

Comments for Proposed Metrics for Reliability-based Control Standards (Project 2007-18)

The Reliability-based Control Standards Drafting Team thanks all commenters who submitted comments on the proposed metrics for the reliability-based control standards. The proposed metrics were posted for a 30-day public comment period from August 29, 2008 through September 29, 2008. The stakeholders were asked to provide feedback on the proposed metrics through a special electronic Standard Comment Form. There were more than 19 sets of comments, including comments from 60 different people from more than 40 companies representing 9 of the 10 Industry Segments as shown in the table on the following pages.

http://www.nerc.com/filez/standards/Reliability-Based_Control_Project_2007-18.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, Gerry Adamski, at 609-452-8060 or at gerry.adamski@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

Commenter		Organization		Industry Segment											
				1	2	3	4	5	6	7	8	9	10		
1.	Joe Uchiyama	US Bureau of Reclamation												X	
2.	Howard Illian	Energy Mark, Inc.											X		
3.	Guy Zito (NPCC)	NPCC													X
Additional Member	Additional Organization	Region	Segment Selection												
1.	Ralph Rufrano	New York Power Authority	NPCC	5											
2.	David Kiguel	Hydro One Networks Inc.	NPCC	1											
3.	Chris De Graffenried	Consolidated Edison Co. of New York, Inc.	NPCC	1											
4.	Alan Adamson	New York State Reliability Council	NPCC	10											
5.	Rick White	Northeast Utilities	NPCC	1											
6.	Lee Pedowicz	NPCC	NPCC	10											
7.	Gerry Dunbar	NPCC	NPCC	10											
8.	Brian Hogue	NPCC	NPCC	10											
9.	Don Nelson	Massachusetts of Dept. of Public Utilities	NPCC	9											
10.	Kathleen Goodman	ISO - New England	NPCC	2											
11.	Gregory Campoli	New York Independent System Operator	NPCC	2											
12.	Brian Gooder	Ontario Power Generation Incorporated	NPCC	5											
4.	Will Franklin	Entergy Services, Inc System Planning & Operations (Generation)								X					
5.	Rao Somayajula	ReliabilityFirst Corporation													X
6.	Patrick Brown (PJM)	PJM Interconnection			X										

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Commenter		Organization		Industry Segment											
				1	2	3	4	5	6	7	8	9	10		
Additional Member	Additional Organization	Region	Segment Selection												
1.	Al DiCaprio	PJM Interconnection	RFC	2											
2.	Tom Moleski	PJM Interconnection	RFC	2											
7.	Ken McIntyre		ERCOT ISO			X									
8.	Howard Rulf		We Energies				X	X	X						
9.	Dan Rochester		IESO			X									
10.	Perpetuo Tan (LADWP)		WECC Performance Work Group		X		X		X						
Additional Member	Additional Organization	Region	Segment Selection												
1.	Don Badley	NWPP	WECC	NA											
2.	Bart McManus	BPAT	WECC	1											
3.	James Murphy	BPAT	WECC	1											
4.	John Tolo	TEP	WECC	1											
11.	Eric Ruskamp (LES)		MRO NERC Standards Review Subcommittee		X		X		X	X					
Additional Member	Additional Organization	Region	Segment Selection												
1.	Neal Balu	WPA	MRO	3, 4, 5, 6											
2.	Terry Bilke	MISO	MRO	2											
3.	Carol Gerou	MP	MRO	1, 3, 5, 6											
4.	Jim Haigh	WAPA	MRO	1, 6											
5.	Charles Lawrence	ATC	MRO	1											
6.	Ken Goldsmith	ALTW	MRO	4											
7.	Tom Milenik	MEC	MRO	1, 3, 5, 6											
8.	Pam Sordet	XCEL	MRO	1, 3, 5, 6											
9.	Dave Rudolph	BEPC	MRO	1, 3, 5, 6											
10.	Joseph Knight	GRE	MRO	1, 3, 5, 6											
11.	Joe DePoorter	MGE	MRO	3, 4, 5, 6											
12.	Larry Brusseau	MRO	MRO	10											
13.	Michael Brytowski	MRO	MRO	10											
12.	Kathleen Goodman		ISO New England Inc.			X									
13.	Sam Ciccone (FE)		FirstEnergy Corp.		X		X	X	X	X					
Additional Member	Additional Organization	Region	Segment Selection												
1.	Dave Folk	FE	RFC	1, 3, 4, 5, 6											
2.	Doug Hohlbaugh	FE	RFC	1, 3, 4, 5, 6											
14.	Kris Manchur		Manitoba Hydro		X		X		X	X					
15.	Greg Rowland		Duke Energy		X		X		X	X					

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Commenter		Organization		Industry Segment											
				1	2	3	4	5	6	7	8	9	10		
16.	JT Wood (SOCO)	Southern Company Transmission		X											
Additional Member		Additional Organization	Region	Segment Selection											
1.	Mike Oatts		SERC	1											
17.	Edward J Davis	Entergy Services		X											
18.	Charles Yeung (SPP)	IRC Standards Review Committee			X										
Additional Member		Additional Organization	Region	Segment Selection											
1.	Patrick Brown	PJM	RFC	2											
2.	Jim Castle	NYISO	NPCC	2											
3.	Dan Rochester	IESO	NPCC	2											
4.	Matt Goldberg	ISONE	NPCC	2											
5.	Lourdes Estrada-Salinero	CAISO	WECC	2											
6.	Anita Lee	AESO	WECC	2											
7.	Steve Myers	ERCOT	ERCOT	2											
8.	Bill Phillips	MISO	RFC	2											
19.	Denise Koehn (BPA)	Bonneville Power Administration		X		X		X	X						
Additional Member		Additional Organization	Region	Segment Selection											
1.	Bart McManus	Transmission Technical Operations		WECC	1										
2.	James Murphy	Transmission Technical Operations		WECC	1										

The following three questions relate to Purpose Statement A:

1. Do you support the RBC SDT researching further the concept of using dependent events as described above as the basis for supplementing or replacing the frequency trigger limits determined from the targeted research? If not, please explain in the comment area.

Summary Consideration:

Organization	Question 1: The following question relates to Purpose Statement A:	Question 1 Comments:
US Bureau of Reclamation	Yes	
Energy Mark, Inc.	Yes	<p>I will always support further research that aids in a better understanding of how operations relate to reliability. Unfortunately, the description of the changes in the frequency model are not clearly stated or supported with appropriate discussion. In fact, some of the suggested changes would make the interconnections less reliable instead of making them more reliable.</p> <p>1. "The frequency model considers independent loss of generation and does not address significant dependent events such as the loss of credible major transmission events, pump coincidence, market coincidental behavior, etc." This statement is incorrect. The frequency model specifically measures the correlations between interconnection frequency and ACE. This is true for both the CPS1 measure and the BAAL measure. These measures capture the correlations between average events, but may need supplementation for certain correlations that are not easily captured by the current metrics. One important point must be considered as the drafting team moves forward with metric development is that any measure that attempts to control interconnection risk due to off-schedule frequency operation must include the coincidence between ACE and interconnection frequency. The reason this is a must is the risk contribution of a control area to interconnection risk for off-frequency operation can only be measured in the correlated frequency/ACE domain. The discussion of the frequency model attempts to use deterministic measures; "The frequency drop associated with a large multi-contingency event would be added to the low frequency value with an adverse reliability impact in order to compute a frequency exposure limit. The goal would be to operate the Interconnection so that its frequency meets a specified level of reliability by keeping the frequency above the frequency exposure limit sufficiently during each month. Corrections to the Interconnection frequency maintenance strategy could be made when the observed reliability either falls short of the specified level of reliability or greatly exceeds it." There is simply no way to</p>

