

Consideration of Comments on Successive Ballot — Underfrequency Load Shedding (Project 2007-01) Date of Successive Ballot: September 24, 2010- October 4, 2010

Summary Consideration: A successive ballot was conducted from September 24-October 4, 2010 and achieved a quorum and an overall weighted segment approval of 81.72%. There were some comments submitted with both affirmative and negative ballots, and all of those comments and the drafting team's consideration of those comments, are included in this report.

Some balloters suggested that the SDT clarify the term "regional boundaries" in Requirement R2 part 2.3. The SDT made a minor change intended to clarify that "regional boundaries" are the "regional entity area boundaries". The SDT considers this change to be a clarifying change that does not substantively change the standard.

Some comments indicated that the Planning Coordinator (PC) should be replaced by the Reliability Coordinator (RC). Wide Industry support exists for the Planning Coordinator as the correct Functional Model entity to develop the UFLS program based on its wide-area view and expertise in the studies necessary to assess UFLS program performance. In addition, the assignment of these functions to the Planning Coordinator is consistent with the role as defined in the Functional Model Version 5 which says that the Planning Coordinator is: "The functional entity that coordinates, facilitates, integrates and evaluates (generally one year and beyond) transmission facility and service plans, and resource plans within a Planning Coordinator area and coordinates those plans with adjoining Planning Coordinator areas..." The Reliability Coordinator is defined as: "The functional entity that maintains the Real-time operating reliability of the Bulk Electric System within a Reliability Coordinator Area." The Reliability Coordinator is not the appropriate entity to establish and assess UFLS programs which is a planning function not a real-time function.

Several comments indicated a concern that Requirement R14 does not go far enough and in other cases is not necessary on the basis that it is an administrative requirement. The SDT added Requirement R14 in response to comments received during the initial ballot conducted in July, 2010 that it was necessary for the Planning Coordinators to involve the UFLS entities in the development of the UFLS program and schedule for implementation. The SDT believes the UFLS Entities should have input into the process as provided in Requirement R14, but Requirement R14 cannot go further to require mutual agreement or concurrence due to the problem that one entity's compliance would be dependent on what another entity does.

Some comments indicated that the Transmission Owners (TOs) in the applicability is confusing considering they are included in "UFLS Entities" and proposed to modify the applicability section to clarify the distinction between 4.2 and 4.3 in the Applicability Section. The SDT thinks that Requirement R10 clearly establishes what is required (and why) of the Transmission Owners: provide automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage as a result of underfrequency load shedding if required by the UFLS program determined by the Planning Coordinator(s).

Several comments indicated that Requirements R8, R9 and R10: should require that the format and schedule be agreed upon by all the parties involved. Including a requirement in a standard that requires that entities agree with one another is problematic. It is possible that such a requirement could lead to compliance concerns because to fulfill the obligation of the requirement an entity will be dependent on another organization to be in compliance with the requirement. The alternative is that including all entities could potentially lead to compliance issues if they cannot reach agreement making all entities non-compliant.

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If you feel that the drafting team overlooked your comments, please let us know immediately. Our goal is to give every comment serious consideration in this process. If you feel there has been an error or omission, you can contact the Vice President and Director of Standards, Herb Schrayshuen, at 609-452-8060 or at herb.schrayshuen@nerc.net. In addition, there is a NERC Reliability Standards Appeals Process.¹

Voter	Entity	Segment	Vote	Comment
Kirit S. Shah	Ameren Services	1	Negative	<p>(1) Requirement R3 should be modified, as stated below, to reflect the need for the Planning Coordinator to recognize and use existing UFLS programs, which have been in place and functional for perhaps decades, as a starting point, rather than 'starting over from scratch': " R3. Each Planning Coordinator shall consider the existing UFLS programs that are in place, and working with the UFLS entities and Transmission Owners , propose modifications to the UFLS program, including notification of and a schedule for implementation by UFLS entities within its area, as needed to meet the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance = [(load - actual generation output) / (load)], of up to 25 percent within the identified island(s). "</p> <p>Response: The SDT expects that Planning Coordinators will not be developing modifications to UFLS programs unless an assessment pursuant to Requirement R4 identifies deficiencies that prevent meeting the performance characteristics in Requirement R3. Although the proposed revision suggests that Planning Coordinators consider existing programs, it does not provide any additional incentive beyond the practical incentive that already exists with the existing requirement. In addition, the SDT added explanatory examples in the implementation plan to illustrate that during the phase-in period a Planning Coordinator may validate the existing program against the performance requirements to ensure the performance characteristics in Requirement R3 are met.</p> <p>(2) Requirement 14 only requires Planning Coordinator to provide a written response to the written comments submitted by the UFLS entities and Transmission Owners before finalizing its UFLS program. While R14 is a step in the right direction, it still provides the Planning Coordinator the authority to develop and pursue items 14.1, 14.2 and 14.3 without active participation of the UFLS entities and Transmission Owners in the process. An opportunity to submit written comments and receive written response is not the same as active involvement. The language of R14 should be modified such that the Planning Coordinator is required to provide for greater involvement of and coordination with the UFLS entities and</p>

¹ The appeals process is in the Reliability Standards Development Procedure: http://www.nerc.com/files/RSDP_V6_1_12Mar07.pdf.

