

Consideration of Comments on PRC-006-NPCC-1 – Frequency Load Shedding

The Regional Reliability Standard PRC-006-NPCC-1 Frequency Load Shedding Drafting Team thanks all commenters who submitted comments on the first posting of the PRC-006-NPCC-1—Automatic Under frequency Load Shedding. These standards were posted for a 45-day public comment period from January 11, 2010 through February 24, 2011. The stakeholders were asked to provide feedback on the standards through a special Electronic Comment Form. There were 11 sets of comments, including comments 29 different people from approximately 22 companies representing 9 of the 10 Industry Segments as shown in the table on the following pages.

http://www.nerc.com/filez/regional_standards/regional_reliability_standards_under_development.html

If you feel that your comment has been overlooked, 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

¹ The appeals process is in the Reliability Standards Development Procedures:
<http://www.nerc.com/standards/newstandardsprocess.html>.

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The Industry Segments are:

- 1 — Transmission Owners
- 2 — RTOs, ISOs
- 3 — Load-serving Entities
- 4 — Transmission-dependent Utilities
- 5 — Electric Generators
- 6 — Electricity Brokers, Aggregators, and Marketers
- 7 — Large Electricity End Users
- 8 — Small Electricity End Users
- 9 — Federal, State, Provincial Regulatory or other Government Entities
- 10 — Regional Reliability Organizations, Regional Entities

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
1.	Group	Mike Garton	Electric Market Policy	X		X		X	X				
Additional Member		Additional Organization	Region	Segment Selection									
1.		Michael Gildea	Dominion Resources Services, Inc.	MRO	5								
2.		Louis Slade	Dominion Resources Services, Inc.	SERC	5								
3.		Connie Lowe	Dominion Resources Services, Inc.	RFC	5								
2.	Group	Denise Koehn	Bonneville Power Administration	X		X		X	X				
Additional Member		Additional Organization	Region	Segment Selection									
1.		Greg Vassallo	BPA, Transmission Customer Service Engineering	WECC	1								
3.	Group	Pat Hervochon	Public Service Enterprise Group	X		X		X	X				
Additional Member		Additional Organization	Region	Segment Selection									
1.		Kenneth Brown	PSE&G	RFC	1, 3								
2.		Dominick Grasso	PSEG Fossil	RFC	5								
3.		Peter Dolan	PSEG ER&T	RFC	6								

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Group/Individual		Commenter	Organization			Registered Ballot Body Segment									
						1	2	3	4	5	6	7	8	9	10
4.		Scott Slickers	PSEG Power NY	NPCC	5										
5.		Eric Schmidt	PSEG ER&T	NPCC	6										
6.		Clint Bogan	Odessa Power Partners	ERCOT	5										
7.		Steven Kimmish	PSEG ER&T	ERCOT											
4.	Group	Frank Gaffney	Florida Municipal Power Agency			X		X	X	X	X	X			
Additional Member		Additional Organization	Region		Segment Selection										
1.		Timothy Beyrle	Utilities Commission of New Smyrna Beach		FRCC	4									
2.		Greg Woessner	Kissimmee Utility Authority		FRCC	1									
3.		Jim Howard	Lakeland Electric		FRCC	3									
4.		Lynne Mila	City of Clewiston		FRCC	3									
5.		Joe Stonecipher	Beaches Energy Services		FRCC	1									
6.		Cairo Vanegas	FPUA		FRCC	4									
7.		Randy Hahn	Ocala Electric Utility		FRCC	3									
5.	Individual	Cynthia S. Bogorad	Transmission Access Policy Study Group			X		X	X	X	X				
6.	Individual	Michael Lombardi	Northeast Utilities			X		X		X					
7.	Individual	J. S. Stonecipher	City of Jacksonville Beach dba/Beaches Energy Services			X								X	
8.	Individual	Dan Rochester	Independent Electricity System Operator				X								
9.	Individual	Don Weaver	New Brunswick System Operator				X								
10.	Individual	Rex Roehl	Indeck Energy Services							X					
11.	Individual	Brian Evans-Mongeon	Utility Services Inc.										X		

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1. Was the proposed standard developed in a fair and open process, using the associated Regional Reliability Standards Development Procedure?