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Organization	Question 1: The following question relates to Purpose Statement A:	Question 1 Comments:
		<p>effectively use a single event to determine the shape or variance of a probabilistic distribution. Attempts to move in this direction can only make the standard and its metrics less effective rather than more effective. The important words that indicate this deficiency are "with one or more large multi-contingency events that are chosen for an Interconnection based upon experience." On the other hand, the current metrics do not capture the total risk that an interconnections face because they do not address certain operating decisions that can affect the shape of the expected frequency error distribution, as the drafting team is attempting to address with Purpose Statement C. Examples of the appropriate correlations between factors that affect interconnection off-frequency operating risk have been included in technical papers and studies that have recently been provided to the standard drafting team. The suggested change to the frequency model provides no method of including the events discussed in the proposed joint probability distribution for an interconnection. If these events are to be effectively included in this joint probability, then the method of including them in the joint probability distribution must be offered and vetted by the industry. Setting frequency limits in any other manner amounts to setting them based on judgment alone with no technical calculations supporting those limits. This is not the right way to maintain a reliable interconnection.</p> <p>2. "The frequency model should allow for the calibration of frequency and other related limits to achieve a specified level of reliability." This statement is excellent, but it can only be supported through the development of good mathematical methods that include all of the important variables in the risk calculation. The suggested changes in the frequency model contained in the Metrics Background document fail to provide any information about how this will be accomplished.</p> <p>3. "The frequency model should address the difference in Interconnection frequency response that occurs at point C versus point B. Under-frequency relays may be activated en route to point C, and generator governor response will be significantly reduced in that timeframe compared to the amount occurring at point B. (For more information see the Frequency Response Characteristic Survey Training Document.)" This is only true in a world that does not change. The UFLS Team is currently developing frequency limits on generation that include the recognition that frequency deviations that can be tolerated by the interconnection are time duration dependent. This also means that alternatives for setting UFLS relays can also include time delays associated with the size and duration of the frequency excursion. If under-frequency relay limits are set in this manner, there is no need to set frequency limits based on current instantaneous tripping schemes. Alternative under-frequency relay limits can be set at multiple frequency excursion limits with multiple tripping delays. Once this is accomplished, the limiting risk limit should be determined based on the shape of the frequency response on the interconnection and the limiting Frequency Response point, Point C or Point B. The statement included in the Metrics Background document assumes that Point C will be the limiting condition in all cases. This does not need to be the case. The</p>

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Organization	Question 1: The following question relates to Purpose Statement A:	Question 1 Comments:
		<p>team should let the reliability risks determine the answer to this issue and provide frequency reliability limits that will work for the limiting condition whether it is based on Point C or Point B.</p> <p>4. "The frequency model should recognize the Interconnection frequency response is not truly a constant, but that it has a rather wide distribution and may vary significantly from year to year." The only way to accomplish this goal is to develop a probabilistically determined frequency limit.</p>
NPCC	Yes	<p>NPCC participating members strongly agree with the need to explore alternative frequency models for reasons stated previously in industry comments. The 8/4/07 event clearly shows exposure to large dependent events. Had the initial frequency been 59.96 Hz, the Florida Underfrequency Load Shedding relays would have been activated. Note that this value is > FTL of 59.95 Hz. The ability to target a specific level of reliability and measure its achievement on a periodic basis (e.g., monthly) has merit in our view. There also is a need for the standard requirements to be compatible with single Balancing Authority Area Interconnections.</p>
Entergy Services, Inc System Planning & Operations (Generation)	Yes	<p>If additional factors are brought to light (e.g. the identified events), then research should be conducted on those identified events and the FTL, FAL, FRL adjusted to maintain reliability.</p>
ReliabilityFirst Corporation	Yes	
PJM Interconnection	No	<p>PJM agrees that research should be conducted to address changes in control objectives and responsibilities, and would support NERC's Resources Subcommittee in coordination with a Generator Operator group to carry out this research. However, PJM does not agree that the NERC Standards Development Process is the proper vehicle for conducting such research. The SDT's questions read more like a Request for Proposal than a request for a standard. The PURPOSE and the REQUIREMENTS sections of the Standards Manual state: PURPOSE: The purpose shall EXPLICITLY state what outcome will be ACHIEVED by the adoption of the standard. The purpose is agreed to early in the process as a step toward obtaining approval to proceed with the development of the standard. The purpose should link the standard to the relevant principle(s). REQUIREMENT(s) Explicitly stated technical, performance, preparedness, or certification requirements. Each requirement identifies WHO IS RESPONSIBLE and WHAT ACTION IS TO BE PERFORMED or what outcome is to be achieved. Each statement in the requirements section shall be a statement for which compliance is mandatory. Only a loose interpretation would include "research" as an objective of a standard, and an even looser interpretation to identify who is the responsible entity that will be held accountable for "non-compliance".</p>

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Organization	Question 1: The following question relates to Purpose Statement A:	Question 1 Comments:
ERCOT ISO	Yes	ERCOT ISO supports the proposal for researching the use of dependent events in addition to independent loss of generation events, to supplement or determine the frequency trigger limits.
We Energies	Yes	
IESO	No	
WECC Performance Work Group	No	That would be one factor that should be considered. What also should be considered is the Transient Study Methodology that is used to set IROL and SOL Limits. Some of the paths in the WECC are Transient Stability Limited and when the studies are done they use 60.0 Hz as the starting frequency. If this standard allows the frequency to deviate very far from 60.0 Hz the study engineers would need to have a lower starting frequency which would have an impact and lower the SOL and IROL path limits. If a lower starting frequency is not used then we could trigger the UFLS or worse. Transmission IROL and SOL overloads should also be factored in.
MRO NERC Standards Review Subcommittee	Yes	
ISO New England Inc.	Yes	ISO New England strongly agrees with the need to explore alternative frequency models for reasons stated previously in industry comments. The 8/4/07 event clearly shows exposure to large dependent events. Had the initial frequency been 59.96 Hz, the Florida Underfrequency Load Shedding relays would have been activated. Note that this value is > FTL of 59.95 Hz. The ability to target a specific level of reliability and measure its achievement on a periodic basis (e.g., monthly) has merit in our view. There also is a need for the standard requirements to be compatible with single Balancing Authority Area Interconnections.
FirstEnergy Corp.	Yes	While it is not clear from the statement "one or more large multi-contingency events that are chosen for an Interconnection based upon experience" which types of events the drafting team is proposing to study, it is appropriate that the industry understand the interaction or lack of interaction multiple contingency events have on the reliability of the Bulk Electric System in order to determine the need to defend against them and develop the appropriate response to them.
Manitoba Hydro	Yes	
Duke Energy	Yes	Though Duke Energy supports the targeted research that has already been performed and the considerations given in the development of the limits and the conservative time set for Tv, we would support the RBCSDT researching this concept further noting some of the concerns that have been expressed by the WECC for its Interconnection. Given that the other purpose statements of this standard are new to the industry, we believe much more work should be focused on the development of requirements and measures in those areas. Duke

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Organization	Question 1: The following question relates to Purpose Statement A:	Question 1 Comments:
		Energy would like to take this opportunity to also state that it does not support the direction of the draft standards that will penalize a Reliability Coordinator for a frequency event when its capability to correct frequency is clearly limited to the directives that it can issue to the Balancing Authorities. The standards should penalize the entities that do not follow the directives of the Reliability Coordinator, not penalize the RC when the directives are not followed.
Southern Company Transmission	Yes	One question related to the proposed metric write-up is the use of the word "dependent". "It is unclear what is dependent on what? Was a term such as "inter-related", "interdependent" or perhaps "contemporaneous" intended instead. As it stands the issue is not clearly explained.
Entergy Services	Yes	
IRC Standards Review Committee		
Bonneville Power Administration	No	That would be one factor that should be considered. What also should be considered is the Transient Study Methodology that is used to set IROL and SOL Limits. Some of the paths in the WECC are Transient Stability Limited and when the studies are done they use 60.0 Hz as the starting frequency. If this standard allows the frequency to deviate very far from 60.0 Hz the study engineers would need to have a lower starting frequency which would have an impact and lower the SOL and IROL path limits. If a lower starting frequency is not used then we could trigger the UFLS or worse. Transmission IROL and SOL overloads should also be factored in.

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2. The RBC SDT has discussed having each Interconnection define a specific reliability target and compare actual performance against the target on a periodic basis. Do you agree with this concept? If not, please explain in the comment area.

