COMMENT FORM
Proposed Frequency Response Standard

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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:	Phil Creech	
Organization:	Progress Energy – Carolinas	
Telephone:	919-546-6738	
Email:	phil.creech@pgnmail.com	
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT ☐ ECAR ☐ FRCC ☐ MAAC ☐ MAIN ☐ MAPP ☐ NPCC ☒ SERC ☐ SPP ☐ WECC ☐ NA - Not Applicable	☒	1 - Transmission Owners
	☐	2 - RTOs, ISOs, Regional Reliability Councils
	☒	3 - Load-serving Entities
	☐	4 - Transmission-dependent Utilities
	☒	5 - Electric Generators
	☒	6 - Electricity Brokers, Aggregators, and Marketers
	☐	7 - Large Electricity End Users
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Group Comments (Complete this page if comments are from a group.)

Group Name:

Lead Contact:

Contact Organization:

Contact Segment:

Contact Telephone:

Contact Email:

Additional Member Name	Additional Member Organization	Region*	Segment*

* If more than one Region or Segment applies, indicate the best fit for the purpose of these comments. Regional acronyms and segment numbers are shown on prior page.

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

Question 2: Do you agree with the scope and applicability of the proposed standard?

☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

Scope:
The scope of the proposed standard is appropriate. However, the reliability requirements would be better addressed by a comprehensive review that considers the adequacy of existing reliability standards.

Applicability:
The applicability of the proposed standard is understood to be Reliability Authorities, Balancing Authorities, and Generator Operators. However, substantial questions remain as to how the responsibilities implied in the proposed standard will be equitably distributed.

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☒ Yes

☐ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

The reliability requirements provided in the proposed standard would be better addressed by a comprehensive review that considers the adequacy of the existing reliability standards (i.e., 300 - Balance Resources and Demand)

Comments

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☐ Yes

☒ No

If yes, please share those comments in the space provided below.

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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:	Les Pereira	
Organization:	Northern California Power Agency	
Telephone:	916-781-4218	
Email:	les@ncpa.com	
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT ☐ ECAR ☐ FRCC ☐ MAAC ☐ MAIN ☐ MAPP ☐ NPCC ☐ SERC ☐ SPP x☐ WECC ☐ NA - Not Applicable	☐	1 - Transmission Owners
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Group Name:

Lead Contact:

Contact Organization:

Contact Segment:

Contact Telephone:

Contact Email:

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x☐ Yes

☐ No

If no, please explain in the space provided below.

Comments

Question 2: Do you agree with the scope and applicability of the proposed standard?

☐ Yes

x☐ No

If no, please explain in the space provided below.

The scope needs to be expanded – see detailed comments in a following section – based on extensive modeling and validation work in WECC.

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☐ Yes

x☐ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Comments

A new SAR will be more prescriptive, however there is also need for other related sections in NERC Operating Policy and Planning that need to be modified – see other comments below.

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

x☐ Yes

☐ No

If yes, please share those comments in the space provided below.

Two statements are made in the SAR:

1. The purpose of the proposed SAR is to ensure that frequency of the Interconnection remains above underfrequency load shedding setpoints during the transient period following the sudden loss of generation on the Interconnection.
2. Furthermore, it is stated that " In regard to frequency response, one shortcoming of the recommendations in policy today is that there is no guidance regarding how much governor response (in MW) is required at the 5% droop rate."

The first is a calculated number and depends not only on the amount of generation tripped, but also the total generation in the Whole Interconnection at the time of trip. Obviously two very different answers will be obtained : one with the Interconnection intact (normal operation) and the second when islanded. Both affect reliability.

The second issue has been thoroughly investigated in the WECC and a new Thermal Governor modeling approach has been implemented in the WECC after system tests, an exhaustive modeling validation effort and obtaining data from the generator owners. This has been documented in two IEEE Transaction papers described below. These papers present the development of a new turbine-governor modeling approach in WECC that correctly represents thermal units that have demonstrated unresponsive characteristics such as "base loaded" units operated with limiters, or partially responsive units with MW-load-controllers. The May 18th 2001 system trip test for 1250 MW performed with all AGCs off indicated that only about 40% of the governors effectively responded in the real system. If all the governors were responsive the calculated generation pickup for governors with a 5% droop for a 0.1 Hz frequency deviation would be 3185 MW instead of 1250 MW. The new modeling approach has been extensively validated against recordings from three WECC system tests and several large disturbances, and has been approved for use in all operation and planning studies in the WECC. The second paper describes the steps being taken to obtain validated data for the new governor models.

The work done by WECC indicate clearly that we do not get the required 5% droop from all units as required by NERC. The modeling approach taken was to model the governors in planning and operating studies exactly as they are being actually operated. Enforcement/compliance of the 5% droop is a separate issue and must be addressed by operating policies.

Obviously, the SAR touches upon only part of the problem, but it is a good start and should be expanded. It also needs to be cross-referenced with other areas such as the 5% droop requirement, an effective spinning reserves policy that actually works (see the

papers), and the effect on 'governor' powerflow and voltage stability analysis as a result of "unresponsive" governors.

The white paper referred by the SAR only touches upon the WECC effort and seems to miss the whole point of the modeling and validation work by the Governor Modeling Task Force in WECC - and what we have achieved in WECC to address realistic modeling of unresponsive governors in the real system.

1. "A New Thermal Governor Modeling Approach in the WECC"
by L. Pereira, J. Undrill, D. Kosterev, D. Davies, S. Patterson, *IEEE Trans. Power Systems*, vol. 18, Issue.2, pp. 819-829, May 2003. (*IEEE 2004 prize paper). Presented at Toronto IEEE PES, July 2003.*

2. "New Thermal Governor Model Selection and Validation in the WECC"
by Les Pereira, Dmitry Kosterev, Donald Davies, and Shawn Patterson - IEEE TPWRS – Vol.19, No.1, pp 517-523, February 2004. *Presented at Denver IEEE PES, July 2004.*

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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:	Mike Calimano	
Organization:	New York Independent System Operator	
Telephone:	518-356-6129	
Email:	mcalimano@nyiso.com	
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT	☐	1 - Transmission Owners
☐ ECAR	☒	2 - RTOs, ISOs, Regional Reliability Councils
☐ FRCC	☐	3 - Load-serving Entities
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☐ SERC	☐	8 - Small Electricity End Users
☐ SPP	☐	9 - Federal, State, Provincial Regulatory or other Government Entities
☐ WECC		
☐ NA - Not Applicable		

Group Comments (Complete this page if comments are from a group.)

Group Name: **New York Independent System Operator**

Lead Contact: **Mike Calimano**

Contact Organization: **NYISO**

Contact Segment: **2**

Contact Telephone: **518-356-6129**

Contact Email: **mcalimano@nyiso.com**

Additional Member Name	Additional Member Organization	Region*	Segment*

* If more than one Region or Segment applies, indicate the best fit for the purpose of these comments. Regional acronyms and segment numbers are shown on prior page.

