Due consideration should be given to published codes and standards, fire hazards, current-carrying capacity, voltage drop, insulation level, mechanical strength, routing, shielding, grounding, and environment.

2.5.2 Environment

2.5.2.1 Means should be employed to maintain environmental conditions that are favorable to the correct performance of an SPS.

2.5.2.2. Fire barrier used to separate the cabling of the two protection
groups of an SPS in common raceway should be sufficiently rated to allow enough time to isolate the affected facility while maintaining operation of one protection group.

2.6 Operating Time of an SPS

Adequate time margin should be provided taking into account study inaccuracies, differences in equipment, and protection operating times.

2.7 Arming of an SPS

Arming is the selection, which may be external to the SPS, of desired output action based on power system conditions and recognized contingencies. Arming of an SPS is normally based upon the results of system studies, which take into account recognized contingencies, operating policies/procedures, and current power system load/generation conditions. For a simple SPS, arming may be an on/off function. An SPS can be armed either automatically or manually.

2.7.1 Automatic arming is implemented without human intervention.

2.7.2 Manual arming requires human intervention. Sufficient time, with adequate margin for recognition, analysis, and the taking of corrective action, should be allowed.

2.8 Voltage Transformer and Potential Device

Voltage transformer installations should be designed with due regard to ferroresonance.

2.9 Communication Medium for Teleprotection

In cases where constraints do not allow three feet separation, this distance may be reduced if a proposed alternative design can achieve comparable physical protection of the communication medium. If an alternative design cannot be met, then an alternative communication path or protection scheme should be proposed.

2.10 Maintenance Considerations

2.10.1 As an SPS may be complex and may interface with other protection systems or control systems, special attention should be placed on ensuring that test devices and test interfaces properly support a clearly defined maintenance strategy.

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2.10.2 Proper overlap is ensured if each portion of circuitry is seen to perform its intended function, such as operating a relay, from either a real or test stimulus, while observing some common reliable downstream indicator.

2.11 Grounding

Station grounding is critical to the correct operation of an SPS. The design of the ground grid directly impacts proper SPS operation and probability of false operation from fault currents or transient voltages,

2.12 Battery and Direct Current (dc) Supply

Protective devices protecting battery chargers and dc circuits should be coordinated to minimize the number of dc circuits interrupted.
Appendix B
Procedure for the Review of a Special Protection System (SPS)

1.0 Introduction

1.1. This Appendix provides the procedure to obtain concurrence from NPCC if an entity proposes a new SPS, or the modification of or the retirement of a SPS.

1.2. The proposing entity should allow sufficient lead time in order to accomplish all the steps in the process outlined here in. These processes are shown in the attached flow charts.

1.3. The following NPCC groups are involved in the review and approval process of the SPS:

- Task Force on Coordination of Planning - TFCP
- Task Force on System Protection - TFSP
- Task Force on System Studies - TFSS
- Task Force on Coordination of Operations – TFCO
- Reliability Coordinating Committee – RCC

2.0 NPCC Review and Concurrence of a Proposed New or the Modification to an Existing SPS

2.1. The proposing entity shall notify the TFCP Chairman and Secretary of its intention to install a new SPS or to modify an existing SPS.

The notification shall include statements and analysis which describes:

- the proposed SPS Type (I, II, III) and rationale for classification,
- the need and location for the SPS,
- when the SPS is planned for service,
- how long the SPS is expected to be in service,
- the specific contingency(s) for which the SPS is designed to operate,
- the possible failure modes and the consequences of misoperation, unintended operation or failure of the SPS,
- for modification of an existing SPS, a descriptive statement of the modification, the current SPS type and the reason for the change, and
- a statement that the SPS is designed according to the existing NPCC Criteria and Standards.

For the purpose of this Appendix, a modification that involves the re-classification of the “Type”
for an existing SPS is a change to its original functionality such that the results of previous analysis or the study which was used for the classification of that SPS, is no longer representative of the consequences of the SPS’s proper operation, its failure to operate, or the misoperation of that SPS.

2.2. TFCP shall forward the documentation from the proposing entity to TFSS to review and confirm the proposed SPS Type.

TFSS shall confirm the proposed SPS Type by reviewing the analysis that the proposing entity has performed to determine the consequences of either a failure of the SPS to operate when and how it is required, or an inadvertent or unintended operation of the SPS. If necessary, TFSS shall request that the proposing entity conduct additional studies.

TFSS shall forward a summary of their findings confirming the Type of the SPS to TFCP.