Summary Consideration:

Organization	Question 2: The following question relates to Purpose Statement A:	Question 2 Comments:
US Bureau of Reclamation	Yes	
Energy Mark, Inc.	Yes	Yes, I support this concept, but only if the specific reliability target(s) are defined on a probabilistic basis. Development of specific reliability target(s) for an interconnection should not provide an excuse to water down reliability limits to the point that they are no longer related to reliability. Only probabilistic reliability target(s) can directly relate to the interconnection reliability risk since reliability risk is an inherently probabilistic measure.
NPCC	Yes	
Entergy Services, Inc System Planning & Operations (Generation)	Yes	
ReliabilityFirst Corporation	Yes	
PJM Interconnection	Yes	The Resource Subcommittee should conduct an objective study and not be directed by any Interconnection. Using Interconnection Subject Matter Experts will be needed, but ad hoc targets should not be presupposed (otherwise there is no need to do research).
ERCOT ISO	Yes	ERCOT ISO supports this concept of reviewing the target against the actual performance on a periodic basis. ERCOT ISO would request further clarification on the use of and relationship between, multiple events for establishing reliability targets and Under Frequency Load Shed limits.
We Energies	Yes	
IESO	Yes	
WECC Performance	No	We don't agree with only one specific reliability target. Multiple targets should be considered for reliability. Frequency is one target but we also need to look at transmission loading. We do agree that each

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Organization	Question 2: The following question relates to Purpose Statement A:	Question 2 Comments:
Work Group		interconnection should define specific reliability targets.
MRO NERC Standards Review Subcommittee	Yes	
ISO New England Inc.	Yes	
FirstEnergy Corp.	Yes	As stated in response to question 1 above, the meaning of "one or more large multi-contingency events that are chosen for an Interconnection based upon experience" is not clear. Identifying historical events that would meet this definition would assist the industry in determining when to consider a multiple contingency event as a threat to reliability and when they are not. In addition, it would help the industry identify and classify these events based on impact to reliability, if any.
Manitoba Hydro	Yes	
Duke Energy	Yes	The concept should be looked into further however Duke Energy questions what group would be responsible for representing the Eastern Interconnection for determining the reliability target. We believe this would also support the capability for each Interconnection to determine the criteria used for its Interconnection - for example, utilization of targets based upon independent events or dependent events.
Southern Company Transmission		
Entergy Services	Yes	
IRC Standards Review Committee	Yes	
Bonneville Power Administration	No	We don't agree with only one specific reliability target. Multiple targets should be considered for reliability. Frequency is one target but we also need to look at transmission loading. We do agree that each interconnection should define specific reliability targets.

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- The RBC SDT has discussed gathering data to analyze the performance of each Interconnection and using this data to evaluate and revise the frequency limits. Do you agree with this concept? If not, please explain in the comment area.

Summary Consideration:

Organization	Question 3: The following question relates to Purpose Statement A:	Question 3 Comments:
US Bureau of Reclamation	Yes	
Energy Mark, Inc.	Yes	I agree with the concept, but as with my previous answer, only if the revised target(s) are based on good probabilistic analysis and goal setting methods. This change in the target(s) should not be used to justify the setting of target values that cannot be mathematically related to reliability risk.
NPCC	Yes	
Entergy Services, Inc System Planning & Operations (Generation)	Yes	
ReliabilityFirst Corporation	Yes	
PJM Interconnection	Yes	NERC, through its Resource Subcommittee, should be encouraged to collect whatever data it needs to address reliability concerns.
ERCOT ISO	Yes	ERCOT ISO supports gathering the necessary data for evaluating and revising frequency limits.
We Energies	Yes	
IESO	Yes	NERC, through its Resource Subcommittee, should be encouraged to collect whatever data it needs to address reliability concerns
WECC Performance Work Group	No	We agree with concept of gathering data but it is not clear what data will be collected and used to evaluate and revise the frequency limits. The concept in question 1 would be one factor that should be considered. What also should be considered is the Transient Study Methodology that is used to set IROL and SOL Limits. Some of the paths in the WECC are Transient Stability Limited and when the studies are done they use 60.0 Hz as the starting frequency. If this standard allows the frequency to deviate very far from 60.0 Hz the study engineers would need

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Organization	Question 3: The following question relates to Purpose Statement A:	Question 3 Comments:
		to have a lower starting frequency which would have an impact and lower the SOL and IROL path limits. If a lower starting frequency is not used then we could trigger the UFLS or worseTransmission IROL and SOL overloads should also be factored in.
MRO NERC Standards Review Subcommittee	Yes	
ISO New England Inc.	Yes	
FirstEnergy Corp.	Yes	For the reasons stated in responses to questions 1 and 2, this will help determine the best response to these issues.
Manitoba Hydro	Yes	
Duke Energy		Yes and No. Duke Energy supports that data should be gathered to analyze the performance of each Interconnection, however more discussion needs to take place on the process to be followed for revising the frequency limits. It is important that consideration be given to the additional information that must be gathered for the frequency analysis, as the frequency data on its own will not be enough to understand the factors contributing to what is seen. As the limits determined have implications to the performance of an entire Interconnection, the standards developed should support that if an Interconnection desires to maintain performance above the minimum targets developed for that Interconnection, then more stringent limits can be proposed and adopted through the NERC standards process, rather than through individual reliability regions.
Southern Company Transmission		
Entergy Services	Yes	
IRC Standards Review Committee	Yes	NERC through its Resource Subcommittee should be encouraged to collect whatever data it needs to address reliability concerns.
Bonneville Power Administration	No	We agree with concept of gathering data but it is not clear what data will be collected and used to evaluate and revise the frequency limits. The concept in question 1 would be one factor that should be considered. What also should be considered is the Transient Study Methodology that is used to set IROL and SOL Limits. Some of the paths in the WECC are Transient Stability Limited and when the studies are done they use 60.0 Hz as the starting

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Organization	Question 3: The following question relates to Purpose Statement A:	Question 3 Comments:
		frequency. If this standard allows the frequency to deviate very far from 60.0 Hz the study engineers would need to have a lower starting frequency which would have an impact and lower the SOL and IROL path limits. If a lower starting frequency is not used then we could trigger the UFLS or worse. Transmission IROL and SOL overloads should also be factored in.

The following two questions relate to Purpose Statement B:

4. Do you agree with the technical concepts of prospective metric 1? If not, please provide specific comments defining your objections and your proposed alternative.

Summary Consideration:

Organization	Question 4: The following question relates to Purpose Statement B:	Question 4 Comments:
US Bureau of Reclamation	Yes	
Energy Mark, Inc.	Yes	<p>I agree with the technical concepts proposed in Metric 1, however, I do have some comments on the methodologies suggested.</p> <p>The drafting team is correct in its selection of a MW domain for this metric since the reliability risk is directly related to the MW level of contribution to the IROL or SOL.</p> <p>The transmission system is highly dynamic in that the configuration can easily change from day to day. Under these conditions, it only makes sense to use a static ACE limit that is based on the current configuration. Setting limits based on all possible configurations can only result in limits that are too restrictive some of the time and not restrictive enough at other times. Therefore, static ACE limits must be dynamic on at least a daily basis. This suggests that, if the transmission system configuration changes daily, the static ACE limit must also change daily. Changing a static ACE limit that often would require some method of automating the static ACE limit calculation. If the static ACE limit calculations are automated, then the determining factors that would govern the periodic modification of the limit would be related to the ability to keep the dispatchers informed and knowledgeable about the current static ACE limit value.</p> <p>There is no reason for a metric to be symmetrical. The constraints that occur on the interconnections are usually only in a single direction for a single constrained interface. Therefore, they should be allowed to be asymmetrical and only be set at the same value when the results of the analysis provide the same value in both directions. The time limit associated with the ACE limit should be derived from the transmission or equipment time limits for overloads in the case of thermal limits.</p>