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				<p>Transmission Owners in developing items 14.1 -14.3.</p> <p>Response: A requirement that the Planning Coordinators provide for involvement of and coordination with the UFLS entities and Transmission Owners does not provide a clear measure as to what constitutes “involvement” and “coordination.” Industry comments have supported that the Planning Coordinator is the correct Functional Model entity to develop the UFLS program based on its wide-area view and expertise in the studies necessary to assess UFLS program performance. The SDT believes the UFLS Entities should have input into the process as provided in Requirement R14, but cannot go further to require mutual agreement or concurrence due to the problem that one entity’s compliance would be dependent on what another entity does.</p> <p>(3) The previous version included curves out to 10,000 seconds where generators trip frequencies had to be modeled. This version includes revised curves, which is ok; but, a clarification is needed on whether or not to include generators with trip times longer than 100 seconds</p> <p>Response: Requirement R3 indicates that simulations must be run for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached. The time axis on the graphs in Attachment 1 was reduced to reflect this requirement. It is not necessary to model underfrequency protection that would operate beyond the end of the simulation.</p>
Paul B. Johnson	American Electric Power	1	Affirmative	In R2.3 suggest clarification be provided for the terms “regional boundaries”
Raj Rana	American Electric Power	3		
Brock Ondayko	AEP Service Corp.	5		
Edward P. Cox	AEP Marketing	6		
<p>Response: The SDT made a minor change intended to clarify that “regional boundaries” are the “Regional Entity area boundaries” in Requirement R3 part 2.3.</p>				
Robert D Smith	Arizona Public Service Co.	1	Negative	The standard is complicated and too prescriptive. It does not allow enough flexibility to Planning Coordinator and does not account for safety nets.

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Mel Jensen	APS	5		
<p>Response: The SDT cannot fully consider the comment without additional detail. However, the SDT believes the approach taken provides the Planning Coordinators the greatest flexibility by defining <u>what</u> performance characteristics the UFLS program must meet to support system reliability rather than defining <u>how</u> the Planning Coordinators are to design the UFLS program.</p>				
Paul Rocha	CenterPoint Energy	1	Negative	<p>In response to previous CenterPoint Energy comments, the SDT admits that island identification is subjective; however, the SDT has not made any significant changes in PRC-006-1 Draft 5 to address the confusion on island identification. In addition, the recent Webinar (September 17, 2010) stated “PC must have some criteria (R1), though not necessary that the criteria produce islands.” R2 requires a PC to identify one or more islands. Again from the Webinar; “One island must be the regional footprint (R2.3) so as to preserve existing coordination of UFLS at regional level.” Since R1 does not require the criteria to produce islands and R2 only requires one island, i.e. the regional footprint could suffice, it appears R1 and R2 require activities that are unnecessary and produce no meaningful product and therefore offer no enhancement of reliability to the BES above the current Standard. A reliability standard should have clearly defined requirements. CenterPoint Energy believes the islanding requirements are low level facilitating requirements that are more appropriately and inherently monitored under various higher-level performance-based requirements. Essentially, requirements R1 and R2 should be deleted. Alternatively, if the SDT feels compelled, for whatever reason, to maintain the proposed islanding requirements, CenterPoint Energy proposes adding wording to R1 along the lines of the SDT comments in the Webinar (September 17, 2010) and the Consideration of Comments. That is, concerning the criteria required for R1, clarify that it is “... not necessary that the criteria produce islands” and that R1 “does not mean that islands must be identified from a Planning Coordinator’s R1 criteria.”</p>
<p>Response: Past system disturbances including the August 14, 2003 Northeast Blackout demonstrate the value of identifying and assessing islands that may form. Identification and assessment of islands other than along regional boundaries, where they may form, offers a significant enhancement to reliability and justification for Requirements R1 and R2. The identification of at least one island is essential to serve as the basis for designing and assessing the UFLS program. The intent of R1 is the identification of islands that may have more than an insignificant probability of occurring and it is therefore desirable to use these, if there are any, in assessing UFLS program performance. However, if none are identified by the R1 criteria, that is still acceptable and the region or interconnection alone will suffice as the basis for the design assessments. So the result of R2 should be at least one island as explained during the webinar. Again, the SDT recognizes that it is possible that the R1 criteria yield no islands which is further justification, besides regional coordination, for including Requirement R2 Part 2.3 as it is important that at least one island serve as the basis for designing the UFLS program.</p>				

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Danny McDaniel	Cleco Power LLC	1	Negative	<p>In the Applicability section of PRC-006, Planning Coordinator should be changed to Reliability Coordinator. This would allow the entity which has the highest authority to determine what is best for its region.</p> <p>Response: Wide industry support exists for the Planning Coordinator as the correct Functional Model entity to develop the UFLS program based on its wide-area view and expertise in the studies necessary to assess UFLS program performance. In addition, the assignment of these functions to the Planning Coordinator is consistent with the role as defined in the Functional Model version 5 which says that the Planning Coordinator is: "The functional entity that coordinates, facilitates, integrates and evaluates (generally one year and beyond) transmission facility and service plans, and resource plans within a Planning Coordinator area and coordinates those plans with adjoining Planning Coordinator areas..." The Reliability Coordinator is defined as: "The functional entity that maintains the Real-time operating reliability of the Bulk Electric System within a Reliability Coordinator Area." The Reliability Coordinator is not the appropriate entity to establish and assess UFLS programs which is a planning function not a real-time function.</p> <p>For EOP-003, R5, Severe VSL, please add the statement "as directed by the requirement" as noted in the other requirements VSL.</p> <p>Response: The proposed change is outside the scope of the supplemental SAR for this project to revise the requirements specific to Underfrequency Load Shedding in EOP-003-1 to remove inconsistencies and redundancies with PRC-006-1.</p>
Bryan Y Harper	Cleco Utility Group	3		
Matthew D Cripps	Cleco Power LLC	6		
Robert Martinko	FirstEnergy Energy Delivery	1	Affirmative	<p>FE appreciates the SDT's hard work on this project and is casting an Affirmative vote. Also, we offer the following comments and suggestions: We anticipate that Planning Coordinators and UFLS Entities will work together to reach consensus on the implementation schedules. However, we still believe that the standard or implementation plan should explicitly afford the UFLS entity at least 12 months to implement any new capital equipment, and at least 3 months to implement setting changes on existing equipment. Also, we believe that the standard should explicitly require that the PC solicit input into the final draft of the program from its UFLS Entities.</p> <p>Response: Thank you for your support. The SDT expects that the Planning Coordinators will consider input from the UFLS entities when establishing their UFLS program and schedule for implementation per Requirement R14 Part 14.1. The SDT also expects that as the Planning Coordinators fulfill their role as described in the Functional Model, including coordinating with the Transmission Owners and Distribution Providers, they will not make unilateral decisions without considering</p>
Kevin Querry	FirstEnergy Solutions	3		
Kenneth Dresner	FirstEnergy Solutions	5		
Mark S Travaglianti	FirstEnergy Solutions	6		