2.3 The review shall proceed as follows:

Type I or II SPS as described in paragraph 2.4, or if a Type III SPS as described in paragraph 2.5.

2.4 Approval of a New or the Modification of a Type I or II SPS

2.4.1 TFCP shall forward the documentation from the proposing entity and the TFSS findings to TFSP and TFCO.

2.4.2 TFSP shall confirm the failure modes of the SPS including actions of back-up protection, and whether or not the SPS complies with NPCC system protection standards. TFSP shall review whether the new or modified SPS is in conformance with the NPCC Regional Reliability Reference Directory #4 “Bulk Power System Protection Criteria”; and the NPCC Regional Reliability Reference Directory #7 “Special Protection System Criteria”.

TFSP shall forward a summary of its findings to TFCP.

2.4.3 TFCO shall review the operability of the SPS and shall assess its impact to operations if the SPS were to operate incorrectly or fail to operate, and any potential for unintended interaction with other special protection systems. TFCO shall provide a summary of its conclusions together with a statement accepting or rejecting the proposed installation of the new SPS or the modification of the existing SPS. TFCO shall include a statement that the new SPS or the
modification of an existing SPS conforms to NPCC Regional Reliability Reference Directory #1 “Design and Operation of the Bulk Power System”.

TFCO shall forward a summary of its findings to TFCP.

2.4.4 TFCP shall review the SPS proposal for conformance with NPCC Regional Reliability Reference Directory #1 “Design and Operation of the Bulk Power System”. TFCP may return the application to the proposing entity for further clarification or for additional information.

2.4.5 TFCP shall prepare a combined summary report including the proposing entity notification and the task force recommendations for evaluation by RCC.

2.4.6 RCC shall review the summary report and act on the proposal. RCC may approve the proposal, reject, or remand the review of the SPS proposal back to TFCP with a recommendation of further action or the need for clarification.

2.4.7 TFCP shall notify all the task forces and the proposing entity of the outcome of the review.

2.4.8 Upon RCC approval the SPS may be deployed.

2.4.9 TFSS shall update the NPCC Special Protection System list/database.

2.5 Approval of a New or Modification Type III SPS

2.5.1 After review of the SPS proposal for conformance with NPCC Regional Reliability Reference Directory #1 “Design and Operation of the Bulk Power System”, TFCP shall approve or reject the proposal, or remand the SPS back to the proposing entity with a recommendation of further action or the need for clarification or for additional information.

2.5.2 TFCP shall prepare a summary report including the proposing entity notification informing RCC of their conclusion.

2.5.3 TFCP shall notify all the task forces and the proposing entity of the outcome of the review.

2.5.4 Upon TFCP approval the SPS may be deployed.

2.5.5 TFSS shall update the NPCC Special Protection System list/database.
3 NPCC Review and Concurrence for the Retirement of an Existing SPS

3.1 The proposing entity shall notify the TFCP Chairman and Secretary of its intention to retire an existing SPS.

The notification shall include statements that describe:

- the identification and type of SPS being retired,
- the specific changes which have eliminated the need for the SPS, and
- for a Type I or II SPS, the proposing entity will provide evidence that the SPS retirement does not have a significant adverse impact on the reliability of the bulk power system.

3.2 The review shall proceed as follows:

Type I or II SPS as described in paragraph 3.3 or if a Type III SPS as described in paragraph 3.4.

3.3 Approval to Retire a Type I or II SPS

3.3.1 TFCP shall forward the documentation from the proposing entity to TFSS.

TFSS shall review the analysis that the proposing entity has performed to determine the consequences of the removal of the SPS.

TFSS shall forward a summary of their findings or concerns to TFCP.

3.3.2 TFCP may return the application to the proposing entity for further clarification.

3.3.3 TFCP shall prepare a combined summary report including the proposing entity notification and TFSS recommendation for evaluation by RCC.

3.3.4 RCC shall review the summary report and act on the proposal. RCC may approve the retirement of the SPS, or remand the proposal back to TFCP with a recommendation of further action or the need for clarification.

3.3.5 TFCP shall notify in a formal letter to all the task force groups and the proposing entity of the outcome of the review.

3.3.6 Upon RCC approval the SPS may be retired.

3.3.7 The TFSS shall update the NPCC Special Protection System list/database.

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3.4 Retiring a Type III SPS

3.4.1 A formal approval to retire a Type III SPS is not required. The proposing entity shall inform TFCP of the retirement. TFCP shall inform all the task forces and the RCC of the SPS retirement.