Summary Consideration:

Organization	Yes or No	Question 1 Comment
Dominion Electric Market Policy	No	PRC-006-NPCC-1 was filed concurrently at NPCC and NERC. However, the ballot for this standard has not yet passed at NPCC. Accordingly, this standard is not ripe for NERC consideration. Dominion suggests that NERC suspend this proceeding until the ballot passes at NPCC, and then reopen this proceeding for further comments based on the standard as finally approved by NPCC.
<p>Response: Thank you for your comment. As noted in the NERC Regional Reliability Evaluation Procedure the region may request that NERC consideration of the standard occur concurrent with the anticipated final public comment period in the regional entity's regional standard development process.</p> <p>http://www.nerc.com/docs/sac/rrswg/NERC_Regional_Reliability_Evaluation_Procedure.pdf</p>		
Bonneville Power Administration	Yes	
Transmission Access Policy Study Group	Yes	
Public Service Enterprise Group		As the NPCC process is still ongoing, it is difficult to develop an opinion at this time whether that process was fair and open.
<p>Response: Thank you for your comment. As noted in the NERC Regional Reliability Evaluation Procedure the region may request that NERC consideration of the standard occur concurrent with the anticipated final public comment period in the regional entity's regional standard development process.</p> <p>http://www.nerc.com/docs/sac/rrswg/NERC_Regional_Reliability_Evaluation_Procedure.pdf</p>		
Florida Municipal Power Agency		The NPCC process is still ongoing, but it is our understanding that so far it has been fair and open.

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Organization	Yes or No	Question 1 Comment
<p>Response: Thank you for your comment.</p>		
Northeast Utilities	Yes	
City of Jacksonville Beach dba/Beaches Energy Services	Yes	Yes, This is pretty much what we're doing now with some good success.
<p>Response: Thank you for the comment.</p>		
Independent Electricity System Operator	Yes	
New Brunswick System Operator	Yes	
Indeck Energy Services	No	<p>1) None of our generating plants is a member of NPCC. One of them is not large enough to register for NERC membership and is connected at 34 kV. The pre-ballot review of the regional standard was not posted for public comment. No comment form is available on the public NPCC website. The letter announcing a webinar on 1/4/2011 was dated 1/6/2011. The letter also announced an extension of the comment period from the date of the letter to a week later. The process is patently unfair to generators or others in NPCC that are not members.</p> <p>2) The standard improperly extends NERC standards to non-registered entities. NPCC's authority to implement regional reliability standards issues from its delegation agreement with NERC. NERC has chosen not to extend registration to entities <20 MW or not connected to the BES.</p>
<p>Response: Thank you for your comment.</p> <p>1) According to the NPCC Regional Standards Development Procedure the pre ballot review is not intended for comment. Additionally, the NPCC bylaws promote membership for all registered entities which allow members to actively participate in the development of regional standards.</p> <p>2)The Regional Standard Drafting Team has reviewed your concerns and notes that the NERC Statement of Registry Criteria does not limit registration of generation to those greater than 20MVA. However, the applicability in Section 4 has been revised and Attachment C has been removed.</p>		

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Organization	Yes or No	Question 1 Comment
Utility Services Inc.	Yes	

2. Does the proposed standard pose an adverse impact to reliability or commerce in a neighboring region or interconnection?

Summary Consideration:

Organization	Yes or No	Question 2 Comment
Dominion Electric Market Policy	Yes	See comments (item #1) below under Question 5.
Response: Thank you for your comment. Please see the response developed for item#1 Question 5.		
Bonneville Power Administration	No	
Public Service Enterprise Group		No Comment
Florida Municipal Power Agency	Yes	<p>FMPA questions the need for the proposed regional standard. A continent-wide UFLS standard has been drafted and approved by stakeholders and the NERC Board, and will presumably be filed at FERC in the very near future. That standard is sufficient to protect reliability; the industry should not, at this point in time, be devoting its scarce resources to developing regional standards on the same subject. Reliability Standard PRC-006-1 requires Planning Coordinators to develop UFLS programs. It does not require Regional Entities to develop separate reliability standards.</p> <p>Furthermore, a regional standard on this topic could place the entities in NPCC under a double jeopardy threat since all the entities will need to comply with mandatory NERC and Regional Standards. This double jeopardy threat is exacerbated by the fact that the continent-wide standard requires a periodic review and potential change to the program every five years whereas the NPCC program locks the UFLS relay settings into a regional standard that cannot be changed without FERC approval. If those relay settings need to be changed pursuant to the continent-wide standard, there would be a conflict between the continent-wide standard and the regional standard that could only be resolved through a revision to one of the standards, which would have to be FERC-approved to go into effect. In the meantime, entities would have no choice but to be non-compliant with one of the two standards. NPCC would be better served by being consistent with</p>