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Douglas Hohlbaugh	Ohio Edison Company	4		<p>the input from the UFLS entities (as provided for in Requirement R14 or otherwise). The SDT debated on whether to include a minimum implementation time frame as suggested, but concluded that selecting a minimum time could still not guarantee sufficient lead time, the time frame must be based on the scope of the program modifications on a case-by-case basis, and any particular time frame would be difficult to justify for a continent-wide standard.</p> <p>Lastly, in the rare case of any concerns among the UFLS entities of the PC’s UFLS program, we suggest an enhancement to require that the PC have a dispute resolution process. To incorporate our comments above, we have the following proposed wording for Requirement R14: "R14. Each Planning Coordinator shall meet the following during the development of a new UFLS program and during subsequent revisions of the program [VRF: Low][Time Horizon: Long-Term Planning]: 14.1. Submit an initial draft of its UFLS program for review and feedback by the identified UFLS Entity before the UFLS program is finalized. 14.2. Assure that the schedule for implementation of a UFLS program affords the UFLS Entity at least 12 months to achieve compliance for any required capital equipment expenditures and installations, and at least 3 months for any required settings changes to existing equipment. 14.3. Have and implement a dispute resolution for cases where the UFLS Entity and the Planning Coordinator cannot reach agreement on the UFLS program.</p> <p>Response: The SDT thinks that adding a requirement to establish a dispute resolution process would go too far in prescribing “how” the Planning Coordinator will fulfill its role rather than what needs to be accomplished to achieve reliability.</p>
Claudiu Cadar	GDS Associates, Inc.	1	Negative	<p>1. Applicability. 4.3. We do not agree with prior SDT response to comment. While SDT response indicates that 4.3 is intended for TOs that may need to switch equipment other than load, however we consider that 4.3 is a redundant assignment since reference to TOs controlling UFLS equipment already included in 4.2.2. We consider that TOs that own control / operate elements other than the UFLS equipments but identified in an UFLS program, should be considered as part of the same category “UFLS entities”. However, if SDT wants to split the TOs into two categories based on the end-use load, and elements other than UFLS equipments, 4.3 should be reformulated to reflect the difference in between the two (this will help to point out to what TOs are the requirements applicable). We suggest adjusting 4.3 such as “Transmission Owners that own Elements identified in the UFLS program other than the UFLS equipment as established by the Planning Coordinators.”</p> <p>Response: The SDT thinks that the Transmission Owner applicability is sufficiently</p>

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				<p>clear and that Requirement R10 clearly establishes what is required (and why) of the Transmission Owners: provide automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage as a result of underfrequency load shedding if required by the UFLS program determined by the Planning Coordinator(s).</p> <p>2. Effective Date. 5. Depending on when this standard becomes mandatory and enforceable, it may fall between entities' budgeting periods. An 18 months implementation would allow for all entities to budget the funds necessary to implement the standard.</p> <p>Response: The SDT expects that the Planning Coordinators will consider input from the UFLS entities when establishing their UFLS program and schedule for implementation per Requirement R14 part 14.1. The SDT also expects that as the Planning Coordinators fulfill their role as described in the Functional Model, including coordinating with the Transmission Owners and Distribution Providers, they will not make unilateral decisions without considering the input from the UFLS entities (as provided for in Requirement R14 or otherwise). The SDT debated on whether to include a minimum implementation time frame as suggested, but concluded that selecting a minimum time could still not guarantee sufficient lead time, the time frame should be based on the scope of the program modifications on a case-by-case basis, and any particular time frame would be difficult to justify for a continent-wide standard.</p> <p>3. Requirements. R2.3. The added wording, which although brings some clarification in how the regional boundaries will be established, can be confusing with respect to the elements included in the UFLS program when for simulation purposes there will be elements either integrated or excluded; the elements comprised in the assessment may not entirely match the list of elements identified by the UFLS program. We consider that the models used in simulation should reflect the correct topology and structure of the BES.</p> <p>Response: The R2.3 added wording (the last sentence of R2.3) is necessary because the contour of some sections of the Regional Entity boundaries in the Eastern Interconnection may cause difficulties when attempting to simulate each Regional Entity area as a single contiguous island. However, once island boundaries are adjusted by mutual consent, and such islands are thereby defined for purposes of UFLS design assessments, there should be no confusion as to which elements are in an island and which are outside, though it is true that UFLS</p>

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				<p>program(s) of Planning Coordinator(s) of a different region may be represented in a portion of a Regional Entity island with adjusted boundaries.</p> <p>4. Requirements. R8. We disagree with SDT response on previous comment. While all this flow of data requires coordination among the UFLS entities, TOs that own equipment as identified in the UFLS program and PCs, we suggest that the proper format and schedule should be agreed upon by all these parties involved, where the standard should specifically state this. Comment applies also to R9 and R10. Response: UFLS entities and Transmission Owners have opportunity for input on the schedule for implementation as provided for by R14. The requirement to supply data (R8) is not onerous and the SDT believes that as the Planning Coordinator may be receiving data from many entities, the PC should be able to determine the schedule and format for efficiency in processing the received data.</p> <p>While the standard does not set a certain schedule, can the SDT explain the timing in the corresponding VSL for R8 Response: The VSLs for R8 refer to days beyond the schedule (that is, date) specified by the Planning Coordinator to receive the data. Requirement R8 says that the Planning Coordinator will establish the format and schedule. The corresponding VSL is an after-the-fact element once the requirement has been violated and since the requirement is “time sensitive” the VSL must establish various levels of severity for non-conformance to the requirement. The VSLs were developed using the SDT Guidelines and conform to the NERC and FERC guidelines for VSLs.</p> <p>5. Requirements. R5, R13. The addition of bullet-pointed methods to approach the coordination of the design assessment or event assessment should be followed by a comment period and written response such in case PCs have not reach the same conclusions of its own individual assessment, otherwise there will be no coordination in that case. We also suggest replacing the bullet points with numbers such as 5.1, 5.2, 5.3 / 13.1, 13.2, 13.3. Response: Unfortunately, a comment period cannot assure coordination either. A previous draft of the standard required Planning Coordinators to reach concurrence, but this was found to be unacceptable to a wide spectrum of industry commenters. Bullets points in a standard indicate that the entity has various options to select from to fulfill its duties as clarified by the term that precedes the list of bullets “through or by one of the following” in Requirement R5 and Requirement R13. Numbers in the standard establish a “must” list. The entities would be required to</p>