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

We agree in general that there is a reliability need to have frequency response, particularly during disturbances, islanding and restoration. The standard should provide the process for a technically sound calculation of frequency response and bias (both fixed and variable).

Any new standards on frequency response need not and should not be onerous by finding BAs noncompliant with response less than average or below some un-validated norms. There may be valid reasons why a BA is below observed norms in response. For example, the BA may meet most of its obligations with schedules or its native load may be non-responsive.

If performance is significantly less than an Interconnection norm, the standard should not trigger an automatic non-compliance. In these situations the BA should perform an internal review/assessment that ensures governors are working as designed, that the BA knows which resources are frequency responsive (so the information can be included in restoration plans), whether governors can be put in more responsive modes during disturbances, etc.

When required, the validation of governor performance could be achieved either through online monitoring in an EMS or periodic testing (both methods should be explained in a reference document to support the standard).

The standard should acknowledge that some units might not provide response under normal operations (e.g. nuclear units operating at full load) and that response is highly variable event-to-event based on simultaneous load changes. The standard should acknowledge the differing Interconnection requirements (smaller Interconnections need greater response).

The standard should also track Interconnection response over time (years) and be reevaluated as performance changes.

Question 2: Do you agree with the scope and applicability of the proposed standard?

☐ Yes

☒ No

If no, please explain in the space provided below.

There is a general need for a standard, but the outcomes and expectations should address the comments raised in question 1.

While we agree that the standard should not preclude market solutions (e.g. allow purchasing of response as long as deliverability and restoration criteria can be met), we have concerns with the statement: *There must be a means for sale/purchase of frequency response as for any other quantity.*

It is not clear what is meant by *A method of allocation must be developed"*. Is this an allocation of Interconnection response to BAs, BA allocation to generators or something different?

.

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☐ Yes

☒ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Comments

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☒ Yes

☐ No

If yes, please share those comments in the space provided below.

We appreciate the opportunity to comment and believe there is a need for such a standard. Published studies show frequency response is declining when it should be increasing with load. The main concerns with this decreasing performance are:

There may be areas unable to withstand severe disturbances.

Following a grid separation or collapse, control areas may be unable to fulfill their blackstart and restoration responsibilities, thereby becoming a burden to neighbors.

Because engineering models use theoretical frequency response, they are likely overoptimistic and may misstate grid stability limits.

This standard would allow the industry to determine whether the decline is local or global.

Rather than implementing a complicated infrastructure or process, we would suggest that NERC automate the calculation of frequency response by either:

Asking BAs to save their CPS-source data in a common format so a common tool can be used (MAPP BAs and some others use a common tool that can calculate frequency response with CPS-source data).

Embed the calculation in the NERC ACE-monitoring application.

Refer to our earlier comments the structure of the standard (where lower amounts of BA response trigger an internal assessment rather than automatic assignment of non-compliance). BAs (and ultimately generators) would only be initially non-compliant if their response was low AND the BA failed to perform a reliability assessment in conjunction with its TOP. This default assessment would be at the BA level, but could be on an area basis (likely islanding area or where a TSP has responsibility for frequency responsive and black start ancillary services).

The standard should employ a methodology that not only captures initial response (first few seconds after the event) but also the sustained response until AGC action takes over

Each Interconnection should have the ability to add and further define the standard to meet its needs.

Providing visibility on where and when performance is substandard will likely initiate sufficient action to arrest the decline in performance. Minimum performance standards could be

implemented after the industry has identified what is reasonably achievable and technically justified.

CHANGE
This SAR is proposed to develop a standard to measure sub-minute responses to changes in frequency and to set minimum acceptable responses to system these events.
TO
This SAR is proposed to develop a standard to measure sub-minute responses to changes in frequency and to set minimum acceptable responses to these system events.

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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:	James Stanton	
Organization:	Calpine	
Telephone:	832-476-4453	
Email:	jstanton@calpine.com	
NERC Region		**Registered Ballot Body Segment**
☒ ERCOT ☒ ECAR ☒ FRCC ☒ MAAC ☒ MAIN ☒ MAPP ☒ NPCC ☒ SERC ☒ SPP ☒ WECC ☐ NA - Not Applicable	☐	1 - Transmission Owners
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Lead Contact:

Contact Organization:

Contact Segment:

Contact Telephone:

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☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

Question 2: Do you agree with the scope and applicability of the proposed standard?

☒ Yes
☐ No

If no, please explain in the space provided below.

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☐ Yes

☒ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Comments

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☒ Yes

☐ No

If yes, please share those comments in the space provided below.

Given the language in the accompanying White Paper: The standard should not preclude market solutions (e.g. allow purchasing of response as long as deliverability and restoration criteria can be met).There must be a means for sale/purchase of frequency response as for any other quantity. – I believe this Standard should be developed in conjunction with NAESB. The definition, attributes and procurement metrics of the frequency response product will be a critical component of this Standard. Some guidance in defining and developing this service to the bulk interconnected system can be found in the NERC IOS Reference Document. The Standard should build on this previous IOS work.

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Group Comments (Complete this page if comments are from a group.)

Group Name: **Operating Reliability Working Group (ORWG)**

Lead Contact: **Robert Rhodes**

Contact Organization: **Southwest Power Pool**

Contact Segment: **1, 2**

Contact Telephone: **501-614-3241**

Contact Email: **rrhodes@spp.org**

Additional Member Name	Additional Member Organization	Region*	Segment*
Ron Ciesiel	Southwest Power Pool	SPP	2
Bob Cochran	SPS	SPP	1
Mike Gammon	KCPL	SPP	1
Steve Hillman	WPEK	SPP	1
Allen Klassen	Westar	SPP	1
Bill Nolte	SECI	SPP	1
Robert Rhodes	Southwest Power Pool	SPP	2
Mike Stafford	GRDA	SPP	1

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☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

A frequency response standard is needed but only within the scope and range of the previously provided guides in Policy 1 such as a design criteria of 5% droop, a 36 mHz deadband with exclusions for nuclear, combined cycle and small generating units.

Question 2: Do you agree with the scope and applicability of the proposed standard?

☒ Yes
☐ No

If no, please explain in the space provided below.

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☒ Yes

☐ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

We would recommend that this standard be incorporated into the Balance Resource and Demand Standard (Standard 300) or the Version 0 BAL Standard.

Comments

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☐ Yes

☒ No

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Group Comments (Complete this page if comments are from a group.)

Group Name: California ISO

Lead Contact: **Ed Riley**

Contact Organization: **California ISO**

Contact Segment: **2**

Contact Telephone: **916 351 4463**

Contact Email: **eriley@caiso.com**

Additional Member Name	Additional Member Organization	Region*	Segment*
Yuri Makarov	**California ISO**	**WECC**	**2**
Steve McCoy	**California ISO**	**WECC**	**2**

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The requestor would like to receive industry comments on this SAR and to obtain the input of the industry prior to determining the final scope and requirements of the SAR. Accordingly, we request your comments included on this form, emailed with the subject "Frequency Response SAR Comments" by February 17, 2005.

Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

X Yes

☐ No

If no, please explain in the space provided below.

Comments

Frequency response provided by speed governors and loads helps to prevent load shedding and generator trips at significant frequency excursions caused by sudden active power mismatches in the systems. Without a sufficient frequency response emerging during the first seconds after a frequency disturbance, there is a danger of further cascading development or frequency instability and system collapse cased by underfrequency generator trips. It has been already noted that insufficient frequency response in some parts of an Interconnection may cause certain temporary redistribution of power flows and reduce stability margins after frequency disturbances that may limit the OTC on critical paths within the Interconnection. It has been also observed that insufficient frequency response may cause a weaker frequency recovery that bears a greater risk of system collapse at subsequent frequency disturbances. Therefore, frequency response is definitely a reliability issue that needs to be addressed by a NERC standard.

Question 2: Do you agree with the scope and applicability of the proposed standard?

X Yes

☐ No

If no, please explain in the space provided below.

Comments

Generally, our answer is yes, but the matter of applicability needs a very careful consideration. The question is whether the proposed standard should be applied to only the reliability and balancing authorities and plant operators, or also to the resource and system planning authorities and generator owners. For example, wind generators do not provide a frequency response, whereas the response from the Combined Cycle units is limited. This is a matter of design as well as the matter of controllability of the primary energy source. If the generation portfolio contains a lot of wind and CC generators, the balancing authority cannot do much to improve its summary frequency response in general terms. Also, if frequency responsive generators in a CA are heavily loaded, would the new standard force the balancing authorities to re-dispatch generation in favor of non-responsive generation and commit more responsive generation ahead of the non-responsive generation? Another issue is whether the standard should specify the required response in the area or individual responses from generators. Perhaps, NERC should work with NASB to find the right answers before establishing the standard. One possible solution is to establish penalties for non-compliance that would stimulate generator owners to invest in frequency responsive generation. Another possible recommendation could be establishing a market for frequency response. Without resolving these difficult issues, this standard cannot be accepted.

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☐ Yes

X No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Comments

The new standard should a stand-alone standard because of its potential implications for control areas and the necessity to stage the implementation of the standard in coordination with resolution of the issues discussed above.

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☐ Yes

X No

If yes, please share those comments in the space provided below.

COMMENT FORM
Proposed Frequency Response Standard

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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:	Travis Besier or Ellis Rankin	
Organization:	TXU Electric Delivery Company	
Telephone:	214-812-4917 or 214-743-6825	
Email:	tbesier1@txued.com or erankin@txued.com	
NERC Region		**Registered Ballot Body Segment**
☒ ERCOT	☒	1 - Transmission Owners
☐ ECAR	☐	2 - RTOs, ISOs, Regional Reliability Councils
☐ FRCC	☐	3 - Load-serving Entities
☐ MAAC	☐	4 - Transmission-dependent Utilities
☐ MAIN	☐	5 - Electric Generators
☐ MAPP	☐	6 - Electricity Brokers, Aggregators, and Marketers
☐ NPCC	☐	7 - Large Electricity End Users
☐ SERC	☐	8 - Small Electricity End Users
☐ SPP	☐	9 - Federal, State, Provincial Regulatory or other Government Entities
☐ WECC		
☐ NA - Not Applicable		

Group Comments (Complete this page if comments are from a group.)

Group Name:

Lead Contact:

Contact Organization:

Contact Segment:

Contact Telephone:

Contact Email:

Additional Member Name	Additional Member Organization	Region*	Segment*

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

TXU Electric Delivery proposes that Frequency Response Guidelines at the NERC level should only be in general terms and require that each Reliability Authority establish a specific Frequency Response Standard with detailed specifications as appropriate for its region.

Question 2: Do you agree with the scope and applicability of the proposed standard?

☒ Yes
☐ No

If no, please explain in the space provided below.

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☐ Yes

☒ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Comments

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☐ Yes

☒ No

If yes, please share those comments in the space provided below.

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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:		
Organization:		
Telephone:		
Email:		
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT ☐ ECAR ☐ FRCC ☐ MAAC ☐ MAIN ☐ MAPP ☐ NPCC ☐ SERC ☐ SPP ☐ WECC ☐ NA - Not Applicable	☐	1 - Transmission Owners
	☐	2 - RTOs, ISOs, Regional Reliability Councils
	☐	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

Group Comments (Complete this page if comments are from a group.)

Group Name: RTO/ISO Standards Review Committee

Lead Contact: **Karl Tammar**

Contact Organization: **NYISO**

Contact Segment: 2

Contact Telephone: **518-356-6205**

Contact Email: **ktammar@nyiso.com**

Additional Member Name	Additional Member Organization	Region*	Segment*
Dale McMaster	**AESO**	**WECC**	**2**
Ed Riley	**CAISO**	**WECC**	**2**
Sam Jones	**ERCOT**	**ERCOT**	**2**
Peter Henderson	**IESO**	**NPCC**	**2**
Peter Brandien	**ISO-NE**	**NPCC**	**2**
Bill Phillips	**MISO**		**2**
Karl Tammar	**NYISO**	**NPCC**	**2**
Bruce Balmat	**PJM**	**MAAC**	**2**
Charles Yeung	**SPP**	**SPP**	**2**

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

☒ Yes

☒ No

If no, please explain in the space provided below.

Comments

We agree in general that there is a reliability need to have frequency response, particularly during disturbances, islanding and restoration. The standard should provide the process for a technically sound calculation of frequency response and bias (both fixed and variable).

Any new standards on frequency response need not and should not be onerous by finding BAs noncompliant with response less than average or below some un-validated norms.

If performance is significantly less than an Interconnection norm, the standard should not trigger an automatic non-compliance. In these situations the BA should perform an internal review/assessment that ensures governors are working as designed, that the BA knows which resources are frequency responsive (so the information can be included in restoration plans), whether governors can be triggered to be more responsive during disturbances, etc and satisfy the Interconnection requirement. If the Interconnection requirement is not met within a reasonable timeframe then the BA should be deemed as non-compliant.

When required, the validation of governor performance could be achieved either through online monitoring in an EMS or periodic testing (both methods should be explained in a reference document to support the standard).

The standard should acknowledge that some units might not provide response under normal operations (e.g. nuclear units operating at full load) and that response is highly variable event-to-event based on simultaneous load changes.

The standard should acknowledge the differing Interconnection requirements (smaller Interconnections need greater response).

The standard should also track Interconnection and BA areas response over time (years) and be reevaluated as performance changes.

Question 2: Do you agree with the scope and applicability of the proposed standard?