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Organization	Yes or No	Question 2 Comment
		<p>NERC's PRC-006-1 and not developing a UFLS program as a regional standard.</p> <p>The draft regional standard's proposed applicability to Generator Owners--including to small, otherwise unregistrable generators--highlights the proposed framework's inappropriateness in the context of continent-wide standards. NERC's PRC-006-1 does not apply to Generator Owners because the frequency protection set points are being covered in PRC-024-1, which is currently with its SDT. Covering generators in a regional PRC-006 will result in confusion and a lack of coordination, including the risk of a conflict between the regional standard and PRC-024-1. If NPCC proceeds down a path of developing a regional standard, at a minimum, applicability to generators should be removed altogether.</p> <p>Furthermore, the proposed NPCC UFLS program is not robust enough to serve the overall reliability of the Eastern Interconnect. The NPCC UFLS program seems to be designed such that a 1% inaccuracy causes the UFLS program to no longer meet performance requirements. This is far too tight of a tolerance for an inherently inaccurate analysis and reflects a lack of robustness of the UFLS program. The Eastern Interconnect would be better protected from an event that causes multiple region instability by a more robust UFLS program. It seems that one of the primary drivers in designing NPCC's UFLS program is to cover the Connecticut island, with roughly 6000 MW of peak load. The SS-38 report titled "Determination of a Threshold for Generator Applicability" dated November 15, 2010 shows in its Table 1 on Page 3 that there is only a 1% margin of error in the supply / demand mismatch in the design of the program (or 60 MW). There are numerous sources of inaccuracy of greater than 1% in the analysis and design of a UFLS program. Hence, since the proposed UFLS program cannot tolerate a 1% error, it is insufficiently robust to protect reliability. A UFLS program more robust than that proposed in this regional reliability standard would benefit other regions in the Eastern Interconnect by helping to defray opportunity for cascading from one region to another. Examples of sources of inaccuracy greater than 1% include:</p> <p>1. Load models are nowhere close to 1% accurate. As an industry, we are unavoidably uncertain of the extent to which electronic and power electronic equipment such as variable speed drives, compact fluorescent lighting, etc., have penetrated customer premises; we cannot know this because we cannot</p>

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Organization	Yes or No	Question 2 Comment
		<p>control customer behavior. In addition, we can only approximate how these devices interact with voltage and frequency excursions. An inaccurate load model showing that load decreases less by voltage than actual, for instance, could result in post-disturbance conditions with a far greater than 1% supply/demand mismatch, outside the NPCC design tolerance. If post-disturbance load is actually 60 MW more than modeled, that disparity has the same impact as tripping an additional 60 MW of generation.</p> <p>2. UFLS relays are typically on individual distribution feeders, each of which have different load profiles, different distributed generation patterns, different levels of important load such as hospitals, and different levels of electronic and power electronic loads, and are in other ways dissimilar to each other and to the overall system load pattern. Hence, load diversity with respect to time of day, day of week, time of season, amount of distributed generation (e.g., generator assistance programs, net-metering and feed-in tariffs), priority of loads, composition of loads, etc., will result in a larger than 1% inaccuracy in the amount of load tripped by the UFLS program. If 60 MW too little load is shed, it has the same impact as tripping an additional 60 MW of generation.</p> <p>3. The continent-wide PRC-006-1 recently approved by the BOT contains a reasonable, but arbitrary assumption of a 25% supply / demand mismatch. The fact that the NERC standard had to choose a relatively arbitrary number shows the inexactness of the science of designing a UFLS program. This inexactness runs counter to a philosophy of designing a UFLS program with only a 1% margin of error; such a UFLS program lacks the robustness of larger design tolerances.</p> <p>4. Many more examples exist of inaccuracies inherent in stability studies and UFLS program design greater than 1%, such as: a) governing systems are difficult and risky to test and their performance characteristic changes with different operating conditions such as temperature, pressure and power level; and b) the partial differential equations and numerical methods that describe the stability response of the system are subject to what mathematicians call "Chaos Theory" and cannot be accurate to within 1%.NPCC mistakenly believes that a 1% design tolerance can be achieved and uses this mistaken belief to include very small generators in its UFLS program. As shown above, a 1% design tolerance cannot be achieved due to the very nature of</p>