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Organization	Question 4: The following question relates to Purpose Statement B:	Question 4 Comments:
		The time limit associated with the ACE limit should be derived from the acceptable time limits associated with voltage stability or dynamic stability for the interfaces in the case of stability limits. These time limits should be shorter than the normal time limits applied to implementation of correction of the IROL or SOL to insure that once an IROL or SOL is identified that the actions to correct ACE contributions will be implemented before redispatch alternatives.
NPCC	Yes	NPCC participating members support the proposal.
Entergy Services, Inc System Planning & Operations (Generation)	Yes	Technically, metric 1 sounds great. Operationally, it is overly complicated to implement and use from an operator's perspective. There are so many inputs that the failure or invalid data feed of one input could cause and erroneous limit to be calculated. The fewer moving parts, the less likely it will break.
ReliabilityFirst Corporation	Yes	
PJM Interconnection	No	First, the NERC Standard Comment process is not the way to conduct research. NERC through it Resources Subcommittee should evaluate whatever metrics its sees fit to analyze. And only after a decision has been made on a justifiable metric should the concept be brought forward as a Standard Request. The current procedure of asking questions and selecting the set of answers the SDT thinks is correct is no different than just doing the work on their own. The Industry has enough to do in reviewing real requirements, and does not need to get involved in research projects. That being said, PJM disagrees with Statement B in the SAR stage and hence we continue to disagree with the technical concept presented in the metrics paper. Further, to define an ACE limit that would restrict contributions to an SOL or IROL violation is mixing resource-based control parameters with transmission reliability for which the BA has no role and may have no information. The ACE limit, if made dependent on the prevailing flow on the interface for which there is an SOL or IROL, is subject to influential parallel flows for which the ACE limit may be greatly affected. This ACE limit will thus be very volatile rendering it almost useless for the purpose of preventing an SOL/IROL violation or for mitigating such violations. Further, we are unable to grasp the concept of determining any distribution factors to associate an ACE with the potentially constrained interface for which there is an SOL or IROL. ACE is the difference between the algebraic sum of the tie flows and the BA's net interchange; it has no direction or specific distribution allocation to a BA area's interties or internal interfaces or flowgate. The objective of this standard and the associated filed test are to ensure and demonstrate that new BAL requirements, e.g. BAAL limits, do not result in an increase in parallel flows. The requirements should focus on the BAAL limits to satisfy this condition, not on focusing on preventing or mitigating SOL/IROL violations. Limiting

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Organization	Question 4: The following question relates to Purpose Statement B:	Question 4 Comments:
		parallel flow is a condition that needs to be demonstrated, not a requirement to be included in the standard. As we indicated in our previous comments, while it is a worthwhile exercise to conduct field tests to assess whether any proposed BAL requirements (on frequency, etc.) can result in increased parallel flows or aggravated transmission loading to address industry concerns, developing requirements to support eliminating SOL/IROL violations appears to be outside of the scope of any proposed BAL standards.
ERCOT ISO		
We Energies	No	The BA function does not own or operate transmission and may not be able to obtain the transmission system information necessary to perform these calculations. Our TO/TOP will not provide us (BA) with all the data we would prefer to have for wide area view because of FERC Standards of Conduct issues. We might not know of or be able to get data for constrained interfaces outside of our BA Area. In the MISO Market as it exists today, MISO is responsible for Interchange Transactions. The BAs in this market do not know what Interchange Transactions MISO has made or what the Distribution Factors are.
IESO	No	We disagreed with Statement B in the SAR stage and hence we continue to disagree with the technical concept presented in the metrics paper. Further, to define an ACE limit that would restrict contributions to an SOL or IROL violation is mixing resource-based control parameters with transmission reliability for which the BA has no role and may have no information. The ACE limit, if made dependent on the prevailing flow on the interface for which there is an SOL or IROL, is subject to influential parallel flows for which the ACE limit may be greatly affected. This ACE limit will thus be very volatile rendering it almost useless for the purpose of preventing an SOL/IROL violation or for mitigating such violations. Further, we are unable to grasp the concept of determining any distribution factors to associate an ACE with the potentially constrained interface for which there is an SOL or IROL. ACE is the difference between the algebraic sum of the tie flows and the BA's net interchange; it has no direction or specific distribution allocation to a BA area's interties or internal interfaces or flowgate. The objective of this standard and the associated field test are to ensure and demonstrate that new BAL requirements, e.g. BAAL limits, do not result in an increase in parallel flows. The requirements should focus on the BAAL limits to satisfy this condition, not on focusing on preventing or mitigating SOL/IROL violations. Limiting parallel flow is a condition that needs to be demonstrated, not a requirement to be included in the standard. As we indicated in our previous comments, while it is a worthwhile exercise to conduct field tests to assess whether any proposed BAL requirements (on frequency, etc.) can result in increased parallel flows or aggravated transmission loading to address industry concerns, developing requirements to support eliminating SOL/IROL violations appears to be outside of the scope of any proposed BAL standards.
WECC	No	We agree it should be a dynamic ACE limit, but there should be no option given to the BAs regarding the static

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Organization	Question 4: The following question relates to Purpose Statement B:	Question 4 Comments:
Performance Work Group		and dynamic limits. It should be calculated by the RC and sent to the BAs in real time. The RC has a much broader view and a BA's path may be impacted by a BA several BA's away. We also disagree with limiting it to greater than 10% distribution factor. There could be a large BA with a large ACE impacting a low limit path with less than 10% distribution factor.
MRO NERC Standards Review Subcommittee	Yes	
ISO New England Inc.	Yes	
FirstEnergy Corp.	Yes	While we agree the technical basis for this option appears reasonable, the proposal is still nebulous and we would reserve the right to review the specific details of the limits produced by this process. The effect of this metric should also be studied carefully to ensure the issue seen with the TLR process of "large cuts for small effects" is not repeated by this metric such that "large ACE limitations produce small transmission constraint relief effects." Also, we are compelled to ask if the drafting team is responding to a perceived issue raised by the industry as opposed to an actual issue. These limits appear to be designed to constrain a BA to an ACE level bandwidth when the entity is supporting the return of frequency to 60 Hz. Does the pilot data show that the member's operations deviated excessively outside their L10 limits? If not, are we responding to a problem that is only perceived to exist? If they did, was the effect of those deviations on the constrained paths significant enough to warrant remediation and long enough for remediation attempts to be effective?
Manitoba Hydro	Yes	
Duke Energy	No	It is very likely this limit would be too high and highly subjective to the inputs in the sensitivity study which could allow for gaming the system. If this option is pursued, we believe that a reliability function other than the Balancing Authority, perhaps an independent entity, should play a role in the development of the parameters allowed for calculating the dynamic limits. Prior NERC documents have highlighted the difficulty in quantifying the flow impacts of off-nominal ACE. However, placing a bound on ACE under BAAL would address some of the concerns associated with this control process.
Southern Company Transmission	No	It is unclear how, particularly on a geographically dispersed system, "excessive ACE" can consistently be determined such that it can be applied to this metric. It is possible the under some generation patterns "excessive ACE" on a short-term basis created due to unit maneuverability considerations may be helping a constrained interface and similarly a zero ACE condition may be worse. Under different yet realistic patterns, the

Comments for Proposed Metrics for Reliability-based Control Standards (Project 2007-18)