☐ Yes

☒ No

If no, please explain in the space provided below.

There is a general need for a standard, but the outcomes and expectations should address the comments raised in question 1.

While we agree that the standard should not preclude market solutions (e.g. allow purchasing of response as long as deliverability and restoration criteria can be met), we have concerns with the statement *There must be a means for sale/purchase of frequency response as for any other quantity.*

It is not clear what is meant by *A method of allocation must be developed"* Is this an allocation of Interconnection response to BAs, BA allocation to generators or something different?

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☐ Yes

☒ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Comments

Unless the Version 0 (BAL-003-0 — Frequency Response and Bias) can be clarified and brought in line with this proposed standard, it should be stand-alone.

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☒ Yes

☐ No

If yes, please share those comments in the space provided below.

We appreciate the opportunity to comment and believe there is a need for such a standard.

It needs to be recognized that there are two objectives for governor response, namely, to provide response on an interconnection wide basis to maintain an acceptable frequency and secondly to control frequency in island situations. The former may allow for averaging over an area of the response requirement but the latter may limit the extent of averaging.

Published studies show frequency response is declining when it should be increasing with load. The main concerns with this decreasing performance are:

There may be areas unable to withstand severe disturbances.

Following a grid separation or collapse, control areas may be unable to fulfill their blackstart and restoration responsibilities, thereby becoming a burden to neighbors.

Because engineering models use theoretical frequency response, they are likely over optimistic and may misstate grid stability limits.

This standard would allow the industry to determine whether the decline is local or global.

Rather than implementing a complicated infrastructure or process, we would suggest that NERC automate the calculation of frequency response by either:

Asking BAs to save their CPS-source data in a common format so a common tool can be used (MAPP BAs and some others use a common tool that can calculate frequency response with CPS-source data).

Embed the calculation in the NERC ACE-monitoring application.

Refer to our earlier comments the structure of the standard (where lower amounts of BA response trigger an internal assessment rather than automatic assignment of non-compliance). BAs (and ultimately generators) would only be initially non-compliant if their response was low AND the BA failed to perform a reliability assessment in conjunction with its TOP. Non compliance should be assessed if the BA does not alleviate the deficiency within a reasonable timeframe. This default assessment would be at the BA level, but could be on an area basis (likely islanding area or where a TSP has responsibility for frequency responsive and black start ancillary services).

The standard should employ a methodology that not only captures initial response (first few seconds after the event) but also the sustained response until AGC action takes over

Each Interconnection should have the ability to add and further define the standard to meet its needs.

Providing visibility on where and when performance is substandard will likely initiate sufficient action to arrest the decline in performance. Minimum performance standards could be implemented after the industry has identified what is reasonably achievable and technically justified.

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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:		
Organization: Bonneville Power Administration		
Telephone:		
Email:		
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT ☐ ECAR ☐ FRCC ☐ MAAC ☐ MAIN ☐ MAPP ☐ NPCC ☐ SERC ☐ SPP ☒ WECC ☐ NA - Not Applicable	☒	1 - Transmission Owners
	☐	2 - RTOs, ISOs, Regional Reliability Councils
	☐	3 - Load-serving Entities
	☐	4 - Transmission-dependent Utilities
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	☐	7 - Large Electricity End Users
	☐	8 - Small Electricity End Users
	☐	9 - Federal, State, Provincial Regulatory or other Government Entities

Group Comments (Complete this page if comments are from a group.)

Group Name: Bonneville Power Administration

Lead Contact: **Bart McManus**

Contact Organization:

Contact Segment:

Contact Telephone: **(360)418-2309**

Contact Email: **bamcmanus@bpa.gov**

Additional Member Name	Additional Member Organization	Region*	Segment*
Brian Tuck	**BPA**		
James Randall	**BPA**		
Francis Halpin	**BPA**		
Bill Mittlestat	**BPA**		
James Murphy	**BPA**		

* If more than one Region or Segment applies, indicate the best fit for the purpose of these comments. Regional acronyms and segment numbers are shown on prior page.

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☐ Yes

☒ No

If no, please explain in the space provided below.

NERC should not involve itself in the development of these standards and should allow individual interconnections to address frequency response issues independently. For example, the WECC is currently working on standards that will address this concern. They will be tailored to the specific requirements of this interconnection and will provide the best possible solution to the problem. There may be a need to specify frequency response requirements within some interconnections; however, it is not necessary, or most effective for them to be defined at the NERC level.

Comments

Question 2: Do you agree with the scope and applicability of the proposed standard?

☐ Yes

☒ No

If no, please explain in the space provided below.

The main theme that there needs to be a relationship between response and frequency decline is the right approach but requirements would be different from region to region. Standards to manage frequency response should be developed by individual interconnections; not NERC. The scope and applicability should be defined by the needs of the interconnection to provide the most benefit to system wide reliability.

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☐ Yes

☒ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

WECC has been working on frequency response standards for a few years and is close to finalizing standards specifically for the WECC interconnection. We do think there is a need for standardization of frequency response (clearly we do since WECC is doing it) BUT this standard should be developed at the Regional Council or Interconnection level and then adopted by NERC as a "Standard" with regional differences. Any new standards concerning frequency response should be developed by the individual interconnections.

Comments

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☒ Yes

☐ No

If yes, please share those comments in the space provided below.

Frequency response requirements are likely different for each of the three interconnected regions and a generalized approach will likely not meet WECC needs. The danger here is that a NERC-wide approach may not be compatible with the needs of a regional approach. Standards are currently being developed within WECC to address the frequency response concerns of this interconnection. We feel that if the Eastern Interconnection needs a Frequency Response Standard, they should utilize the NERC Frequency Response Standard Whitepaper to draft an Eastern Interconnection-specific Frequency Response Standard.

COMMENT FORM
Proposed Frequency Response Standard

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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name: Richard P. Schulz		
Organization: Richard Schulz LLC		
Telephone: 614.899.9184		
Email: r.p.schulz@ieee.org		
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT ☐ ECAR ☐ FRCC ☐ MAAC ☐ MAIN ☐ MAPP ☐ NPCC ☐ SERC ☐ SPP ☐ WECC ☒ NA - Not Applicable	☐	1 - Transmission Owners
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	☐	9 - Federal, State, Provincial Regulatory or other Government Entities

Group Comments (Complete this page if comments are from a group.)

Group Name:

Lead Contact:

Contact Organization:

Contact Segment:

Contact Telephone:

Contact Email:

Additional Member Name	Additional Member Organization	Region*	Segment*

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

Question 2: Do you agree with the scope and applicability of the proposed standard?

☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

The proposed scope and applicability, to the extent that they are in the given in the SAR, are good.

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☐ Yes

☐ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Comments

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☒ Yes

☐ No

If yes, please share those comments in the space provided below.