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				<p>meet all the items on a numbered list.</p> <p>6. New requirement / measure. The standard should include a requirement so the PCs to communicate their UFLS program, design / event assessment to UFLS entities and TOs involved (which own elements identified by the program or assessment). Appropriate measures for retaining evidence should be also included.</p> <p>Response: Requirement R3 includes notification to the UFLS entities of the UFLS program and schedule for implementation. Event assessments do not directly affect UFLS entities unless a redesign is in order in which case R3 would again require notification. Evidence retention is specified in the Compliance Section, D 1.2.</p>
Michelle Rheault	Manitoba Hydro	1	Negative	The current draft standard did not consider most Manitoba Hydro and MRO concerns submitted during the commenting period.
Greg C Parent		3		
Daniel Prowse		6		
<p>Response: The SDT considered all comments received during development of the standard. The SDT made many changes to the standard in response to industry comments. The SDT acknowledges that it did not modify the standard in response to every comment, but also notes that explanations were provided whenever the SDT decided not to modify the standard in response to comments.</p>				
Terry Harbour	MidAmerican Energy Co.	1	Negative	<p>While the TPL note “b” approach has improved, MidAmerican has concerns that including the wording “review and acceptance” goes beyond the FERC Order 890 Order, process, and intent of including the an open review. Therefore, to align with FERC Order 890, the “review and acceptance” should be replaced with “subject to comment”. Anything more exceeds FERC Order 890 and the reason why the review process was included. In the end, Transmission Owning and Operating entities must have final say in the operation of the grid. Entities can comment, but cannot obstruct Transmission Owning and Operating entities from properly operating the grid or reliability could be reduced.</p>
<p>Response: The phrase “review and acceptance” does not appear in PRC-006-1. The SDT believes this comment may have been intended for another standard and inadvertently submitted as a comment to this ballot.</p>				
Richard L. Koch	Nebraska Public Power District	1	Affirmative	Modeling criteria may need to be changed with the approval of PRC-024-1.

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<p>Response: Thank you for your support. The SDT understands that the generator off-nominal frequency protection coordination curves that will be included in PRC-024 are the same as what is currently included in PRC-006. The intent by both teams is that these curves will continue to be coordinated going forward.</p>				
Kenneth D. Brown	Public Service Electric and Gas Co.	1	Affirmative	<p>The PSEG Companies' vote to approve is based on the following understanding of the standards. The Planning Coordinator is responsible for development and coordination of the overall UFLS programs and assessments. Support from the Transmission Owners and other entities consists of providing the Planning Coordinator with data such as forecasted loads and installed UFLS capability upon request, and to maintain and modify the capability as required, with the understanding that the PRC-006-1 Requirement 14 process will address any TO or other entity concerns. Regarding requirements specified in PRC-006-1 Requirement 10, Planning Coordinators will need to confirm that any automatic switching of capacitors, reactors and particularly transmission lines will not be a detriment to local conditions as specified by the Transmission Owners. Switching of specific transmission lines could result in the further reduction of load in an island, compounding the overvoltage effects.</p>
Jeffrey Mueller	Public Service Electric and Gas Co.	3		
David Murray	PSEG Power LLC	5		
James D. Hebson	PSEG Energy Resources & Trade LLC	6		
<p>Response: The SDT agrees. Thank you for your comments and support of the standard.</p>				
Keith V. Carman	Tri-State G & T Association, Inc.	1	Negative	<p>Tri-State appreciates the hard work by the drafting team and its attempt to address the concerns of many entities by inserting a WECC variance. We also agree that a standard of this nature is necessary to ensure reliable operation of the Bulk Electric System. However, we believe that the functional entity responsible for developing and documenting the UFLS program should be the Regional Entity through its registration as the Reliability Assurer. The drafting team addressed earlier comments in that regard by stating that the drafting team had confirmed "that the Planning Coordinator is the appropriate entity to design UFLS and conduct the other UFLS related activities based on the definition of the Planning Coordinator in the Functional Model Version 5." We do not reach that same conclusion. We do not see any assigned function of the Planning Coordinator that includes UFLS plan development. The NERC Reliability Functional Model Technical Document-Version 5, however, does state that a representative task undertaken by the Reliability Assurer might be to "perform high-level evaluations, such as at a regional or Interconnection level, of protection systems as they relate to the reliability of the Bulk Electric System." FERC, when addressing PRC-006-0, also states in Order 693, Paragraph 1480 "The Commission expects that this function will pass from the regional reliability organization to the Regional Entity after they are approved." This</p>
Janelle Marriott		3		