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Organization	Yes or No	Question 2 Comment
		<p>variable load and other variables that cannot be modeled to within a 1% margin of error. The correct approach is to determine the range of error inherent in the variables used in performing UFLS program design. If a variable cannot be modeled to within a +/-10% accuracy bandwidth (as is likely the case of loads and load models), the UFLS program should be designed to be robust enough to tolerate this margin of error. By not designing the UFLS program with more reasonable design tolerances, the NPCC program creates unnecessary risk to the reliability of the Eastern Interconnect.</p>
<p>Response: Thank you for your comment. The standard was developed in response to a request from NERC to satisfy FERC Order 693 issued in 2006. At that time, twenty four standards were identified as "fill in the blank" and as a result the FERC directed NERC to modify the individual standards reliance on the Regional Reliability Organization.</p> <p>Additionally, of those twenty four standards, four were identified by NERC and the regions to be regionally specific enough to warrant the development of a regional standard and Under Frequency Load Shedding is one of those four standards.</p> <p>The remaining comments are beyond the scope of Question#2.</p>		
<p>Transmission Access Policy Study Group</p>	<p>Yes</p>	<p>TAPS questions the need for the proposed regional standard. A continent-wide UFLS standard has been drafted and approved by stakeholders and the NERC Board, and will presumably be filed at FERC in the very near future. That standard is sufficient to protect reliability; the industry should not, at this point in time, be devoting its scarce resources to developing regional standards on the same subject. Reliability Standard PRC-006-1 requires Planning Coordinators to develop UFLS programs. It does not require Regional Entities to develop separate UFLS reliability standards. Furthermore, a regional standard on this topic could place the entities in NPCC under a double jeopardy threat since all the entities will need to comply with mandatory NERC and Regional Standards. This double jeopardy threat is exacerbated by the fact that the continent-wide standard requires a periodic review and potential change to the program every five years whereas the NPCC program locks the UFLS relay settings into a regional standard that cannot be changed without FERC approval. If those relay settings need to be changed pursuant to the continent-wide standard, there would be a conflict between the continent-wide standard and the regional standard that could only be resolved through a revision to one of the standards, which would have to be FERC-approved to go into effect. In the meantime, entities would have no choice but to be non-compliant with one of the two standards. NPCC would be better served by being consistent with NERC's PRC-006-1 and not developing a UFLS program as a regional standard. The draft regional standard's proposed applicability to Generator Owners--including to small, otherwise unregistrable generators--highlights the proposed framework's inappropriateness in the context of continent-wide standards. NERC's PRC-006-1 does not apply to Generator Owners because the</p>

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Organization	Yes or No	Question 2 Comment
		<p>frequency protection set points are being covered in PRC-024-1, which is currently with its SDT. Covering generators in a regional PRC-006 will result in confusion and a lack of coordination, including the risk of a conflict between the regional standard and PRC-024-1. If NPCC proceeds down a path of developing a regional standard, at a minimum, applicability to generators should be removed altogether. Furthermore, the proposed NPCC UFLS program is not robust enough to serve the overall reliability of the Eastern Interconnect. The NPCC UFLS program seems to be designed such that a 1% inaccuracy causes the UFLS program to no longer meet performance requirements. This is far too tight of a tolerance for an inherently inaccurate analysis and reflects a lack of robustness of the UFLS program. The Eastern Interconnect would be better protected from an event that causes multiple region instability by a more robust UFLS program. It seems that one of the primary drivers in designing NPCC's UFLS program is to cover the Connecticut island, with roughly 6000 MW of peak load. The SS-38 report titled "Determination of a Threshold for Generator Applicability" dated November 15, 2010 shows in its Table 1 on Page 3 that there is only a 1% margin of error in the supply / demand mismatch in the design of the program (or 60 MW). There are numerous sources of inaccuracy of greater than 1% in the analysis and design of a UFLS program. Hence, since the proposed UFLS program cannot tolerate a 1% error, it is insufficiently robust to protect reliability. A UFLS program more robust than that proposed in this regional reliability standard would benefit other regions in the Eastern Interconnect by helping to defray opportunity for cascading from one region to another. Examples of sources of inaccuracy greater than 1% include:</p> <ol style="list-style-type: none"> 1. Load models are nowhere close to 1% accurate. As an industry, we are unavoidably uncertain of the extent to which electronic and power electronic equipment such as variable speed drives, compact fluorescent lighting, etc., have penetrated customer premises; we cannot know this because we cannot control customer behavior. In addition, we can only approximate how these devices interact with voltage and frequency excursions. An inaccurate load model showing that load decreases less by voltage than actual, for instance, could result in post-disturbance conditions with a far greater than 1% supply/demand mismatch, outside the NPCC design tolerance. If post-disturbance load is actually 60 MW more than modeled, that disparity has the same impact as tripping an additional 60 MW of generation. 2. UFLS relays are typically on individual distribution feeders, each of which have different load profiles, different distributed generation patterns, different levels of important load such as hospitals, and different levels of electronic and power electronic loads, and are in other ways dissimilar to each other and to the overall system load pattern. Hence, load diversity with respect to time of day, day of week, time of season, amount of distributed generation (e.g., generator assistance programs, net-metering and feed-in tariffs), priority of loads, composition of loads, etc., will result in a larger than 1% inaccuracy in the amount of load tripped by the UFLS program. If 60 MW too little load is shed, it has the same impact as tripping an additional 60 MW of generation. 3. The continent-wide PRC-006-1 recently approved by the BOT contains a reasonable, but arbitrary assumption of a 25% supply / demand mismatch. The fact that the NERC standard had to choose a relatively arbitrary number shows the inexactness of the science of designing a UFLS program. This inexactness runs counter to a philosophy of designing a UFLS program with only a 1% margin of error; such a UFLS program lacks the robustness of larger design tolerances. 4. Many more examples exist of inaccuracies