Please see the attachment <SAR_Comments_RPSchulz.doc>

Comments on SAR Frequency Response

First, I make these comments based on work that I've done principally at American Electric Power Service Corp, before my retirement from there in November 2000, and as founding Chair of the IEEE Task Force on Large Interconnected Power System Response to Generation Governing. These comments are entirely mine, and reflect no views of either body.

Second. It appears that the final standard will differ from any single person's opinions. Thus the specific comments below may not prevail.

Specific Comment 1:

The comment on page 4 of the SAR, "The standard should not preclude market solutions (e.g. allow purchasing of response as long as deliverability and restoration criteria can be met).There must be a means for sale/purchase of frequency response as for any other quantity." is workable only in near-normal operating conditions. But it will fail miserably when there is any islanding condition. An analogy:

> Several skydivers agree that reserve parachutes are a very good idea, but don't want to invest in 1 reserve each. So they agree that they'll buy one to share among them, so each will be saved by that spare. This means that they will hold hands until they pull their ripcords.
>
> Sounded good, until they tried it, and the first guy to pull his cord came unhitched, had a failed main 'chute, and the spare was on someone else.

Specific Comment 2:

The comment on page 4 of the SAR, "The measurement selected must be accurate and, to the extent practical, easy to implement.' may be met in the Eastern Interconnection by the underway DOE "Eastern Interconnection Phasor Project ' and by the similar WECC measurement systems, commonly called "WAMS". Les Peieira's paper, cited in the White Paper, used the WAMS measurements.

Dick Schulz
Chair, IEEE Task Force on Large Interconnected Power System Response to Generation Governing
433 S. Spring Rd.
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r.p.schulz@ieee.org or schulzes@copper.net

COMMENT FORM
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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:	Roy Boyer	
Organization:	TXU Electric Delivery	
Telephone:	214-743-6682	
Email:	rboyer@txued.com	
NERC Region		**Registered Ballot Body Segment**
x **ERCOT**	☐	1 - Transmission Owners
☐ **ECAR**	☐	2 - RTOs, ISOs, Regional Reliability Councils
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☐ **NA - Not Applicable**		

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

☐ xYes

☐ No

If no, please explain in the space provided below.

Comments

Yes, I agree there is a reliability need for specifying the quality and quantity of frequency response. There is ample evidence that specifying a droop value or that specifying governors must be in operation will not necessarily result in any useful governor response to a sudden large drop in system frequency. So yes, I think a SAR team should look into this matter. I would suggest the part load can play in arresting frequency decline be included in the scope. I would also suggest that the frequency response needs of the regions will likely vary, so final specific requirements should probably be made at the region level.

Question 2: Do you agree with the scope and applicability of the proposed standard?

☒ Yes

☐ No

If no, please explain in the space provided below.

Comments
Yes, I agree.

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☐ Yes

☐ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Comments
No opinion.

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☐ Yes

☐ xNo

If yes, please share those comments in the space provided below.

COMMENT FORM
Proposed Frequency Response Standard

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Do not submit a response in an unprotected copy of this form.

Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:	Linda Campbell	
Organization:	FRCC	
Telephone:	813-289-5644	
Email:	lcampbell@frcc.com	
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT ☐ ECAR ☒ FRCC ☐ MAAC ☐ MAIN ☐ MAPP ☐ NPCC ☐ SERC ☐ SPP ☐ WECC ☐ NA - Not Applicable	☐	1 - Transmission Owners
	☒	2 - RTOs, ISOs, Regional Reliability Councils
	☐	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

Group Comments (Complete this page if comments are from a group.)

Group Name: FRCC Region

Lead Contact: **Eric Senkowicz**

Contact Organization:

Contact Segment: **2**

Contact Telephone: **813-289-5646**

Contact Email: **erics@frcc.com**

Additional Member Name	Additional Member Organization	Region*	Segment*
Ron Donahey	**TEC**	**FRCC**	**1**
Mark Bennett	**GRU**	**FRCC**	**3**
Steve Wallace	**SEC**	**FRCC**	**5**
Steve McElhaney	**FMPA**	**FRCC**	**5**
Ted Hobson	**JEA**	**FRCC**	**1**

* If more than one Region or Segment applies, indicate the best fit for the purpose of these comments. Regional acronyms and segment numbers are shown on prior page.

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

☐ Yes

☒ No

If no, please explain in the space provided below.

Comments

The FRCC does not support the development of a Frequency Response Standard at this time. A standard for each Interconnection, although informative would be unenforceable as far as identifying short term, frequency response deficient, entities or areas. As such measurability and compliance by the relevant entities would be all but impossible. As far as an Interconnection allocation program for frequency response, we feel that the "apparent" decline in response is not significant enough to warrant a standard at this time and we would require additional details of how such a plan would be implemented and the potential economic impacts on the Regions that would be associated with that plan.

Question 2: Do you agree with the scope and applicability of the proposed standard?

☐ Yes

☒ No

If no, please explain in the space provided below.

Comments

The SAR indicates a measure of frequency response for the Interconnection, as a measure of performance. This would be very difficult to translate to individual entity compliance and thus render the standard applicable to no entities.

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☐ Yes

☒ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Comments

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☒ Yes

☐ No

If yes, please share those comments in the space provided below.

At this time the FRCC has the highest frequency settings for load shedding in the Eastern Interconnection (southern part of the Region). Being a peninsula and out of necessity, the Region has developed a well coordinated, under-frequency program for extreme frequency excursions. Ambiguity of the requirements, uncertainty of measurement and the lack of benefit to the Region require that the FRCC to oppose this Standard Authorization Request at this time.

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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:	Gerald Rheault	
Organization:	Manitoba Hydro	
Telephone:	204-487-5423	
Email:	gnrheault@hydro.mb.ca	
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT ☐ ECAR ☐ FRCC ☐ MAAC ☐ MAIN ☒ MAPP ☐ NPCC ☐ SERC ☐ SPP ☐ WECC ☐ NA - Not Applicable	■	1 - Transmission Owners
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Group Comments (Complete this page if comments are from a group.)

Group Name:

Lead Contact:

Contact Organization:

Contact Segment:

Contact Telephone:

Contact Email:

Additional Member Name	Additional Member Organization	Region*	Segment*

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

■ Yes

☐ No

If no, please explain in the space provided below.

Comments

Manitoba Hydro , from a reliability perspective, supports the idea of specifying the quantity and quality of frequency response and incorporating these elements in a Standard. However, the development of this standard should not be rushed since the evidence provided in the Standard Authorization Request form and in the Frequency Response Standard White paper shows that current frequency response and projected frequency response trends do not pose a significant potential for compromising system reliability and for major under-frequency load shedding to occur in the near term.

Also in the section of the white paper which examines “frequency response standard considerations”, a broad scope and outline is given, more detail is required especially regarding methods of ensuring compliance.