Organization	Question 4: The following question relates to Purpose Statement B:	Question 4 Comments:
		situation could be reversed. Generation commitment and economic dispatch patterns are not typically established to consider real-time, moment-to-moment ACE deviations created by the need to move more responsive units. Commitment and dispatch instead are chosen to manage load balancing, transmission issues and contingency reserve requirements. A real-time correlation of ACE control using the most maneuverable units to interface constraints on a large area generation pattern would not seem to consistently exist.
Entergy Services	No	Setting dynamic limits for ACE in SOL and IROL events in an already fluid situation where the BA is responding to ACE by the BAAL rules may lead to unpredictable results. If, for example, static limits set at the L10 of the BA were imposed, that is a clear target to shoot for by the BA that will enable it to design its internal processes to consistently be able to comply with the standard. Dynamic limits would likely not be so simple for which to write a procedure nor for which effective training could be designed and delivered.
IRC Standards Review Committee	No	We disagreed with Statement B in the SAR stage and hence we continue to disagree with the technical concept presented in the metrics paper. Further, to define an ACE limit that would restrict contributions to an SOL or IROL violation is mixing resource-based control parameters with transmission reliability for which the BA may have little or no information. The ACE limit, if made dependent on the prevailing flow on the interface for which there is an SOL or IROL, is subject to influential parallel flows for which the ACE limit may be greatly affected. This ACE limit will thus be very volatile rendering it almost useless for the purpose of preventing an SOL/IROL violation or for mitigating such violations. Further, we are unable to grasp the concept of determining any distribution factors to associate an ACE with the potentially constrained interface for which there is an SOL or IROL. ACE is the difference between the algebraic sum of the tie flows and the BA's net interchange; it has no direction or specific distribution allocation to a BA area's interties or internal interfaces or flowgate. The objective of this standard and the associated field test are to ensure and demonstrate that new BAL requirements, e.g. BAAL limits, do not result in an increase in parallel flows. The requirements should focus on the BAAL limits to satisfy this condition, not on focusing on preventing or mitigating SOL/IROL violations. Limiting parallel flow is a condition that needs to be demonstrated, not a requirement to be included in the standard. As we indicated in our previous comments, while it is a worthwhile exercise to conduct field tests to assess whether any proposed BAL requirements (on frequency, etc.) can result in increased parallel flows or aggravated transmission loading to address industry concerns, developing requirements to support eliminating SOL/IROL violations appears to be outside of the scope of any proposed BAL standards.
Bonneville Power Administration	No	We agree it should be a dynamic ACE limit, but there should be no option given to the BAs regarding the static and dynamic limits. It should be calculated by the RC and sent to the BAs in real time. The RC has a much broader view and a BA's path may be impacted by a BA several BA's away. We also disagree with limiting it to greater than 10% distribution factor. There could be a large BA with a large ACE impacting a low limit path with

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Organization	Question 4: The following question relates to Purpose Statement B:	Question 4 Comments:
		less than 10% distribution factor.

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5. Do you agree with the technical concepts of prospective metric 2? If not, please provide specific comments defining your objections and your proposed alternative.

Summary Consideration:

Organization	Question 5: The following question relates to Purpose Statement B:	Question 5 Comments:
US Bureau of Reclamation	Yes	
Energy Mark, Inc.		I agree with most of the technical concepts proposed in Metric 2, however, I do have some comments on the methodologies suggested. The drafting team is correct in its selection of a MW domain for this metric since the reliability risk is directly related to the MW level of contribution to the IROL or SOL. There is no technical basis for the use of the value of L10 in this metric. In Metric 2, it is suggested that a 90% effectiveness limit would be appropriate. In all cases, reliability standards should be set considering both Type 1 and Type 2 error and the consequences of each error should be used to determine the appropriate limit for the metric. (Type 1 error occurs when the limit is not exceeded but the desired reliability level is not maintained. Type 2 error occurs when the limit is exceeded but the desired reliability level is maintained.)
NPCC	Yes	NPCC participating members support the proposal.
Entergy Services, Inc System Planning & Operations (Generation)	Yes	This is much easier to implement from an operations perspective and does not require intensive data processing. Operators are better suited operating to a non-changing excess limit rather than having to constantly worry about a changing value and its validity. The use of "subject matter experts" should be replaced with "NERC". If NERC wants to convene a team of experts or use its Operating Committee then that would be their choice.
ReliabilityFirst Corporation	Yes	
PJM Interconnection	No	Please see our comments, above. We suggest an ACE limit, if so decided to develop, be determined on the basis of reflecting a BA's ability to balance its load-resource-interchange with consideration of the prevailing frequency, not tied to any transmission constraints or limits.
ERCOT ISO		
We Energies	Yes	
IESO	No	Please see our comments above. We suggest that an ACE limit, if so decided to develop, be determined on the basis of reflecting a BA's ability to balance its load-resource-interchange with consideration of the prevailing

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Organization	Question 5: The following question relates to Purpose Statement B:	Question 5 Comments:
		frequency, not tied to any transmission constraints or limits.
WECC Performance Work Group	No	There are too many varying factors from seasonality, topology, heavy load, light load for this option to work unless a very conservative number is used.
MRO NERC Standards Review Subcommittee	Yes	
ISO New England Inc.	Yes	
FirstEnergy Corp.	Yes	Our comment on this question is the same as question 4 above. In addition, what method does the drafting team propose for selecting the Subject Matter Experts that will make the determination of the limit in this option?
Manitoba Hydro	Yes	
Duke Energy	Yes	Given the difference between actual frequency response and frequency bias, we believe the RBCSDT should consider basing its measure(s) on the interchange portion of ACE only. An alternative to the proposed metric would be to set a bound with 10-minute performance calculated similar to CPS2, designed to limit ACE when in support of Interconnection frequency.
Southern Company Transmission	No	See response to question 4
Entergy Services	Yes	
IRC Standards Review Committee	No	Please see our comments, above. We suggest an ACE limit, if so decided to develop, be determined on the basis of reflecting a BA's ability to balance its load-resource-interchange with consideration of the prevailing frequency, not tied to any transmission constraints or limits.
Bonneville Power Administration	No	There are too many varying factors from seasonality, topology, heavy load, light load for this option to work unless a very conservative number is used.

The following four questions relate to Purpose Statement C:

6. Would you agree that Purpose Statement C should be modified to reflect all contributing factors to short-duration frequency excursions including coincident actions (see above) rather than just ramping of Interchange Transactions only? If not, please explain in the comment area.

Summary Consideration:

Organization	Question 6: The following question relates to Purpose Statement C:	Question 6 Comments:
US Bureau of Reclamation	Yes	
Energy Mark, Inc.	Yes	
NPCC	Yes	
Entergy Services, Inc System Planning & Operations (Generation)	Yes	Is the field trial capturing information as to how many times the RCs have implemented the actions in Attachment B of the field trial? For example, have the RCs actually directed BAs to correct ACE per actions 1, 2, and 3?
ReliabilityFirst Corporation	Yes	
PJM Interconnection	Yes	
ERCOT ISO		
We Energies	Yes	
IESO	Yes	
WECC Performance Work Group	No	It appears to be a Eastern Interconnection problem and should be addressed in a Regional Standard for the East. However, moving the time limit Tv to 20 minutes from the proposed 30 minutes could limit the amount of time the problem is occurring and may make Statement C irrelevant. Note that there is a 15-minute recovery period for DCS and allowing 30 minutes for BA ACE to drift is substantially longer.
MRO NERC Standards Review	Yes	The MRO supports the purpose statement, however we are concerned that the standard once drafted may have limits that are too narrow and what the O&M costs would be verses the reliability benefits.

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Organization	Question 6: The following question relates to Purpose Statement C:	Question 6 Comments:
Subcommittee		
ISO New England Inc.	Yes	
FirstEnergy Corp.	Yes	All contributing factors should be considered to ensure the solution to the problem is accurate and complete. As an example, the practice of leading in a morning load pickup due to the physical inability of generation resources to match the load ramp characteristic may contribute greatly to this phenomenon, but may be the only way to keep the system reliable. Furthermore, if the study of the data finds this to be the case, we would expect the standards to support this practice by providing limitations on this behavior that ensure the reliability of the Bulk Electric System.
Manitoba Hydro	Yes	
Duke Energy	Yes	Although all factors should be considered, Interchange Transactions should be evaluated first and independently of the other factors as they appear to be the largest cause of the excursions.
Southern Company Transmission		
Entergy Services	Yes	
IRC Standards Review Committee	Yes	
Bonneville Power Administration	No	It appears to be a Eastern Interconnection problem and should be addressed in a Regional Standard for the East. However, moving the time limit Tv to 20 minutes from the proposed 30 minutes could limit the amount of time the problem is occurring and may make Statement C irrelevant. Note that there is a 15-minute recovery period for DCS and allowing 30 minutes for BA ACE to drift is substantially longer.

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7. The proposed metric for Purpose Statement C would only apply during the time period where the clock minutes within the day chronically exhibit poor frequency performance (see item 2 above). Do you agree that the proposed metric should only apply during the time period where the clock minutes within the day chronically exhibit poor frequency performance? If not, please provide specific comments on why you do not agree and an alternate basis for the metric.