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Organization	Yes or No	Question 2 Comment
		<p>inherent in stability studies and UFLS program design greater than 1%, such as: a) governing systems are difficult and risky to test and their performance characteristic changes with different operating conditions such as temperature, pressure and power level; and b) the partial differential equations and numerical methods that describe the stability response of the system are subject to what mathematicians call "Chaos Theory" and cannot be accurate to within 1%.NPCC mistakenly believes that a 1% design tolerance can be achieved and uses this mistaken belief to include very small generators in its UFLS program. As shown above, a 1% design tolerance cannot be achieved due to the very nature of variable load and other variables that cannot be modeled to within a 1% margin of error.The correct approach is to determine the range of error inherent in the variables used in performing UFLS program design. If a variable cannot be modeled to within a +/-10% accuracy bandwidth (as is likely the case with respect to loads and load models), the UFLS program should be designed to be robust enough to tolerate this margin of error. By not designing the UFLS program with more reasonable design tolerances, the NPCC program creates unnecessary risk to the reliability of the Eastern Interconnect.</p>
<p>Response: Thank you for your comment. The standard was developed in response to a request from NERC to satisfy FERC Order 693 issued in 2006. At that time, twenty four standards were identified as "fill in the blank" and as a result the FERC directed NERC to modify the individual standards reliance on the Regional Reliability Organization.</p> <p>Additionally, of those twenty four standards, four were identified by NERC and the regions to be regionally specific enough to warrant the development of a regional standard and Under Frequency Load Shedding was one of those four standards.</p> <p>The remaining comments are beyond the scope of Question#2.</p>		
Northeast Utilities	No	
City of Jacksonville Beach dba/Beaches Energy Services	No	
Independent Electricity System Operator	No	
New Brunswick System Operator	No	

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Organization	Yes or No	Question 2 Comment
Indeck Energy Services		
Utility Services Inc.	Yes	<p>The standard's incorporation of generation that is unregistered in the ERO Compliance activities will adversely impact reliability. The standard proposes to include generation between 1 MVA and the registration criteria. Without a thorough examination of the impacts of this generation to the compliance, it is unknown how these "new" registered entities will be dealt with. Further, the standard's requirements in certain ways is inconsistent with the underlying study that is the basis for the UFLS program. The standard requires differing curtailment requirements for load versus load being shed for compensatory generation that is above the curve. Reported data is based upon non-coincidentalized readings while the study is predicated upon coincidentalized meter readings. The standards expose Registered Entities to double jeopardy when there is a violation. Compensatory loadshedding can be difficult to achieve when there are no willing players and the objective creates financial incentives to entities to withhold from negotiations.</p>
<p>Response: Thank you for response. The applicability in Section 4 has been revised and Attachment C has been removed.</p> <p>Additionally, the SS-38 study represents the initial baseline for the Under Frequency program within NPCC. Each PC shall conduct and document a UFLS design assessment that determines through dynamic simulation whether the UFLS program meets the minimum performance characteristics as defined in the continent wide draft PRC-006.</p>		

3. Does the proposed standard pose a serious and substantial threat to public health, safety, welfare, or national security?

Summary Consideration:

Organization	Yes or No	Question 3 Comment
Electric Market Policy	No	
Bonneville Power Administration	No	Not that we are aware of. Response: Thank you for your comment.
Transmission Access Policy Study Group	No	
Public Service Enterprise Group		
Florida Municipal Power Agency		
Northeast Utilities	No	
City of Jacksonville Beach dba/Beaches Energy Services	No	
Independent Electricity System Operator	No	
New Brunswick System Operator	No	
Indeck Energy Services	Yes	It proposes to drop 50% of load in some islanded areas at frequencies above 58 hz. If they are islanded, they are no longer a risk to reliability of the system. These islanded areas may be subsidizing the larger areas at great cost and potential safety risk to these customers.

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Organization	Yes or No	Question 3 Comment
		<p>Response: Thank you for your response. The results of studies conducted by the NPCC SS38 technical committee showed that the current frequency response for the islands tested are similar to the responses obtained in Part III of the 2006 UFLS Assessment. Thus the variances proposed by the Regional Standard Drafting Team (RSDT) for the small load serving entities are acceptable according to the current levels of load served by such entities on the NPCC system.</p> <p>SS-38 observed that the draft NPCC standard did not specify an upper limit on the amount of load to be armed for UFLS for LSE's in Table 2 and 3 of the draft standard.</p> <p>SS-38 feels that a cumulative upper limit of 50% would keep the amount of load armed for UFLS by these LSE's (i.e. 50% at the first stage for Table #3 and 25% each at the first and third stages for Table #2) closer to the original program design while providing latitude to accommodate any constraints due to the granularity of loads on a limited numbers of feeders.</p> <p>The data submitted for each Area showed that the amount of load in each of the small LSE categories to be small percentages of the overall peak load for current day system conditions. It is recognized that these upper limits may require revision if system conditions change and more LSEs are classified.</p>
Utility Services Inc.	No	

4. Does the proposed standard pose a serious and substantial burden on competitive markets within the interconnection that is not necessary for reliability?