In paragraph 2, page 9 of the white paper where the current frequency response of the Eastern Interconnection is stated as 3100 MW/0.1 Hz with a standard deviation of 1870 MW/0.1 Hz and the statement is made that “the fact that an under-frequency event has not happened yet is only coincidence” requires much more detailed information regarding the origin and calculations of these numbers before these assumptions can be made. Could it be that instead of a frequency response closer to 1230MW/ 0.1 Hz it is actually practically closer to 3100 MW/ 0.1 Hz or even 4970 MW/ 0.1 Hz most of the time?

One understandable major concern addressed in the white paper is the response of combined-cycle units to frequency decline and the fact that due to a drop in combustion air volume their output may actually decrease with a drop in frequency or even result in unit tripping. Also there was concern with the possibility that larger amounts of these types of units will be installed on the system thereby potentially increasing the decline in frequency response rate from 70 MW/ 0.1 Hz /Year (Eastern Interconnection) .

It is also mentioned (on page 10) that with proper tuning combined cycle units can provide correct frequency response. Maybe part of the focus should be on finding ways of enforcing the Current Requirements (Page 14) and including specific frequency response requirements for combined-cycle units.

Question 2: Do you agree with the scope and applicability of the proposed standard?

■ Yes

☐ No

If no, please explain in the space provided below.

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☐ Yes

■ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Comments

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

■ Yes

☐ No

If yes, please share those comments in the space provided below.

Below are a few general comments on the SAR:

There is general agreement with the statement “reliance on load as the sole support to arrest the frequency can lead to a decline in the reliability of the grid” in paragraph 3, page 4 of the white paper. However enough information is not provided to substantiate statements earlier in the paragraph such as, “the turn around in frequency from points C to B attributable to unit governor response has markedly declined and at times is non-existent in the eastern interconnection” and “the line from points C to D is shifting down and becoming horizontal”.

In areas where governor response is limited it may be necessary to explore the necessity of earmarking “high-set” blocks of load , as is practiced in ERCOT, to act as a supplementary to governor response. Although it is anticipated that this approach would probably be much more difficult and challenging to co-ordinate in larger areas.

There should be careful thought put into the system/interconnection performance targets for frequency response. Perhaps the bar should be higher than preventing UFLS for credible generation loss events, i.e., provide a margin above this level. At the same time the standard should not impose unreasonable costs on entities to demonstrate compliance. The performance target should address both total interconnection response and also area or system response (potential islanding) and be very clear how generator operators (or load) obligations are allocated to achieve the performance targets.

NERC should investigate a process to monitor interconnection frequency response to be able to measure performance.

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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:	P.D. Henderson	
Organization:	Independent Electricity System Operator	
Telephone:	905 855-6258	
Email:	peter.henderson@ieso.ca	
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT ☐ ECAR ☐ FRCC ☐ MAAC ☐ MAIN ☐ MAPP ☒ NPCC ☐ SERC ☐ SPP ☐ WECC ☐ NA - Not Applicable	☐	1 - Transmission Owners
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Group Name:

Lead Contact:

Contact Organization:

Contact Segment:

Contact Telephone:

Contact Email:

Additional Member Name	Additional Member Organization	Region*	Segment*

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

We agree in general that there is a reliability need to have frequency response, in order to maintain interconnection frequency and particularly during disturbances, islanding and restoration. The standard need to address both the system needs as well as island requirements for frequency response.

The standard should provide the process for a technically sound calculation of frequency response and bias.

The standard should acknowledge that some units might not provide response under normal operations (e.g. nuclear units operating at full load) and that load response is highly variable event based on time of day or year.

The standard should acknowledge smaller areas need greater response.

Where BA areas are deficient in meeting the interconnection requirement , they should be allowed a reasonable period of time to take appropriate steps to make corrections before being assessed as non compliant.

The standard should also track area response over time (years) and be reevaluated as performance changes.

Quality should be defined. For generators it should include dead-band, droop characteristics, etc.

Question 2: Do you agree with the scope and applicability of the proposed standard?

☐ Yes

☒ No

If no, please explain in the space provided below.

While we agree that the standard should not preclude market solutions (e.g. allow purchasing of response as long as deliverability and restoration criteria can be met), we have concerns with the statement *There must be a means for sale/purchase of frequency response as for any other quantity.* The scope should exclude any reference to a means for sale/purchase of frequency response as it should only address reliability requirements.

It is not clear what is meant by *A method of allocation must be developed.* Is this an allocation of Interconnection response to BAs, BA allocation to generators or something different?

The requirements should recognize the capabilities and limitations of generators (e.g. nuclear units operating at full load).

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☐ Yes

☒ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Comments

If the existing Frequency Response and Bias Standard Version 0 (Bal-003-0) can not be clarified and brought in line with this proposed standard, it should be standalone .

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☒ Yes

☐ No

If yes, please share those comments in the space provided below.

We appreciate the opportunity to comment and believe there is a need for such a standard.

It needs to be recognized that there are two objectives for governor response, namely, to provide response on an interconnection wide basis to maintain an acceptable frequency and secondly to control frequency in island situations. The former may allow for averaging over an area of the response requirement but the latter may limit the extent of averaging.

Published studies show frequency response is declining when it should be increasing with load. The main concerns with this decreasing performance are:

There may be areas unable to withstand severe disturbances.

Following a grid separation or collapse, control areas may be unable to fulfill their blackstart and restoration responsibilities, thereby becoming a burden to neighbors.

Because engineering models use theoretical frequency response, they are likely over optimistic and may misstate grid stability limits.

This standard would allow the industry to determine whether the decline is local or global.

Rather than implementing a complicated infrastructure or process, we would suggest that NERC automate the calculation of frequency response by either:

Asking BAs to save their CPS-source data in a common format so a common tool can be used (MAPP BAs and some others use a common tool that can calculate frequency response with CPS-source data).

Embed the calculation in the NERC ACE-monitoring application.

The standard should employ a methodology that not only captures initial response (first few seconds after the event) but also the sustained response until AGC action takes over

Providing visibility on where and when performance is substandard will likely initiate sufficient action to arrest the decline in performance. Minimum performance standards could be implemented after the industry has identified what is reasonably achievable and technically justified.

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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:	Kenneth A. Goldsmith	
Organization:	Alliant Energy	
Telephone:	319-786-4167	
Email:	kengoldsmith@alliantenergy.com	
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT ☐ ECAR ☐ FRCC ☐ MAAC ☒ MAIN ☐ MAPP ☐ NPCC ☐ SERC ☐ SPP ☐ WECC ☐ NA - Not Applicable	☒	1 - Transmission Owners
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Contact Organization:

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

Question 2: Do you agree with the scope and applicability of the proposed standard?

☒ Yes
☐ No

If no, please explain in the space provided below.

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☒ Yes

☐ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Version 0 of BAL-003-0, Frequency Response and Bias; or its successor

Comments

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☐ Yes

☒ No

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Group Comments (Complete this page if comments are from a group.)