3.4.2 The SPS may be retired.

3.4.3 TFSS shall update the NPCC Special Protection System list/database.
FLOW CHART FOR THE REVIEW OF NEW SPECIAL PROTECTION SYSTEMS (SPS) OR THE MODIFICATION OF AN EXISTING SPS

Entity submits proposal for new or modified SPS to TFCP Chair and Secretary

TFCP Chair reviews and forwards to TFSS for their confirmation of the SPS TYPE

TFSS determines SPS TYPE and provides a statement of their findings

TYPE III

TFCP evaluates SPS for conformance with Directory 1 and approves

No

Yes

TYPE I or II

TFCP requests TFSP and TFCO review

TFSP validates conformance with Directory 4 and Directory 7.

RCC approves the SPS

No

Yes

TFCO validates conformance with Directory 1

TFCP verifies conformance with Directory 1

TFCP documents results to all task forces, RCC and the Proposing Entity. Proposing Entity may deploy the SPS.

TFSS updates NPCC SPS database list

SPS is sent back to proposing entity

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FLOW CHART FOR THE RETIREMENT OF SPECIAL PROTECTION SYSTEMS (SPS)

Entity submits SPS proposal for retirement of existing SPS to the TFCP Chair and Secretary

TFCP proceeds depending on SPS TYPE

TYPE III

TYPE I or II

TFCP requests TFSS review of SPS retirement

TFCP sends the SPS back to proposing entity

TFCP recommends SPS retirement

Yes

No

TFSS reviews TFSS review of SPS retirement

RCC approves SPS retirement

Yes

No

TFCP documents results to all task forces, RCC and Proposing Entity. Proposing Entity may retire the SPS.

TFSS updates NPCC SPS database list

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Appendix C
Procedure for Reporting to TFSP New and Modified Special Protection Systems

1.0 Introduction

In accordance with the applicable facilities described in Section 1.6.2 of this Directory (D7), Responsible Entity should provide the Task Force on System Protection (TFSP) with advance notification of any of its new SPS facilities, or significant changes in its existing SPS facilities. Notification should be made to the TFSP early in the engineering design stage.

2.0 Presentation and Review of SPSs

Each new or modified Type I or Type II SPS shall be reported to the Task Force on System Protection in accordance with the following presentation and review procedure.

2.1 A presentation will be made to the TFSP on new facilities or a modification to an existing facility when requested by an NPCC Member or the TFSP.

2.2 A presentation will be made to the TFSP when the design of the SPS facility deviates from the D7 Criteria.

2.3 A presentation will be made to the TFSP when an NPCC Member is in doubt as to whether a design meets the D7 Criteria.

3.0 Data Required for Presentation and Review

3.1 The Responsible Entity will advise the TFSP of the basic design of the proposed system. The data will be supplied on the Special Protection System Review Form, accompanied by a geographical map, a one-line diagram of all affected areas, and the associated protection and control function diagrams. A physical layout of the protection panels and batteries for the purpose of illustrating physical separation will also be included.

3.2 The proposed protection system will be explained with due emphasis on any special conditions or design restrictions existing on the particular power system.
4.0 Procedure for Presentation

4.1 The Responsible Entity will arrange to have a technical presentation made to the TFSP.

4.2 To facilitate scheduling, the chairman of the TFSP will be notified approximately four months prior to the desired date of presentation.

4.3 Copies of materials to be presented will be distributed to TFSP members 30 days prior to the date of the presentation.

5.0 Review by TFSP

The TFSP will review the material presented and develop a position statement concerning the proposed SPS. This statement will indicate one of the following:

5.1 The need for additional information to enable the TFSP to reach a decision.

5.2 Acceptance of the submitted proposal including the Responsible Entity’s statement of conformance to the D7 Criteria.

5.3 *Conditional acceptance of the submitted proposal.

5.4 *Rejection of the submitted proposal

* Position Statements to include an indication of areas of departure from the intent of the D7 Criteria and suggestions for modifications to bring the SPS into conformance with the NPCC criteria.

5.5 The results of the TFSP review will be documented in the following manner.

- A position statement will be included in the minutes of the meeting at which the proposed SPS was reviewed. The Chair of TFCP will be notified of the position statement.
- An acceptance letter or a letter outlining areas of non-conformance with the NPCC D7 Criteria and recommendations for correction will be submitted to the Responsible Entity.
- The Task Force will maintain a record of all the reviews it has conducted.

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