Summary Consideration:

Organization	Yes or No	Question 4 Comment
Electric Market Policy	No	
Bonneville Power Administration	No	
Public Service Enterprise Group	No	
Transmission Access Policy Study Group	Yes	<p>In requirement R17, the standard would force generators that do not meet the performance requirements in the standard (non-conforming generators) to either: 1) make substantial investments to meet performance requirements imposed on them after they are already interconnected and in commercial operation, or 2) enter an agreement for compensatory load shedding with one of a limited number of entities that can offer such service, and with no market to inform pricing of such service. Either option is a significant burden on the competitiveness of these generators which results in a substantial burden on competitive markets.</p> <p>Also, as discussed in response to Question 2, the 1% design tolerance desired by the NPCC UFLS program design team is a flaw in the design itself; hence, with a more reasonable design tolerance, there is no reliability reason to place this unreasonable burden on small generators.</p> <p>Compensatory load shedding should NOT be allowed for two reasons: 1) the standards should not force agreements to be made; and 2) the UFLS program would become a highly complex scheme with settings that would need to change over time to reflect the status of the non-conforming generator, e.g., if the unit were off-line, then too much load would be "armed" to trip, so, those relay settings would need to be changed when the unit was offline. The complexity of a UFLS program that would have to track the status of non-conforming generators is staggering. For instance, in order to protect the 1% design tolerance of supply / demand balance that the drafters of the standard mistakenly believe is important, the UFLS relay settings would need to change every time the generator changed output. For instance, a non-conforming generator with a capacity of 300 MW would presumably have 300 MW of compensatory load shedding. If it were running at 200 MW, then we would want the 300 MW of compensatory load shedding dropped to 200 MW. How would such a</p>

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Organization	Yes or No	Question 4 Comment
		<p>thing be possible if we are limited to a finite level of distribution circuits whose load varies minute to minute with different load patterns, with varying levels of critical loads (e.g., hospitals) and non-critical loads on those circuits? At what UFLS steps would the compensatory load shedding be adjusted? Would it be multiple steps? If the generator were providing regulation service, the relay settings would need to change minute by minute on different circuits depending on actual loads on those circuits. If the ability to make such minute-by-minute relay changes were not in place, would the generator be barred from participating in the regulation service ancillary services market, further burdening competitive markets? Compensatory load shedding is ill-conceived and highly impractical. The NERC-wide standard recently approved by the BOT takes the correct approach. Existing non-conforming generators of a sufficient size to matter should be modeled and the UFLS program be designed in a robust enough fashion to handle the non-conforming generation.</p>
<p>Response: Thank you for your comment. The RSdT acknowledges the technical challenges of administering the compensatory load shedding program and as a result has developed requirements stating that all new units shall conform to the generator tripping curve.</p> <p>Additionally, to address your concern regarding generators that are already interconnected and in commercial operation, non conforming generators either have existing contracts to provide for compensatory load shedding or have mitigated the conditions that would trip the unit above the appropriate generator tripping curve.</p> <p>These, requirements are contained as criteria within the approved NPCC Directory #12 and are currently in effect throughout the NPCC region.</p> <p>Finally, the NPCC technical committee (SS38) developed reviewed and confirmed the use of tolerances as described in the standard. These studies were reviewed and approved by the NPCC Task Force on System Studies (TFSS) and the Reliability Coordinating Committee (RCC).</p>		
Florida Municipal Power Agency	Yes	<p>In requirement R17, the standard would force generators that do not meet the performance requirements in the standard (non-conforming generators) to either: 1) make substantial investments to meet performance requirements imposed on them after they are already interconnected and in commercial operation, or 2) enter an agreement for compensatory load shedding with one of a limited number of entities that can offer such service, and with no market to inform pricing of such service. Either option is a significant burden on the competitiveness of these generators which results in a substantial burden on competitive markets.</p> <p>Also, as discussed in response to Question 2, the 1% design tolerance desired by the NPCC UFLS program</p>