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				comment would affect the Applicability section as well as nearly all the requirements in the continental standard and in the WECC variance.
<p>Response: The SDT believes that the WECC variance specifically addresses this concern by requiring a single coordinated program in the WECC interconnection. The Planning Coordinators will need to work together on this coordinated, region-wide program. The SDT believes the Planning Coordinator is still the appropriate entity to perform this function. In addition, the assignment of these functions to the Planning Coordinator is consistent with the role as defined in the Functional Model version 5 which says that the Planning Coordinator is: "The functional entity that coordinates, facilitates, integrates and evaluates (generally one year and beyond) transmission facility and service plans, and resource plans within a Planning Coordinator area and coordinates those plans with adjoining Planning Coordinator areas...The Planning Coordinator is responsible for assessing the longer-term reliability of its Planning Coordinator area. While the area under the purview of a Planning Coordinator may include as few as one Transmission Planner and one Resource Planner, the Planning Coordinator's scope of activities may include extended coordination with integrated Planning Coordinators' plans for adjoining areas beyond individual system plans. By its very nature, Bulk Electric System planning involves multiple entities."</p>				
John Tolo	Tucson Electric Power Co.	1	Negative	<p>The primary concern identified is that the current proposal does not require coordination within the interconnection. The standard should require the PCs within an interconnection to coordinate a UFLS Design with all other PCs within the interconnection and that the PCs should be required to develop a coordinated interconnection wide UFLS Design. As proposed the standard could conceivably result in as many different UFLS plans within WECC as there are Planning Coordinators. Additionally, the proposed standard fails to address UFLS relays which are currently part of the existing program which are owned by the customer. Recognition of customer owned relays is critical to have a successful program. To assure areas are covered the LSE needs to be included in the Applicability section. A third concern is the proposed standard attempts to establish continent wide frequency-time curves and eliminate discrete set points. This approach fails to recognize the unique characteristics of the four individual interconnections. Frequency-time curves do not allow for specific and defined measurements and will leave individual entities defaulting to the lowest common denominator. If frequency-time curves are intended to define the boundaries, the determination of discrete set points would fall into the hands of the PCs leading to disagreements among entities. In addition, to determine the frequency-time curves through stability and dynamic modeling, one must establish discrete set points. Frequency-time curves are reverse engineering and require justification and correlation to the reliability of the interconnections - no such justification has been provided.</p>
<p>Response: The WECC variance included with this most recent revision of the standard address most, if not all, of these concerns, which are specific to the WECC interconnection. Please review the justification for the WECC variance included with the ballot of draft 5 of the standard.</p>				
Allen Klassen	Westar Energy	1	Negative	Not enough time for study completion and implementation.

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<p>Response: The SDT believes that there is ample time to complete the study. The implementation schedule is set by the Planning Coordinator, not the standard.</p>				
Kim Warren	Independent Electricity System Operator	2	Affirmative	<p>We thank the drafting team for its response to the issues raised during the last ballot. Notwithstanding our 'AFFIRMATIVE' vote on this occasion, we continue to have several concerns as follows: We believe the generating unit and facility capacities specified in Requirement R4 are not appropriate. In our view, as more renewable energy projects are developed in the future, the significance of generating units and facilities throughout North America that do not meet those thresholds will increase, as is the case in Ontario at present. We will pursue this issue as suggested, as a variance to the NPCC regional UFLS standard which is currently under development where we hope it will be adequately addressed.</p> <p>Response: Thank you for your support of the standard. We believe that pursuing this issue in a regional standard is appropriate if the NPCC system requires lower thresholds.</p> <p>Further, we view the generator overfrequency trip modeling curve as overly conservative. Having higher overfrequency trip thresholds is highly desirable since this will provide greater flexibility to the PC in designing its UFLS program in situations where over-generated islands are formed. We will pursue this matter further under Project 2007-09 - Generator Verification, as part of the continued development of PRC-024-1. We expect that if changes to this curve are made in PRC-024-1, they will be reflected in PRC-006-1.</p> <p>Response: Thank you for your support of the standard. We believe that pursuing this issue with the Generator Verification SDT is an appropriate method for pursuing your concern. If the overfrequency trip curve in PRC-024 is raised a SAR should be submitted to request corresponding changes to PRC-006.</p> <p>Finally, we would like to know what recourse a PC will have if it is unable to design an effective UFLS program due to the tight constraints imposed by the UFLS performance characteristics.</p> <p>Response: The SDT does not believe that designing a UFLS program that satisfies the performance curves for the required imbalance level will be a problem.</p>
Jason L Marshall	Midwest ISO, Inc.	2	Negative	<p>While we continue to agree with the purpose statement of the draft UFLS standard, we have continuing concerns regarding the draft standard that have not been resolved. We believe the standard goes much farther than the purpose statement, is too prescriptive, and includes too many administrative requirements. R14 is an</p>

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				<p>administrative requirement that establishes a stakeholder process which has no demonstrated reliability benefit. It should be removed. UFLS relays already are installed and coordinated today. The standard needs should be simplified to reflect this reality. We believe the standard should not be more complicated than establishing a requirement to have coordinated UFLS relays and making pertinent information available on the UFLS relays and program to the reliability entities with a need to know. The purpose can be accomplished in many fewer requirements than the 14 proposed requirements.</p> <p>Response: The simplified standard requirements suggested in this comment would constitute a fill-in-the-blank standard similar to the existing PRC-006-0 which the Commission did not approve in Order No. 693. The SDT believes the proposed standard does recognize existing programs and expects that Planning Coordinators will not be developing modifications to UFLS programs unless an assessment pursuant to Requirement R4 identifies deficiencies that prevent meeting the performance characteristics in Requirement R3. Ensuring coordination of UFLS relays is not as easy as just saying that UFLS relays shall be coordinated. The SDT believes the standard achieves a reasonable balance between prescription and autonomy. Though R14 is administrative and procedural, it has the support of many industry commenters as a means by which Distribution Providers and Transmission Owners may have input on what they will be required to implement and when.</p> <p>While we agree that it makes sense to develop a frequency envelope to ensure it is coordinated across the Interconnection, we do not believe there is a need for Volts/Hz limit in 3.3.</p> <p>Response: The SDT believes there is a need for V/Hz requirements because shedding load will cause voltages to climb, which may cause excitation systems / voltage regulators to reach the end of their range, which can lead to a V/Hz condition that could cause generators to trip through GSU protection or other similar protection systems. Tripping of generation due to preventable V/Hz conditions may exacerbate an already precarious underfrequency condition. The SDT believes that this threat to UFLS effectiveness should not be overlooked.</p> <p>We continue to disagree with the need to identify islands. While some areas of the BES have obvious islands such as the Florida peninsula, most of the BES does not form obvious islands and trying to predict how islands will form is arbitrary and unnecessary and provides no clear benefit to reliability. Other requirements that build on this islanding concept are unnecessary as well. For instance, we do not</p>

