

**Task Force on System Protection
Blackout Recommendations – Update
November 16, 2007**

RCC Meeting
November 27-28, 2007
Agenda Item 8.11

Objectives	Status
<p>Rec. 1a - TFSS and TFSP should review Type 1 and Type 2 Special Protection Systems (SPSs) that use indirect sensing to determine whether any improvements are warranted that could be made relatively easily and that would reduce the likelihood of their operating for conditions other than those for which they are designed.</p>	<p><u>Complete.</u> No members identified an opportunity for improvements to the sensing of any of the existing Type I or Type II SPSs. This information has been provided to TFSS for their consideration in addressing this recommendation.</p>
<p>Rec. 1b - Improvements to the “Loss of 3001” SPS should be considered and is recommended first.</p>	<p><u>Complete.</u> TFSP viewed a presentation in May by Mr. Jeffrey Fenn describing the overall plans for the development of the new line between Orrington, ME and Point Lepreau, NB. Proposed changes to the associated SPSs were reviewed at the January TFSP meeting and accepted.</p>
<p>Rec. 2a - Transmission owners should investigate changes that could be made to improve the security of protection operation of the Homer City 345 kV transmission lines to Watercure and Stolle Road and recommend any proposed changes to TFSS and TFSP.</p>	<p>On-going. NYSEG and First Energy have agreed to replace the existing protection on these lines with relays capable of providing flexible responses to out-of-step conditions. NYSEG and First Energy have scheduled the physical work to be completed by December 2008. Work continues on the efforts to use the blackout simulations to test the security of the relays. Also, see additional information on Agenda Item 8.4</p>
<p>Rec. 4 - NPCC should continue to investigate the coordination between generating unit (generator, excitation system, and prime mover) protections and the UFLS program through its representation on the NERC System Protection and Control Task Force (SPCTF). TFSS should consider cases where generating unit protection cannot be coordinated with the UFLS program without compromising unit protection in future assessments of the UFLS program. TFSS and TFSP should conduct a review of NPCC Criteria to ensure that any required coordination between the UFLS program and generators is included.</p>	<p>TFSP has prepared a proposed modification to Figure 1 of Document A-3 identifying a recommendation for minimum overfrequency tripping conditions for generators. This proposal has been sent to TFSS for their use in analyses as appropriate and for their comments relative to the usefulness of the proposed curve. TFSS has recommended that further work be done (started by SPCTF) to provide guidance relative to coordination of Generation and Transmission protection systems before we firm up our overfrequency requirements.</p>
<p>Rec. 5c - The impact of low voltages on UFLS relay performance including under-voltage supervision and accuracy of frequency measurements (as determined by TFSP).</p>	<p><u>Complete.</u> Mr. Vasco has worked with the Chair of SS-38 to complete development of the survey. We have scheduled the survey for completion and submittal of data in March, 2007.</p>
<p>Rec. 6c - TFSP should determine whether existing NPCC criteria is sufficient to ensure that recording devices for generating units document event times for mechanical and electrical protection and control actions. If not they should recommend appropriate revisions to criteria.</p>	<p>On-going. Mr. Pagano agreed to lead the working group that includes himself, Mr. Rogers and Mr. Chano to develop a guideline for generator SOE Monitoring. Plan for a draft write-up is scheduled in July 2007. A draft has been sent to the TF for review. Comments are due by 1/1/08, with an expectation to post in the Open Process Review following our January TFSP meeting.</p>

NPCC Inc. TFSS August 14 2003 Blackout Study Follow-up Status Report, November 2007

Supplementary NPCC Blackout Recommendations approved by the RCC on March 8, 2006

Recommendations

#	Assignment	Comments/Results	Priority & Status/ Schedule
1a	TFSS and TFSP should review Type 1 and Type 2 Special Protection Systems (SPSs) that use indirect sensing to determine whether any improvements are warranted that could be made relatively easily and that would reduce the likelihood of their operating for conditions other than those for which they are designed. (See Blackout Report conclusion 7)	TFSP completed review in August 2006, with no SPSs identified. TFSS reviewed SPSs as part of annual SPS List update: only SPS candidates for improvement are the Maxcys & Bucksport SPSs (NPCC SPS #28 & 21), which will be replaced in 2007.	Low Review Complete
1b	More specifically, the review of improvements to the "Loss of 3001" SPS should be considered and is recommended first.	NB Power will replace this SPS with proposed Maritimes Islanding SPS (approved by TFSS in May 2006) in 2007.	High Review Complete
2a	Transmission owners should investigate changes that could be made to improve the security of protection operation of the Homer City 345 kV transmission lines to Watercure and Stolle Road and recommend any proposed changes to TFSS and TFSP.	TFSP received information from NYSEG in July 2006. SS-38 needs all proposed changes at both ends of line to do an assessment. Teleconferences with PJM & FirstEnergy: <ul style="list-style-type: none"> installation in 2008 	Low SS-38 provided swing data for relay testing April 2007 SS-38 guidance and performance evaluation first half 2008
2b	TFSS should investigate whether separating Ontario from Michigan for conditions similar to those experienced during the blackout would improve reliability for other conditions and would not degrade reliability, under most circumstances for both NPCC and other Regions. If so, they should propose a dependable means of detecting the necessary conditions and effecting the separation.	TFSS reviewed Hydro One report at its November 2006 meeting. Ontario-Michigan SPS is likely not both secure and dependable.	Low Investigation Complete
2 other	During the investigation of the Ontario/Michigan interface, if TFSS identifies that other interfaces should be considered as separation candidates, they should make additional recommendations to the RCC.	This will be reviewed by SS-38 through its Blackout Study Task 5 analysis.	Low Start Task 5 Jan 2008 Complete fall 2008