Summary Consideration:

Organization	Question 7: The following question relates to Purpose Statement C:	Question 7 Comments:
US Bureau of Reclamation	Yes	
Energy Mark, Inc.	No	<p>I do not agree that the metric should only apply during the time period when the clock minutes within the day chronically exhibit poor frequency performance. This disagreement is explained in the following discussion of the reliability risk and how it is managed with current metrics. An alternative method is then offered that should correct the problems with the method suggested.</p> <p>First, since the reliability risk is associated with off-frequency operation on the interconnection, the correct risk domain to develop the metric within is the domain that includes the correlation between the frequency and ACE, the same domain used for CPS1. Therefore, the metric should be based on the same data that is used for CPS1, but the metric calculation should differ to provide a metric that is targeted to limiting the specific problem identified, the periods exhibiting chronically poor frequency performance.</p> <p>The problem with the periods that exhibit chronically poor frequency performance is that the team is assuming that this is a reliability problem without any proof. This poor frequency performance indicates one of two conditions. 1) The poor frequency performance during the chronically poor times is adding additional frequency error to the tails of the normal frequency distribution without adding appropriate amounts of data to the body of the normal frequency distribution. If this is the case, the chronically poor performance is inappropriately contributing excess risk to the interconnection that is not being managed by the current metrics. 2) The poor frequency performance during the chronically poor times is not adding additional frequency error to the tails of the normal frequency distribution without adding appropriate amounts of data to the body of the normal frequency distribution. If this is the case the chronically poor performance is not adding any additional excess risk to the</p>

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Organization	Question 7: The following question relates to Purpose Statement C:	Question 7 Comments:
		<p>interconnection and the risk is being properly managed by the current metrics. Implementation of the suggested metric would not be able to differentiate between these two conditions.</p> <p>CPS1 is designed to allow each BA to determine how is allocates is control actions and resources during the day as long as it contributes its share of control. If metrics are implemented that fail to allow each BA determine the most effective way to control frequency, all BAs will expend greater resources on control without any reliability benefit. Good engineering demands that the reliability metrics enforce reliable operations with minimal expenditures. Implementation of a new metric that would require additional control action without knowing whether or not it will result in an improvement in reliability is not prudent. It will increase control costs without any benefit.</p> <p>The above discussion indicates that the problem is not that there are periods of chronically poor frequency performance. This is not the important characteristic. The important characteristic is that these periods of chronically poor performance may be indicators of excess risk due to a distribution of frequency error that has much fatter tails than the normal distribution. Fortunately, there is a measure that has already been developed for financial market analysis that provides an accurate indication of how much a distribution deviates from a normal distribution with respect to whether it has fatter or thinner tails than a normal distribution. This measure is called Excess Kurtosis. Wikipedia has a reasonable discussion of this measure. It can be found at http://en.wikipedia.org/wiki/Kurtosis and additional discussion of its use to manage risk can be found at http://en.wikipedia.org/wiki/Kurtosis_risk. Additional discussions can be found at http://www.riskglossary.com/link/kurtosis.htm and http://mathworld.wolfram.com/Kurtosis.html.</p> <p>The Mean of the frequency error is the first moment of the frequency error around scheduled frequency. The frequency error is close to a normal distribution with an increased risk from fatter tails due to contingency imbalance error that tends to occur randomly. The CPS1 measure is similar to Variance of the frequency error and has a form similar to the second moment of the frequency distribution. The CPS1 measure, limited by ϵ_1, is a Chi-square distribution with an increased risk from the fatter tails due to contingency imbalance error. This CPS1 measure bounds the standard deviation of the frequency error when the frequency error distribution is normally distributed. A new metric based on the Excess Kurtosis would provide the needed measurement to indicate whether or not the chronically poor frequency performance periods have fatter tails than other times. Kurtosis is based on the fourth moment of the frequency error or the second moment of the CPS1 measure. The objective would be to compare all of time with selected intervals of five to ten minutes, a portion of</p>

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Organization	Question 7: The following question relates to Purpose Statement C:	Question 7 Comments:
		<p>the ramping period, to see how much the Excess Kurtosis for the selected period differs from the Excess Kurtosis for all periods in the year. Significantly greater Excess Kurtosis during these chronically poor performance periods as compared to the Excess Kurtosis of all time would be an indication that the BA is contributing additional risk to the interconnection that is not managed by the CPS1 measure. In fact, if automated, this measure could be applied to all time periods without identifying whether or not they are chronically poor frequency performance periods first. This measure could be implemented in manner that would not require the work of identifying the poor frequency periods first. In addition, this measure meets the first requirement of a frequency error risk management measure in that it is based on the CPS1 data that includes the correlation between ACE and frequency, the correct risk domain. The only downside to implementation is that the acceptable Excess Kurtosis would need to be normalized for each interconnection. This normalization process should not require an excessive amount of effort.</p> <p>The real advantage of this kind of measure is that it does not require any more control action than the minimal amount required to support reliability. This measure should be called the "Excess Risk" metric.</p>
NPCC	Yes	At least during the field test to gain an insight on the frequency excursion during these short duration periods. NPCC participating members agree with the need for the metric and suggest researching whether the need for a separate metric would be eliminated if T_v in the frequency model was shortened.
Entergy Services, Inc System Planning & Operations (Generation)	No	The time period for which poor performance is observed may change as market behavior changes. the metric should not be a fixed time, but one determined by the Interconnection RCs.
ReliabilityFirst Corporation	Yes	
PJM Interconnection	Yes	Yes, at least during initial analysis/test to gain an insight on the frequency excursion during these short duration periods .However, in the long run, metrics should apply to all time periods .Furthermore, the research team must recognize that a "leading" ACE is often necessary to meet the control requirements later on in the period. Restricting ACE at all times may preclude supply from being available at the peak period. ACE is as much an indicator of balance as it is an "error".
ERCOT ISO		
We Energies	Yes	

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Organization	Question 7: The following question relates to Purpose Statement C:	Question 7 Comments:
IESO	Yes	Yes, at least during initial analysis/test to gain an insight on the frequency excursion during these short duration periods. However, in the long run, metrics should apply to all time periods.
WECC Performance Work Group	No	It appears to be a Eastern Interconnection problem and should be addressed in a Regional Standard for the East. However, moving the time limit Tv to 20 minutes from the proposed 30 minutes could limit the amount of time the problem is occurring and may make Statement C irrelevant.
MRO NERC Standards Review Subcommittee	No	
ISO New England Inc.	Yes	At least during the field test to gain an insight on the frequency excursion during these short duration periods. We support the need for the metric and suggest researching whether the need for a separate metric would be eliminated if Tv in the frequency model was shortened.
FirstEnergy Corp.	Yes	
Manitoba Hydro	No	Although current interconnection frequency data has identified certain times of the day when these problems occur, market systems and other system events/changes could cause other time periods to exhibit similar problems in the future. The standard should be written to be applicable during all time periods of the day to ensure short-duration events do not adversely impact reliability.
Duke Energy		Yes and No. Developing a requirement that is applicable only at specific times will be more difficult for the operator, and we have to consider the behavior that such a metric might drive. On the other hand, these short-duration frequency excursions are primarily a concern because they are predictable, and control performance measures developed under the assumption of random and non-coincident behavior do not apply. Developing a metric that a) considers the magnitude of schedule ramp to BA size, reserves carried, etc, and b) requires certain performance over the ramp when it exceeds some value, may address the ramp issue no matter of the time of day.
Southern Company Transmission	No	This is merely avoiding the issue by basing the metric on times of typical poor performance rather than on the root the cause of the poor frequency performance. The same conditions could appear at other times for the same reasons. Determine the cause and a solution (e.g. more available, reliable regulation, etc.). Its like saying criminals only rob banks between 9AM and 5PM so the answer is to open at times other than that when the real solution is to stop the criminals when they come between 9 and 5 (or any other time).
Entergy Services	Yes	Coincident events need to be addressed when they cause a threat to reliability. We agree that the off-peak to on-peak transition along with the on-peak to off-peak transition have proven themselves to be problematic for

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Organization	Question 7: The following question relates to Purpose Statement C:	Question 7 Comments:
		frequency.
IRC Standards Review Committee	Yes	Yes, at least during initial analysis/test to gain an insight on the frequency excursion during these short duration periods. However, in the long run, metrics should apply to all time periods.
Bonneville Power Administration	No	It appears to be a Eastern Interconnection problem and should be addressed in a Regional Standard for the East. However, moving the time limit T_v to 20 minutes from the proposed 30 minutes could limit the amount of time the problem is occurring and may make Statement C irrelevant.