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				<p>believe it is necessary or even beneficial to perform dynamic simulations of the UFLS program in areas that do not have natural islands. These simulations involve contingencies to such extremes that it stretches the limits of the analysis software and provides arbitrary results with questionable value. While these studies have been attempted in the past by some NERC regions, some of these very studies have stated within their documentation that the island boundaries are completely arbitrary and don't correspond to any historical or conceivable islanding event. Furthermore, an effective UFLS scheme can be designed without simulations.</p> <p>Response: Past system disturbances including the August 14, 2003 Northeast Blackout demonstrate the value of identifying and assessing islands that may form. Identification and assessment of islands other than along regional boundaries, where they may form, offers a significant enhancement to reliability and justification for Requirements R1 and R2. Islands, whether arbitrary or real, also need to be identified to conduct UFLS design assessments. The intent of R1 is the identification of islands that may have more than an insignificant probability of occurring and it is therefore desirable to use these, if there are any, in assessing UFLS program performance. However, if none are identified by the R1 criteria, that is still acceptable and the region or interconnection alone will suffice as the basis for the design assessments. The SDT agrees that effective UFLS programs can be designed without simulations. However, simulations are necessary to at least supply the evidence that a UFLS design can be effective and may supply insights toward a more effective design.</p> <p>We question the need for R11 and R13 given NERC's recent efforts to develop an event analysis process and focus on becoming a learning organization. NERC's process already compels registered entities to do their own event investigation and UFLS triggers are already included in Category 2. Why do we need requirements for event analysis in this standard as well?</p> <p>Response: The SDT originally planned to cover event analysis requirements through the established NERC governance as suggested, but subsequent conversation with FERC staff led to the conclusion that requirements in PRC-009-0, an existing FERC approved standard which will be retired with the adoption and regulatory approval of PRC-006-1, cannot simply be dropped. As a result, the SDT found it necessary to include the event analysis requirements of PRC-009 as described in R11 and R13.</p>

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Bruce Krawczyk	ComEd	3	Negative	<p>There remains confusion about multiple Planning Coordinators with potentially different criteria enforcing differing mitigations within postulated islands that may overlap amongst any number of PCs. WECC made this same argument and was subsequently granted a separate set of Requirements to alleviate this confusion. It doesn't seem fair that the Eastern Interconnection wouldn't also be able to enjoy that same degree of certainty and ability to adequately plan.</p> <p>Response: The WECC Variance was added in response to a specific request from the WECC entities. The SDT notes however, that in general industry comments raised significant concerns with the compliance implications of forcing entities to reach agreement. The SDT acknowledges that if a Distribution Provider's area is covered by more than one Planning Coordinator, it is possible for the Distribution Providers to be required to adhere to different programs in different parts of its area. This is most likely to occur when a Distribution Provider area includes portions of more than one region. Should this situation occur, the process defined in Requirement R14 allows for UFLS Entities to provide input to the Planning Coordinators regarding the impact of proposed UFLS program modifications.</p> <p>Exelon's previously stated concern that there is not a requirement that all load participate equally in maintaining frequency has not been addressed.</p> <p>Response: The SDT continues to believe that this is a detail best addressed during the UFLS program design.</p> <p>There is a lot of confusion about the interaction of generation with load regarding this frequency standard. This standard states that there is no applicability to generation owners or operators, yet the PCs are required to obtain data from GOs. There is also a V/Hz requirement that seems to apply to generators although it is not specifically stated as such.</p> <p>Response: The Planning Coordinators are not required to model the generator underfrequency and overfrequency trip points until PRC-024 is approved, after which time the data will become available. The V/Hz requirement is a requirement on the Planning Coordinator to assess V/Hz condition in simulations and does not place any requirements on the Generator Owner, nor does it require the Planning Coordinator to obtain any data from the Generator Owner.</p> <p>There needs to be coordination between load and generation to maintain frequency across an interconnection or within an island and that cooperation is not addressed in this standard. There may be another standard in development that applies to</p>

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				<p>generation addressing some or all of the elements to maintain frequency and perform adequate studies, but that should not be assumed to be the case in the development of an enforceable standard. There is confusion regarding Exhibit 1 and how the generator curve requirements and load shape requirements are to be mapped into future requirements.</p> <p>Response: The coordination between load and generation is being achieved through the coordination of standards PRC-006 and PRC-024. The UFLS SDT and the Generator Verification SDT have coordinated the requirements in the two standards to achieve the necessary reliability objective that generator tripping will not impinge on UFLS program effectiveness. Following the previous ballot the SDT added annotation to Attachment 1 to clarify application of the curves</p> <p>Islanding criteria should be consistent and developed through a standards process that allows development through a stakeholder process. This proposed standard circumvents the NERC process and requires PCs to unilaterally impose criteria without sufficient guidance or feedback. There should be a single set of criteria for the determination of an island, which is consistent across the interconnection, unless a specific geographic or regional exception is identified. The standard should state that even if differing islanding criteria are allowed for each PC, the Planning Coordinator with responsibility for the footprint should have sole authority for determining and modifying the criteria within that footprint.</p> <p>Response: The SDT believes that due to differences in physical system characteristics between regions, issues such as how islands are identified are best left to the Planning Coordinators. Comments received during development of the standard indicate industry support for this approach. It is certain that there are many valid approaches to criteria for island identification and any one may be as good as another. A single set of criteria is not appropriate. The standard only requires that Planning Coordinators establish criteria to identify islands for the purpose of conducting their UFLS design assessments, thus the Planning Coordinators will not be unilaterally imposing criteria on other entities. The SDT believes the standard already provides each Planning Coordinator with sole responsibility for developing island identification criteria for its area, although to provide coordination of UFLS programs, a Planning Coordinator may be required to assess an island identified through application of an adjacent Planning Coordinator's criteria in an and adjacent area.</p> <p>There should be some recognition in the standard that UFLS schemes currently exist and effort should be made to avoid needlessly changing relays or settings on</p>