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Organization	Yes or No	Question 4 Comment
		<p>design team is a flaw in the design itself; hence, with a more reasonable design tolerance, there is no reliability reason to place this unreasonable burden on small generators. Compensatory load shedding should NOT be allowed for two reasons: 1) the standards should not force agreements to be made; and 2) the UFLS program would become a highly complex scheme with settings that would need to change over time to reflect the status of the non-conforming generator; e.g., if the unit were off-line, then too much load would be "armed" to trip, so, those relay settings would need to be changed when the unit was off-line. The complexity of a UFLS program that would have to track the status of non-conforming generators is staggering. For instance, in order to protect the 1% design tolerance of supply / demand balance that the drafters of the standard mistakenly believe is important, the UFLS relay settings would need to change every time the generator changed output. For instance, a non-conforming generator with a capacity of 300 MW would presumably have 300 MW of compensatory load shedding. If it were running at 200 MW, then we would want the 300 MW of compensatory load shedding dropped to 200 MW. How would such a thing be possible if we are limited to a finite level of distribution circuits whose load varies minute to minute with different load patterns, with varying levels of critical loads (e.g., hospitals) and non-critical loads on those circuits? At what UFLS steps would the compensatory load shedding be adjusted? Would it be multiple steps? If the generator were providing regulation service, the relay settings would need to change minute by minute on different circuits depending on actual loads on those circuits. If the ability to make such minute-by-minute relay changes were not in place, would the generator be barred from participating in the regulation service ancillary services market, further burdening competitive markets? Compensatory load shedding is ill-conceived and highly impractical. The NERC-wide standard recently approved by the BOT takes the correct approach. Existing non-conforming generators of a sufficient size to matter should be modeled and the UFLS program be designed in a robust enough fashion to handle the non-conforming generation.</p>
<p>Response: Thank you for your comment. The RSDT acknowledges the technical challenges of administering the compensatory load shedding program and as a result has developed requirements stating that all new units shall conform to the generator tripping curve.</p> <p>Additionally, to address your concern regarding generators that are already interconnected and in commercial operation, non conforming generators either have existing contracts to provide for compensatory load shedding or have mitigated the conditions that would trip the unit above the appropriate generator tripping curve.</p> <p>These requirements are contained as criteria within the approved NPCC Directory #12 and are currently in effect throughout the NPCC region.</p>		

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Organization	Yes or No	Question 4 Comment
<p>Finally, the NPCC technical committee (SS38) developed reviewed and confirmed the use of tolerances as described in the standard. These studies were reviewed and approved by the NPCC Task Force on System Studies (TFSS) and the Reliability Coordinating Committee (RCC).</p>		
Northeast Utilities	No	
City of Jacksonville Beach dba/Beaches Energy Services	No	
Independent Electricity System Operator	No	
New Brunswick System Operator	No	
Indeck Energy Services	Yes	<p>The standard imposed a significant burden on the customers of DP's and TO's with less than 100 MW of load by requiring substantially higher percentages of load reductions at similar frequencies. In addition, this standard is not necessary for reliability because, and is particularly burdensome, the DP's and TO's with less than 100 MW's of load are each too small to be a Reportable Disturbance within either the NYISO or ISONE. How then is reliability improved?</p> <p>Also, the standard improperly extends its applicability to GO's less than 20 MW and not connected to directly to the BES. NPCC is delegated its power to develop Regional Standards under the delegation agreement with NERC. NERC has chosen not to apply its standards to any entities other than Registered Entities. Therefore, NPCC may not apply the standard to GO's that are not Registered Entities. The publicly available information does not justify the differences from continent wide standard compared to the burden on competitive markets.</p>
<p>Response: Thank you for your comment. Entities with less than 100MWs are provided additional flexibility via wider cumulative load shedding bands. This allowance, supported by technical studies, was provided based on evidence that many smaller entities could not provide the necessary load shedding without exceeding their requirement based on their limited number of feeders available to be armed. Additionally, the minimum obligation of these entities is essentially the same of entities greater than 100MWs.</p>		

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Organization	Yes or No	Question 4 Comment
<p>Finally, the applicability in Section 4 has been revised and Attachment C has been removed.</p>		
<p>Utility Services Inc.</p>	<p>Yes</p>	<p>See answer in Q2. Generators whose protection systems trip above the curve are "required" to find load to be shed. Load could withhold such until financial incentives were offered. It is also possible that compensatory load might not be found and then the generation would be in violation of the standard. There are no guarantees of compensatory load shedding in today's competitive horizontal electric markets.</p>
<p>Response: Thank you for your comment. The RSDT acknowledges the technical challenges of administering the compensatory load shedding program and as a result has developed requirements stating that all new units shall conform to the generator tripping curve.</p> <p>These requirements are contained as criteria within the approved NPCC Directory #12 and are currently in effect throughout the NPCC region.</p>		

5. Does the proposed regional reliability standard meet at least one of the following criteria?
- The proposed standard has more specific criteria for the same requirements covered in a continent-wide standard
 - The proposed standard has requirements that are not included in the corresponding continent-wide reliability standard
 - The proposed regional difference is necessitated by a physical difference in the bulk power system.