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8. The RBC SDT has discussed possible concepts for the metric for Purpose Statement C and whether it should be based upon a fixed MW amount or based on a variable MW amount that is frequency dependent similar to CPS1. Do you agree that the RBC SDT should consider the development of a fixed MW bound and recognize the differences between expected and actual frequency response in the bounds determined? If not, please provide specific comments on why you do not agree and an alternative basis for the metric.

Summary Consideration:

Organization	Question 8: The following question relates to Purpose Statement C:	Question 8 Comments:
US Bureau of Reclamation	Yes	
Energy Mark, Inc.	No	Please see the discussions provide in the previous responses. They provide a solid technical basis for using CPS1 data as the basis for the measure because the CPS1 data is the only data available that is in the risk domain.
NPCC	Yes	This should be used as a start. Options exist to develop an alternative basis if results or experience of the test should so suggest.
Entergy Services, Inc System Planning & Operations (Generation)	Yes	Consideration of a fixed MW amount would be similar to the proposal for a limit for excessive ACE and may be the simplest approach and should certainly be considered.
ReliabilityFirst Corporation	Yes	
PJM Interconnection	Yes	This should be used as a start. Options exist to develop an alternative basis if results or experience of the test should so suggest.
ERCOT ISO		
We Energies	Yes	
IESO	Yes	This should be used as a start. Options exist to develop an alternative basis if results or experience of the test should so suggest.
WECC	No	It appears to be a Eastern Interconnection problem and should be addressed in a Regional Standard for the East.

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Organization	Question 8: The following question relates to Purpose Statement C:	Question 8 Comments:
Performance Work Group		However, moving the time limit Tv to 20 minutes from the proposed 30 minutes could limit the amount of time the problem is occurring and may make Statement C irrelevant.
MRO NERC Standards Review Subcommittee	Yes	
ISO New England Inc.	Yes	This should be used as a start. Options exist to develop an alternative basis if results or experience of the test should so suggest.
FirstEnergy Corp.	Yes	
Manitoba Hydro	Yes	
Duke Energy	Yes	For simplicity, we believe this should be a fixed MW amount where the differences between expected and actual response are considered in the bounds determined. We do not support using a bound that is frequency dependent for this measure.
Southern Company Transmission		
Entergy Services	Yes	
IRC Standards Review Committee	Yes	This should be used as a start. Options exist to develop an alternative basis if results or experience of the test should so suggest.
Bonneville Power Administration	No	It appears to be a Eastern Interconnection problem and should be addressed in a Regional Standard for the East. However, moving the time limit Tv to 20 minutes from the proposed 30 minutes could limit the amount of time the problem is occurring and may make Statement C irrelevant.

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9. The RBC SDT has discussed whether the proposed metric should apply only to BAs. The questions arose on performance with respect to Interchange Transactions and associated coincident behavior and whether GOPs should have a metric to measure their performance against Interchange ramping. Do you agree that the Generator Operator should have a requirement applicable to meeting the ramping of Interchange Transactions? If not, please provide specific comments on why you do not agree and an alternative if applicable.

Summary Consideration:

Organization	Question 9: The following question relates to Purpose Statement C:	Question 9 Comments:
US Bureau of Reclamation	Yes	
Energy Mark, Inc.	No	The requirement to follow ramps should be included in the contracts between the Generator Operator and the BA. Applying ramping metric directly to the Generator Operator will bias those BAs that are operating in markets. If it is necessary to apply a measure directly to the Generator Operator, the measure should be applied within the contracts between the Generator Operator and the BA. This metric can easily be applied at that level if the BA so desires.
NPCC	Yes	The GOP should also be held responsible for meeting the ramping requirements for implementing interchange transactions. In fact, generators' ramping capabilities should have been considered and agreed to between the GOPs and the transaction arrangers (or the BA) before an Arranged Interchange is submitted to the BA for approval. Holding only the BA responsible for meeting the ramp requirement does not provide the assurance that the generators will and can be adjusted to meet the overall ramping requirements for the BA area.
Entergy Services, Inc System Planning & Operations (Generation)	No	Several BAs have already instituted their own measures under their tariffs to ensure 3rd party generators on their system meet their ramping obligations .It is unclear as to how this proposal would apply to Interchange ramping when a BA is operated as a system rather than individual generators. Additionally, the proposal addresses only the generator side and not the load side. What would be the obligations of the load to ramp their resources in response to receiving Interchange?
ReliabilityFirst Corporation	No	Generator operator will have some ramping requirements on the units under their control, but should not be required to meet Interchange ramping requirements.
PJM Interconnection	Yes	The GOP should also be held responsible for meeting the ramping requirements for implementing interchange transactions. In fact, generators' ramping capabilities should have been considered and agreed to between the

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Organization	Question 9: The following question relates to Purpose Statement C:	Question 9 Comments:
		<p>GOPs and the transaction arrangers (or the BA) before an Arranged Interchange is submitted to the BA for approval. Holding only the BA responsible for meeting the ramp requirement does not provide the assurance that the generators will and can be adjusted to meet the overall ramping requirements for the BA area. However, any proposed standard/metric must be able to separate those GOPs that are responding to Economic Dispatch vs. those that are responding to Regulations vs. those that are responding to Interchange. From a Market perspective each one of those "objectives" is a different service and a different obligation.</p>
ERCOT ISO		
We Energies	Yes	
IESO	Yes	<p>For those interchange schedules that have a specific GOP identified, the GOP should also be held responsible for meeting the ramping requirements for implementing interchange transactions. In fact, generators' ramping capabilities should have been considered and agreed to between the GOPs and the transaction arrangers (or the BA) before an Arranged Interchange is submitted to the BA for approval. Holding only the BA responsible for meeting the ramp requirement does not provide the assurance that the generators will and can be adjusted to meet the overall ramping requirements for the BA area. However, we urge the RBC SDT to undertake the research to explore possible metrics to address this issue outside of the standard development process. We support the notion that a research group summarizes the findings and recommendations in a white paper for industry comment, before any metrics get proposed to be included in a standard to be developed via the established standard development process. Conducting this research as a part of the field test and this SAR is outside of the scope of the SAR. Note also that field tests are intended to try out a proposed standard requirement. The research effort is to identify a possible metrics, which is not yet at a stage where any metrics are recommended to become a requirement and hence inclusion in a field test is not appropriate.</p>
WECC Performance Work Group	No	<p>It appears to be a Eastern Interconnection problem and should be addressed in a Regional Standard for the East. However, moving the time limit T_v to 20 minutes from the proposed 30 minutes could limit the amount of time the problem is occurring and may make Statement C irrelevant.</p>
MRO NERC Standards Review Subcommittee	Yes	
ISO New England Inc.	Yes	<p>The GOP should also be held responsible for meeting the ramping requirements for implementing interchange transactions. In fact, generators' ramping capabilities should have been considered and agreed to between the GOPs and the transaction arrangers (or the BA) before an Arranged Interchange is submitted to the BA for</p>