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				<p>many thousands of installations if some arbitrary and common set points were to be determined by the PC, thus causing needless expense. It is likely desirable to have slightly different settings for UFLS across a footprint so as to not create load changes that are too abrupt.</p> <p>Response: The SDT agrees that arbitrary changes to UFLS programs could result in needless effort and expense. The SDT expects that Planning Coordinators will not be developing modifications to UFLS programs unless an Assessment pursuant to Requirement R4 identifies deficiencies that prevent meeting the performance characteristics in Requirement R3. The process defined in Requirement R14 allows for UFLS Entities to provide input to the Planning Coordinators regarding the impact of proposed UFLS program modifications.</p>
David A. Lapinski	Consumers Energy	3	Affirmative	<p>While we recognize that changes to R2 of EOP-003-2 are not within the scope of the SAR, we are of the opinion that R2 needs significant revision. The vague concept of "Shall establish plans..." could be satisfied by a document that says that UVLS shall be installed by January 1, 2052. It is a plan, but probably not a very good one. R2 seems to establish no requirement for a good plan, no requirement that a plan be implemented, etc. If it is possible for the PRC-006-1 SDT to pass along this comment to the SDT working on EOP-003, it would be appreciated.</p>
David Frank Ronk		4		
James B Lewis		5		
<p>Response: Thank you for your comments and support. The SDT that is working on revising EOP-003 will be posting the proposed revisions to EOP-003 at a future date. You will have an opportunity at that time to provide your comments on EOP-003.</p>				
Henry Ernst-Jr	Duke Energy Carolina	3	Affirmative	<p>There is a typographical error on the "High" VSL for EOP-003-2 Requirement R3. The phrase "or less" after 15% should be struck.</p>
<p>Response: Thank you for your support. The proposed change is outside the scope of the supplemental SAR for this project to revise the requirements specific to Underfrequency Load Shedding in EOP-003-1 to remove inconsistencies and redundancies with PRC-006-1. The SDT suggests that the commenter submit this concern to the team working on project 2009-03.</p>				
Thomas C. Mielnik	MidAmerican Energy Co.	3	Negative	<p>Curves rather than a table results in unrealistic compliance expectations.</p>
<p>Response: The SDT converted the performance characteristics for frequency-time limits from tabular format to curves in response to industry comments. The SDT also has added the equations in tabular format that define the curves in order to address compliance concerns associated with the lack of precision associated with reading values off the graph. The SDT believes that providing the requirement in both tabular and graphical format should address any compliance concerns related to the curves.</p>				

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James R. Keller	Wisconsin Electric Power Marketing	3	Negative	During the 9/17/10 Webinar we commented that our company, as a DP, is covered by two Planning Coordinators. Other entities also indicated a similar situation during the Webinar. In response, the SDT stated that this situation was not taken into consideration and further commented that this situation appears to be a registration issue. The reality is this situation exists and the standard as written does not have a strong enough mechanism to prevent two or more Planning Coordinators from designing respective UFLS programs with conflicting settings for the UFLS Entity that the two Planning Coordinators cover.
Anthony Jankowski	Wisconsin Energy Corp	4		Response: Two overlapping Planning Coordinators was not intended when the function was defined; however, because of the registration these scenarios exist.
Linda Horn	Wisconsin Electric Power Co.	5		<p>The SDT does not believe the standard should be adjusted since the tasks assigned to the Planning Coordinator align with the existing definition and tasks aligned with this entity in the current version of the Functional Model. If the case of two overlapping Planning Coordinators persists, it should behoove them to coordinate their designs in such fashion that a DP is not presented with a situation in which it is impossible to achieve compliance.</p> <p>The Planning Coordinator coordination in Requirement R5 appears to be the standard's main method for attempting to prevent conflicting UFLS program designs. However, the sub-bullets in R5 are a choice of three options, the last of which does not force a resolution of Planning Coordinators' differences. The first two sub-bullets should not be choices, but required actions. The last sub-bullet needs to be removed as it does not force a resolution when there are conflicts/differences in UFLS program designs. R13 should be revised to follow this same concept.</p> <p>Response: During development of this standard the industry comments raised significant concerns with the compliance implications of forcing entities to reach agreement. The SDT agrees that the first two bullets in Requirements R5 and R13 are preferable methods for demonstrating compliance. However, the SDT also believes that the third bullet provides Planning Coordinators a necessary method to comply without reliance on other entities and the SDT expects providing recommendations to the other Planning Coordinators and the ERO will lead to resolution of issues.</p> <p>In response to comments and during the Webinar, the SDT stated that it anticipates the assumption of burden by UFLS Entities for generators that do not conform to the PRC-024 underfrequency/overfrequency tripping curves will not be significant. We continue to believe that ignoring generator responsibilities due to possible small</p>