Group Name: **MAAC Staff**

Lead Contact: **Albert DiCaprio**

Contact Organization: **PJM**

Contact Segment: **2**

Contact Telephone: **610-666-8854**

Contact Email: **dicapram@pjm.com**

Additional Member Name	Additional Member Organization	Region*	Segment*
Bruce M. Balmat	**PJM**	**MAAC**	**2**
Joseph D. Willson	**PJM**	**MAAC**	**2**
Mark Kuras	**PJM**	**MAAC**	**2**

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

☐ Yes

☒ No

If no, please explain in the space provided below.

There is a need for governors but not for frequency response.

Governors are needed to resynchronize during restoration. But the need for a short-term frequency response characteristic has been obviated by the pending Version1 Balancing Standard. That standard is designed to ensure that interconnection frequency is never at such a level that the loss of the largest contingency will cause instability or cascading outages. If the system is always in such a state why would the instantaneous response to the loss of a single contingency add to the system reliability?

The SAR has not provided any definitive need.

The SAR has not provided sufficient focus vis-à-vis who is responsible to meet the standard (the generator, the BA, the Load, the RA)

This proposal has not provided any additional information concerning the need for this proposed Standard since the last time (during the Balancing Resources and Demand consensus) that a similar Frequency Response Requirement was overwhelming rejected by those who commented to that proposal.

Transient frequency response has not been the target of any major public concern. The current Version 1 Control Standard proposal provides limits on the frequency excursions that can be controlled by system-operators and their control systems. Relays and other Protection Devices serve to protect those time frames too short for an operator to respond to. What does this standard add?

Comments

This SAR is not clear as to what it really is intended to mandate. Does the requestor want to create a standard for Generator Owners to install governors? Or a standard on Generator Operators for individuals unit governor response? Or a standard for Balancing Authorities for Area response? Or for Reliability Authorities for Regional response? All of these are different requirements and have different effects.

The requestor must be clear as to what is intended. To ensure that frequency doesn't hit a relay limit (as in the Balancing standard?) or is it to address the need for governors when synchronizing?

When does the standard apply? All times (which means that NERC can go to a unit, BA or RA to check that some finite response is available?) Just at times when large events occur (the problem is of course whether or not the outage is near or far from the entity being checked)? Only during test conditions (since a unit under stress – 'valves wide open' has not governor response at that time – even though it may have the greatest of responses at other times).

The requestor's intent may be laudable but the description is no where near ready to be considered as 'standard material'.

Question 2: Do you agree with the scope and applicability of the proposed standard?

☐ Yes

☒ No

If no, please explain in the space provided below.

Frequency Response characteristics should be dictated by the Reliability entities as part of their respective control services to meet the regional synchronizing requirements as well as the longer duration control standards and of the needs of the interconnection in which they operate.

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☐ Yes

☒ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Comments

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☒ Yes

☐ No

If yes, please share those comments in the space provided below.

The SAR requestor has not provided any indication of a reliability problem. Decreasing frequency response is in and of itself not a reliability problem - more evidence is required as to the magnitude of the threat.

Any standard that is proposed, regarding frequency response, should consider both generator and load response. If Load response does provide a significant portion of the frequency response (as some people contend) then that resource must be considered in the proposal. In short the standard must make clear whether it is for interconnection response or for balancing area response or for individual generator response and individual load response.

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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:	Theodore Pappas	
Organization:	New York State Reliability Council	
Telephone:	516-545-4011	
Email:	tpappas@service.lipower.org	
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT	☐	1 - Transmission Owners
☐ ECAR	X	2 - RTOs, ISOs, Regional Reliability Councils
☐ FRCC	☐	3 - Load-serving Entities
☐ MAAC	☐	4 - Transmission-dependent Utilities
☐ MAIN	☐	5 - Electric Generators
☐ MAPP	☐	6 - Electricity Brokers, Aggregators, and Marketers
X NPCC	☐	7 - Large Electricity End Users
☐ SERC	☐	8 - Small Electricity End Users
☐ SPP	☐	9 - Federal, State, Provincial Regulatory or other Government Entities
☐ WECC		
☐ NA - Not Applicable		

Group Comments (Complete this page if comments are from a group.)

Group Name:

Lead Contact:

Contact Organization:

Contact Segment:

Contact Telephone:

Contact Email:

Additional Member Name	Additional Member Organization	Region*	Segment*

* If more than one Region or Segment applies, indicate the best fit for the purpose of these comments. Regional acronyms and segment numbers are shown on prior page.

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

X Yes

☐ No

If no, please explain in the space provided below.

Comments

Question 2: Do you agree with the scope and applicability of the proposed standard?

X Yes

☐ No

If no, please explain in the space provided below.

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☐ Yes

X No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Comments

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

X Yes

☐ No

If yes, please share those comments in the space provided below.

The Standard should define the term “event” in terms of time and frequency deviation. The frequency deviation the event must fall outside the droop deadband.

COMMENT FORM
Proposed Frequency Response Standard

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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:	Howard Rulf	
Organization:	We Energies	
Telephone:	262-574-6046	
Email:	Howard.Rulf@we-energies.com	
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT ☐ ECAR ☐ FRCC ☐ MAAC ☐ MAIN ☐ MAPP ☐ NPCC ☐ SERC ☐ SPP ☐ WECC ☐ NA - Not Applicable	☐	1 - Transmission Owners
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Group Comments (Complete this page if comments are from a group.)

Group Name:

Lead Contact:

Contact Organization:

Contact Segment:

Contact Telephone:

Contact Email:

Additional Member Name	Additional Member Organization	Region*	Segment*

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☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

Question 2: Do you agree with the scope and applicability of the proposed standard?

☒ Yes
☐ No

If no, please explain in the space provided below.

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☐ Yes

☒ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Comments

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☐ Yes

☒ No

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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:	Raymond L. Vice	
Organization:	Chairman of NERC Frequency Taskforce	
Telephone:	(205) 257-6209	
Email:	rlvice@southernco.com	
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT ☐ ECAR ☐ FRCC ☐ MAAC ☐ MAIN ☐ MAPP ☐ NPCC ☐ SERC ☐ SPP ☐ WECC ☒ NA - Not Applicable	☐	1 - Transmission Owners
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Group Comments (Complete this page if comments are from a group.)

Group Name:

Lead Contact:

Contact Organization:

Contact Segment:

Contact Telephone:

Contact Email:

Additional Member Name	Additional Member Organization	Region*	Segment*

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

Trends in Eastern and Western Interconnection Turbine Governor Response and primary frequency response over the past two decades (as documented by EPRI Project RP2473-53 and Decline of Eastern Interconnection Frequency Response by Ingleson and Nagle) as well as trends in frequency error magnitude and variance over the past five years (as documented by the NERC Resources Subcommittee at URL http://www.nerc.com/~filez/rs.html) indicate that significant frequency response degradation is occurring, particularly in the Eastern Interconnection. While not yet a crisis, these trends are indicative of significant changes in design and operational practices on the interconnected electrical systems of North America which, if not managed intelligently, can cause significant degradation in reliability. I strongly urge the industry to support this SAR and begin the process of controlled management before the processes behind these trends reach crisis proportion.