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Organization	Question 9: The following question relates to Purpose Statement C:	Question 9 Comments:
		approval. Holding only the BA responsible for meeting the ramp requirement does not provide the assurance that the generators will and can be adjusted to meet the overall ramping requirements for the BA area.
FirstEnergy Corp.	Yes	The inclusion of Generator Operators is appropriate. Ramping commitments of interchange transactions should be communicated, recognized, measured, and met. We must keep site of the importance of meeting those commitments with actual unit output. Financial settlements for poor performance, while providing some measure of encouragement for good performance under ideal circumstances, will ultimately provide little or no reliability benefit if performance obligations are not met when needed by the interconnection frequency.
Manitoba Hydro	Yes	
Duke Energy	Yes	Though the Generator Operator should be bound in some manner to follow the Interchange Transaction ramp, it would be difficult to apply to Generator Operators who are also responsible for supplying ancillary services to the transmission service provider, and may at any time be responding to the imbalance of other Generator Operators. We believe this should be addressed in the transmission tariff by allowing Energy Imbalance calculations to capture within-the-hour performance, rather than average performance over an hour. Any metrics developed for this purpose statement should consider that the Balancing Authority does not have direct control of all resources, and may be balancing its system in response to the imbalance of Generator Operators over the schedule ramp.
Southern Company Transmission	No	Multiple concerns are involved with doing this. First, how would individual GOP's be measured if they are responding as a set of units used to meet an Interchange Ramp? Second, would there be any consideration for the practical aspect that a single unit participating in an Interchange Ramp has real physical limitations related to times when they are coming online/offline that do not exist when they are moving within their normal operating range.
Entergy Services	No	Generator Operators are bound by Interconnection agreements with their Transmission Owners and Transmission Service Providers. This becomes a tariff issue that does not need additional rules to overly complicate the situation. The three functions with responsibility for reliability are still the RC, the BA and the TOP. The GOP's relationship with its host BA is a tariff issue, not directly a reliability issue.
IRC Standards Review Committee	No	For those interchange schedules that have a specific GOP identified, the GOP should also be held responsible for meeting the ramping requirements for implementing interchange transactions. In fact, generators' ramping capabilities should have been considered and agreed to between the GOPs and the transaction arrangers (or the BA) before an Arranged Interchange is submitted to the BA for approval. Holding only the BA responsible for meeting the ramp requirement does not provide the assurance that the generators will and can be adjusted to meet the overall ramping requirements for the BA area. However, we have a difficulty supporting the notion that the RBC SDT undertake a research to explore possible metrics to address this issue within the scope of the

Comments for Proposed Metrics for Reliability-based Control Standards (Project 2007-18)

Organization	Question 9: The following question relates to Purpose Statement C:	Question 9 Comments:
		<p>current SAR, and we have a difficulty with the SDT using a SAR as the vehicle for research work in general. As indicated in the current SAR: "The targeted research for the draft standards would support that such short-duration frequency swings on their own do not present undue reliability risk to the Interconnection, however the SAR developer believes further research is needed to determine if other factors need to be considered. As the frequency excursions are predictable, the critical infrastructure aspects of such excursions perhaps needs to be considered as the excursions could be exploited in timing the coincident loss of other resources. "We would support further research work to identify the need and possible means/process to address short-term frequency swing, esp. during ramping, but this work should be undertaken outside of the standard development process. We would support the notion that a research group summarizes the findings and recommendations in a white paper for industry comment, before any metrics get proposed to be included in a standard to be developed via the established standard development process.</p>
Bonneville Power Administration	No	<p>It appears to be a Eastern Interconnection problem and should be addressed in a Regional Standard for the East. However, moving the time limit Tv to 20 minutes from the proposed 30 minutes could limit the amount of time the problem is occurring and may make Statement C irrelevant.</p>

The following question relates to Purpose Statement D:

10. Do you support the RBC SDT deferring metric work for Purpose Statement D until work has been completed on the metric for Purpose Statement B? If not, please provide specific input on a possible metric to address Purpose Statement D?

Summary Consideration:

Organization	Question 10: The following question relates to Purpose Statement D:	Question 10 Comments:
US Bureau of Reclamation	Yes	
Energy Mark, Inc.	Yes	I expect that the implementation of Purpose Statement B will provide a common solution to the problems addressed in Purpose Statement D.
NPCC	Yes	
Entergy Services, Inc System Planning & Operations (Generation)	Yes	The concern identified in Purpose Statement D can essentially be folded into the issues raised by Purpose Statement B. The solutions should be the same, if not very similar. As mentioned in the WebEx presentation, even the existing NERC Standards are currently deficient in addressing the concerns raised in Purpose Statements B & C. The proposal to use a metric similar to "DCS" to measure recovery from curtailed transactions would be almost impossible to monitor as BAs at times receive as much as 30 individual curtailed transactions not all occurring simultaneously but within minutes of each other.
ReliabilityFirst Corporation	Yes	
PJM Interconnection	No	We do not agree with deferring development of this metric until work has been completed on the metric for Purpose Statement B for the following reasons: a. We do not agree with the Purpose Statement B and its associated metric work, and do not see any relevant or useful metric (such as an ACE limit) that can be developed to address transmission constraints. ACE has no direction, whereas SOLs and IROLs are directional; they cannot be mixed. b. We agree that there is not a current standard that requires a BA to balance load-generation-interchange after a curtailment, and this should be addressed. We also hold the opinion that absent this specific requirement, meeting the basic BAL requirements may not address the timely recovery of a resource short fall similar to that of a DCS event. The development of this requirement does not need to wait, and is in our view independent of the completion of the work for Purpose Statement B. Adjusting resource due to a TLR event

Comments for Proposed Metrics for Reliability-based Control Standards (Project 2007-18)

Organization	Question 10: The following question relates to Purpose Statement D:	Question 10 Comments:
		should not impose any real difficulties for the source BAs; the issue to address is therefore limited to the sink BAs. Arguments can be made that by meeting the DCS requirement, all BAs are supposed to also consider the loss of the largest import, either due to a tie line contingency or a transaction curtailment. Thus, options exist for the SDT not only to consider if an explicit requirement is warranted, but also to consider turning the research to another "off-line" group.
ERCOT ISO		
We Energies	Yes	
IESO	No	We do not agree with deferring development of this metric until work has been completed on the metric for Purpose Statement B for the following reasons: a. We do not agree with the Purpose Statement B and its associated metric work, and do not see any relevant or useful metric (such as an ACE limit) that can be developed to address transmission constraints. ACE has no direction, whereas SOLs and IROLs are directional; they cannot be mixed. (b) We agree that there is not a current standard that requires a BA to balance load-generation-interchange after a curtailment, and this should be addressed. We also hold the opinion that absent this specific requirement, meeting the basic BAL requirements may not address the timely recovery of a resource short fall similar to that of a DCS event. The development of this requirement does not need to wait, and is in our view independent of the completion of the work for Purpose Statement B. Adjusting resource due to a TLR event should not impose any real difficulties for the source BAs; the issue to address is therefore limited to the sink BAs. Arguments can be made that by meeting the DCS requirement, all BAs are supposed to also consider the loss of the largest import, either due to a tie line contingency or a transaction curtailment. Thus, options exist for the SDT to consider if an explicit requirement is warranted.
WECC Performance Work Group	Yes	
MRO NERC Standards Review Subcommittee	Yes	
ISO New England Inc.	Yes	
FirstEnergy Corp.	Yes	
Manitoba Hydro	Yes	

Comments for Proposed Metrics for Reliability-based Control Standards (Project 2007-18)

Organization	Question 10: The following question relates to Purpose Statement D:	Question 10 Comments:
Duke Energy	Yes	Yes, provided that this issue is ultimately addressed. Curtailments under TLR are not effective if the BAs are not properly balancing their systems after their transactions have been curtailed. In the absence of BAs taking such action, RCs may need to curtail additional transactions to attempt to get the relief needed, when the first set of curtailments could have been more effective by having a standard such as this in place. If this metric is developed further, the magnitude of the Interchange Transaction curtailments, and the TLR level, should be considered.
Southern Company Transmission	Yes	The concern expressed by the RBC SDT that Statement B may solve any concerns raised by Statement D, raises an even larger related concern. It would seem conceivable that some of these metrics may in fact conflict with one another. For example the units used by a utility to ramp an Interchange to comply with Statement C issues may in fact be the same maneuverable units that conflict with the issues associated with Statement B. It would appear that the result may be the need for a "Security Constrained AGC" application that would need to also consider issues related to dispatch. Because the most economical units to move are not necessarily the same ones that can/should move quickly to address ACE imbalance, the problem is not just one of managing ACE and frequency.
Entergy Services	No	BAs should be balancing generation / load under TLR at this time. There should be no need for more standards. If there is then the standards should be developed before addressing Purpose Statement B. The RC is required to resolve an IROL in less than Tv or less than 30 minutes, whichever is shorter. The RC already has the right to insist on redispatch or the curtailment of firm load in an IROL situation, and actually, it has been stated on many occasions that RCs should not depend on TLR for emergency response to an IROL exceedance. There is no need for additional rules related to this issue.
IRC Standards Review Committee		
Bonneville Power Administration	Yes	