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4	<p>NPCC should continue to investigate the coordination between generating unit (generator, excitation system, and prime mover) protections and the UFLS program through its representation on the NERC System Protection and Control Task Force (SPCTF).</p> <ul style="list-style-type: none"> i. TFSS should consider cases where generating unit protection cannot be coordinated with the UFLS program without compromising unit protection in future assessments of the UFLS program. ii. TFSS and TFSP should conduct a review of NPCC Criteria to ensure that any required coordination between the UFLS program and generators is included. <p>(See Blackout Report conclusion 12)</p>	<p>A-03 changes include UFLS coordination with nuclear unit protection.</p> <p>SS-38 study of NPCC UFLS program completed May 2007.</p> <p>Generator unit governor survey results sent to SS-38 in May 2007. SS-38 has reviewed these, along with ERCOT & WECC efforts, and is preparing a white paper.</p>	<p>High, but major endeavor</p> <p>SPCTF report expected in mid-2008</p> <p>SS-38 review as part of Task 5 fall 2008</p>
5	<p>TFSS should ensure that future assessments of the Underfrequency Load Shedding (UFLS) Program include:</p> <ul style="list-style-type: none"> a) Sensitivity studies to examine the impact of unexpected load or generation loss near the electrical center of unstable swings during island formation. b) Simulation of island formation across Area and regional boundaries and modeling more severe conditions including modeling of initiating disturbances and non-coincident tripping of circuits across the island boundary. c) The impact of low voltages on UFLS relay performance including under-voltage supervision and accuracy of frequency measurements (as determined by TFSP). d) Identification of large load areas within NPCC that are frequently deficient in generation by more than 25% and that are susceptible to islanding and assessment of the performance of such islands. 	<p>SS-38 study of NPCC UFLS program completed May 2007.</p>	<p>Medium</p> <p>Assessment Complete</p>
6a	<p>The TFSS should survey what methods are available now within NPCC to create accurate power flow models based on actual operating data, what initiatives are underway by NERC, how much effort it would take to develop a common approach within NPCC and any costs associated with these. If RCC approves the development of such powerflow models, they should be used to validate the reactive power, load power factor, and voltage profile data in the NPCC library powerflow cases. (See Blackout Report conclusion 16)</p>	<p>SS-37 will conduct a survey in summer 2007.</p> <p>This recommendation was reviewed by SS-38, which updated C-25, approved by TFSS.</p> <p>SS-38 Procedure Manual includes a provision for SS-38 to provide data from actual disturbance simulations to SS-37.</p>	<p>High</p> <p>Survey sent spring 2007</p> <p>About half of responses received November 2007</p>

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6b	<p>NPCC should assess what methods would be most effective for modeling mid-term dynamics in analysis of disturbances that propagate over a significant time period. Specifically,</p> <ul style="list-style-type: none"> i. TFSS should document what was learned during the blackout investigation regarding the modeling of mid-term dynamic effects. ii. TFSS should also summarize recent industry efforts. <p>This information will be used to evaluate whether to develop and maintain a mid-term dynamics model, including qualitative benefits to system analysis work and any associated costs. (See Blackout Report conclusion 17)</p>	<p>Under review by SS-38, in follow-up to UFLS study, parallel with Task 5.</p> <p>HQ described its methodology and the tools it has developed for mid-term dynamic modeling for TFSS in November 2007.</p>	<p>Medium/ Low</p> <p>Completion expected fall 2008</p>
6c	<p>... TFSS should consider developing requirements for dynamic recording devices in Document A-2 that assure the NERC standards are adequately represented.</p>	<p>TFSP has developed a new NPCC B-26 document, and reviewed NERC Reliability Standards vs. NPCC documents with TFSS in September 2006. New Document A-15 is in open process.</p>	<p>Medium/ Low</p> <p>Requirements developed</p>
6d	<p>The TFSS should review past industry efforts to study dynamic load behavior, such as the NPCC COSS-2 Study, and contact others within the industry to benefit from their research. The focus should be on behavior of load during large frequency and voltage excursions and the ability to model when load is tripped.</p> <p>The TFSS should recommend whether to develop improved models for use in analysis of major disturbances or to develop appropriate models at the time of analyzing a disturbance. (See Blackout Report conclusion 15)</p>	<p>Under review by SS-38, in follow-up to UFLS study, parallel with Task 5.</p> <p>PJM issued a RFP for dynamic load modeling – TFSS will track this.</p> <p>Load modeling is significant in limiting island simulations (CT & SENY). SS-38 is investigating load modeling efforts in other regions.</p>	<p>Low</p> <p>Review expected fall 2008</p> <p>Ongoing</p>