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				<p>burden is not acceptable, as in some areas the burden may be significant and unwarranted without an obligation on the generator. Since the standard requires the study of the effects of non-conforming generators, the SDT must feel that the effects of non-conforming generators may be significant.</p> <p>Response: The PRC-024-1 curves were chosen in view of permissible off-nominal frequency time durations advised by major generator manufacturers and in view of existing regional guidelines on generator off-nominal frequency protection. The team’s expectation, therefore, is that the amount of non-conforming generation will be small. Some regions currently have generator under-frequency tripping characteristic guidelines that are of higher frequency and of shorter time delay than the PRC-024-1 Attachment 1 curve allowing generators to trip sooner or at higher frequencies. We expect that this may initially produce a significant quantity of non-conforming generators in some regions due to the settings of under-frequency relays, but that there should generally be no particular technical reason for not resetting these relays to conform to the PRC-024-1 Attachment 1 curves once that standard becomes enforceable. The continent-wide standard does not prevent regional standards from requiring compensatory load shedding by Generator Owners thus shifting the burden of responsibility.</p> <p>It is for the above reasons that we continue to believe that the UFLS program which is ultimately implemented by the UFLS Entity needs to be mutually agreed to between the Planning Coordinator and the UFLS entity.</p> <p>Response: Requiring mutual agreement or concurrence between entities was found to be unacceptable by many industry commenters due to one entity’s compliance being dependent on what another entity does. Industry comments have supported that the Planning Coordinator is the correct Functional Model entity to develop the UFLS program based on its wide-area view and expertise in the studies necessary to assess UFLS program performance. The SDT also agrees that the UFLS Entities should have input into the process and has added Requirement R14 to address this concern.</p>
Michael Ibold	Xcel Energy, Inc.	3	Negative	Xcel Energy continues to believe that Generators Owners should be subject to this standard. The role of Generator response to under frequency conditions is integral to under frequency plan performance. Comments to previous responses indicate that a pending PRC-024, applicable to GOs, would resolve many of these concerns however the gap should be closed in this standard (PRC-006) until the PRC-024 standard is approved.
Liam Noailles		5		
David F. Lemmons		6		

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<p>Response: In view of the scope of PRC-024 and the already established coordination between it and PRC-006, the SDT does not wish to introduce double jeopardy for Generator Owners. Filling the gap until PRC-024 is approved would lead to confusion regarding development of the same requirement in two standards, would be inefficient, cause extra complexity, and likely take longer than the time frame for approval of PRC-024.</p>				
James A Ziebarth	Y-W Electric Association, Inc.	4	Negative	Y-WEA appreciates the efforts of the SDT in respect to addressing previous comments calling for region-wide UFLS program development. However, Y-WEA concurs with Tri-State G&T in believing that the duties performed by the Planning Coordinator under this proposed standard would be more appropriately carried out by the Reliability Assurer. In addition, the SDT's addition of R14 to the proposed standard is helpful in requiring that the parties developing UFLS programs respond to comments by the UFLS entities, but there is presently no requirement for the UFLS developers to solicit comments from the UFLS entities. For this reason, Y-WEA proposes that R14 be replaced with the following: R14. Each Planning Coordinator shall conduct a comment period before finalizing its UFLS program and shall respond to written comments submitted by UFLS entities and Transmission Owners within its Planning Coordinator area following the comment period and before finalizing its UFLS program, indicating in the written response to comments whether changes will be made or reasons why changes will not be made to the following [VRF: Lower][Time Horizon: Long-term Planning]: 14.1. UFLS program, including a schedule for implementation 14.2. UFLS design assessment 14.3. Format and schedule of UFLS data submittal
<p>Response: The SDT believes that the WECC variance specifically addresses this concern by requiring a single coordinated program in the WECC interconnection. The Planning Coordinators will need to work together on this coordinated, region-wide program. The SDT believes the Planning Coordinator is still the appropriate entity to perform this function.</p>				
Michael J. Haynes	Seattle City Light	5	Affirmative	Rationale: SCL SME concur with WECC's recommendation to approve both proposed PRC-006-1 - Automatic Underfrequency Load Shedding and EOP-003-2 - Load Shedding Plans. Proposed PRC-006 includes a Regional Variance for the Western Interconnection that requires Planning Coordinators to continue regional coordination for Underfrequency Load Shedding Plans, an element missing from the PRC-006 standard balloted in July 2010. Proposed EOP-003-2 removes automatic Underfrequency Load Shedding requirements from EOP-003-2, as they are redundant with PRC-006-1, and to remove from the Balancing Authority requirements for which they are not responsible.
<p>Response: Thank you for your comments and support of the standard.</p>				
Jim D.	JDRJC	8	Negative	Too many administrative requirements and overly complex

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Cyrulewski	Associates			
<p>Response: The SDT cannot fully consider the comment without additional detail. However, the SDT believes the approach taken provides the Planning Coordinators the greatest flexibility by defining <u>what</u> performance characteristics the UFLS program must meet to support system reliability rather than defining <u>how</u> the Planning Coordinators are to design the UFLS program.</p>				
Guy V. Zito	Northeast Power Coordinating Council, Inc.	10	Affirmative	<p>NPCC supports the standard however some reservation exists about a potential "fill in the blank" nature of the requirements. The PC is required to have a UFLS program and this program is required to be followed by the TOs and GOs even though FERC has not seen the specific program. There are targets specified in the standard that a PC must meet however it should be recognized that there are many different potential programs that may meet the target and contain other concerns. It would have been more desirable to have only the basic program targets for the PCs to have in their individual programs in this standard and then, in the companion Regional Standards that the ERO already directed the regions to develop, Have the specific PC program requirements and the specific requirements on the TOs and GOs to follow them. As written currently, the standard requires the TOs and GOs to follow some unapproved and not commission filed program. Compliance with this may be problematic.</p>
<p>Response: Many regions are developing regional standards or have regional criteria that establish the region's UFLS program requirements. The PC is required to notify the UFLS entities of the UFLS program requirements and schedule for implementation as required in Requirement R3. The UFLS entities will know what is expected and when. The SDT recognized that because the characteristics and UFLS needs of regions are different, establishing one UFLS program is unrealistic; however, the standard does propose common performance characteristics that all UFLS programs must meet. This promotes consistency for the benefit of reliability across UFLS programs while not prescribing one program that would excessively restrict regions from designing UFLS programs that best fulfill their needs.</p>				