Summary Consideration:

Organization	Yes or No	Question 5 Comment
Dominion Electric Market Policy	Yes	<p>Dominion is opposed to NPCC regional reliability standard PRC-006-1, Automatic Underfrequency Load Shedding, for the following reasons:1. The process by which a Generator Owner would arrange for a Distribution Provider or Transmission Owner to provide the appropriate amount of compensatory load shed (Reference Attachment B, Step 2.2) remains unresolved. In previous comments, we noted that Dominion had polled various Transmission Owners and Distribution Providers and none were willing to offer load shed service, citing the following:</p> <p>a. Implementation - load shed service does not currently exist in the Transmission Owner or Distribution Providers' tariffs. Requiring them to implement this service, would raise numerous issues, including, but not limited to the issues of determining which customers' load is shed to provide this service (retail or wholesale) and in determining 'fair value' for the price of such service. Accordingly, a requirement that these entities create and manage a new service that is not compelled by the needs of the market, would have a detrimental impact on commerce.</p> <p>b. Technical difficulty - (design complexity, difficulty meeting overshoot requirements) - Shedding additional load equivalent to a non-coordinating generator would be extremely difficult to design and coordinate. The design would have to account for the real-time status and output of the generator. Otherwise, this requirement could create more problems than it attempts to solve. For example, consider a load shed program that is designed assuming the need to shed load equivalent to rated capacity for a non-coordinating generator and a frequency event occurs when this generator is off line. The program sees the frequency at the trigger level and sheds the load equivalent to the non-coordinating generator.</p>

Consideration of Comments on PRC-006-NPCC-1 Frequency Load Shedding

Organization	Yes or No	Question 5 Comment
		<p>However, since that generator wasn't actually on line, there is no additional loss of generation, but the MW load equivalent of the generator (that is not designed into the UFLS scheme) is lost anyway. If the UFLS program then implements the next level of designed reduction of load, this may result in a subsequent rebound in frequency. This may very well result in overshoot that is more than designed for, resulting in generator trip from over-frequency. Obviously, the more non-coordinating generators there are, the more difficult the task of coordination with UFLS schemes becomes and the more widespread the effects on customers.</p> <p>c. 2. The Implementation Plan suggests that "the Drafting Team coordinated its development [of NPCC regional reliability standard PRC-006-1] with the recently approved NERC UFLS Standard PRC-006". Dominion is compelled to point out that NERC UFLS Standard PRC-006 has only attained NERC Board of Trustee approval, has not yet been approved by FERC, and is therefore not enforceable. Since there is uncertainty as to the FERC outcome, Dominion recommends that NERC suspend its review of regional reliability standard NPCC regional reliability standard PRC-006-1 until continent-wide standards PRC-006 (Project 2007-01) and PRC-024 (Project 2007-09) are approved by FERC.</p> <p>d. 3. The applicability of this standard to "Generator Owners with individual generating units or generating plant/facility <= 1 MVA (nameplate rating) connected at all voltage levels" does not meet the NERC Statement of Compliance Registry Criteria (Revision 5.0) or the NPCC Compliance Guidance Statement "Defining Generator Materiality for Registration;" therefore creating a registration gap. Attachment "C" attempts to close this gap by requiring these facilities to coordinate with NPCC UFLS program characteristics as mandated by their respective OATT tariff agreements. This appears inappropriate in a Regional Reliability Standard as enforcement of the OATT tariff resides with FERC, not NERC or the Regions. Therefore, as acknowledged by NPPC during the January 4, 2011 Webinar, the issue of registration for generating plants/facilities <= 1 MVA, but < the NERC Registration Criteria remains unresolved.</p>

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Organization	Yes or No	Question 5 Comment
<p>Response: Thank you for your comment. The RSDT acknowledges the technical challenges of administering the compensatory load shedding and as a result has developed requirements stating that all new units shall conform to the generator tripping curve.</p> <p>NERC has mandated the development of certain regional standards and its development cannot wait until all approvals are obtained on the NERC continent wide standard. However, the RSDT did coordinate the development of the regional standard with the progress of the continent wide standard.</p> <p>The Regional Standard Drafting Team has reviewed your concerns and notes that the NERC Statement of Registry Criteria does not limit registration of generation to those greater than 20MVA. However, the applicability in Section 4 has been revised and Attachment C has been removed.</p>		
Bonneville Power Administration	Yes	
Transmission Access Policy Study Group	Yes	
Public Service Enterprise Group		
Florida Municipal Power Agency		
Northeast Utilities	Yes	
City of Jacksonville Beach dba/Beaches Energy Services	Yes	
Independent Electricity System Operator	Yes	
New Brunswick System Operator	Yes	
Indeck Energy Services	No	

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Organization	Yes or No	Question 5 Comment
Utility Services Inc.	Yes	

END OF REPORT