Question 2: Do you agree with the scope and applicability of the proposed standard?

☒ Yes
☐ No

If no, please explain in the space provided below.

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☒ Yes

☐ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

The Frequency Response Standard could be included as part of the Balance Resources and Demand Standard.

Comments

Since both the Frequency Response Standard and the Balance Resources and Demand Standard address frequency, they obviously must work together closely. If they are crafted, as originally intended by the Frequency Taskforce, to utilize the same CPS database, there may be savings in administrative overhead in putting them both in the same standard.

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☒ Yes

☐ No

If yes, please share those comments in the space provided below.

I personally believe that the industry will be exposing the interconnected electrical systems of North America to a significant degree of reliability risk if a Frequency Response Standard similar to the one proposed by this SAR is not adopted. This risk can be mitigated somewhat by the turbine governor requirements of Standard MOD-014-1 from the Phase III/IV Standards SAR, if passed. However, the risk can be managed properly (and in the most economical manner) only on an interconnection/balancing authority basis, not on an individual generator basis as required by Standard MOD-014-1.

What is important is that the interconnections maintain sufficient frequency responsive resources to ensure the stability of interconnection frequency under first contingency conditions. The Frequency Response Standard, as proposed, sets requirements for the management and deployment of frequency responsive resources that achieve this goal without unduly interfering with the on going operation of the interconnection. I strongly urge the industry to support this SAR.

RLV

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Email:		
NERC Region		**Registered Ballot Body Segment**
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Group Comments (Complete this page if comments are from a group.)

Group Name: Southern Company Transmission, Operations, Planning and EMS divisions

Lead Contact: **Marc Butts**

Contact Organization: **Southern Company**

Contact Segment: **1**

Contact Telephone: **205-257-4839**

Contact Email: **mmbutts@southernco.com**

Additional Member Name	Additional Member Organization	Region*	Segment*
Raymond Vice	**Southern Company Services**	**SERC**	**1**
Steve Corbin	**Southern Company Services**	**SERC**	**1**
Jim Viikinsalo	**Southern Company Services**	**SERC**	**1**
Jim Griffith	**Southern Company Services**	**SERC**	**1**
Doug McLaughlin	**Southern Company Services**	**SERC**	**1**
Monroe Landrum	**Southern Company Services**	**SERC**	**1**

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☐ No

If no, please explain in the space provided below.

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Question 2: Do you agree with the scope and applicability of the proposed standard?

☒ Yes
☐ No

If no, please explain in the space provided below.

Comments

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☐ No

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Organization:		
Telephone:		
Email:		
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Group Comments (Complete this page if comments are from a group.)

Group Name: Midwest Reliability Organization

Lead Contact: Lawrence R Larson, P E

Contact Organization: Otter Tail Power Company

Contact Segment: 2

Contact Telephone: 218/739-8572

Contact Email: llarson@otpco.com

Additional Member Name	Additional Member Organization	Region*	Segment*
Lawrence R Larson, P E	Otter Tail Power Company	MRO	2
Al Boesch	Nebraska Public Power District	MRO	2
Terry Bilke	Midwest ISO	MRO	2
Robert Coish	Manitoba Hydro	MRO	2
Dennis Florom	Lincoln Electric System	MRO	2
Ken Goldsmith	Alliant Energy	MRO	2
Todd Gosnell	Omaha Public Power District	MRO	2
Wayne Guttormson	Saskatchewan Power Corporation	MRO	2
Jim Maenner	WPS Resources	MRO	2
Tom Mielnik	MidAmerican Energy	MRO	2
Darrick Moe	Western Area Power Administration	MRO	2
Joe Knight	Midwest Reliability Organization	MRO	2

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

We agree (with qualifications). Any new standards on frequency response need not and should not be onerous (identifying BAs noncompliant with less than average response or some un-validated norms).

The standard should provide the process for a sound calculation of frequency response and bias (both fixed and variable).

There may be valid reasons why a BA is below observed norms in response. It may meet most of its obligations with schedules.

Rather than generate an automatic non-compliance when response is below some benchmark, the standard should require an internal review that ensures governors are working as designed, that the BA knows which resources are frequency responsive (so the information can be included in restoration plans), whether governors can be put in more responsive modes during disturbances, etc.

The standard should have some requirements on generators if the BA is not providing the response outlined in the standard (governors should be working as designed).

The standard should also track Interconnection response over time and identify a target response (different for each Interconnection). NERC or NAESB will want to look at how this is allocated to BAs and generators.

Question 2: Do you agree with the scope and applicability of the proposed standard?

☒ Yes
☐ No

If no, please explain in the space provided below.

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☒ Yes

☐ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Version 0 (BAL-003-0 — Frequency Response and Bias) or its successor is a logical place. Depending on the outcome of the V1 Balance Resource and Demand standard, it could reside there.

Comments

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☒ Yes

☐ No

If yes, please share those comments in the space provided below.

We appreciate the opportunity to comment and believe there is a need for such a standard. Published studies show frequency response is declining when it should be increasing with load.

Because there is no process in place to track BA or Interconnection response, we don't know whether the decline is local or global. Primary concerns with this decreasing performance in primary control:

1. There may be areas unable to withstand severe disturbances.
2. Following a grid separation or collapse, control areas may be unable to fulfill their blackstart and restoration responsibilities, thereby becoming a burden to neighbors.
3. Because engineering models use theoretical frequency response, they are likely overoptimistic and may misstate grid stability limits.

Rather than putting in a complicated infrastructure or process, we would suggest that NERC automate the calculation of frequency response by either:

- Asking BAs to save their CPS-source data in a common format so a common tool can be used (MAPP BAs and some others use a common tool that can calculate frequency response with CPS-source data).
- Embed the calculation in the NERC ACE-monitoring application.

The standard will need to acknowledge the large variability in individual responses at each BA due to coincident load changes and amount and mix of generation. In addition, smaller Interconnections likely need greater response.

Refer to our earlier comments the structure of the standard (where lower amounts of response trigger an internal assessment rather than assessment non-compliance). BAs (and ultimately generators) would only be initially non-compliant if their response was low AND they failed to perform the reliability assessment.

Providing visibility on where and when performance is substandard will likely initiate sufficient action to arrest the decline in performance. Minimum performance standards could be implemented after the industry has identified what is reasonably achievable and technically justified.

The standard should not preclude market solutions to providing frequency response, but such arrangements would need to be looked at closely to be sure they fulfill reliability needs.

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Individual Commenter Information (Complete this page for comments from one organization or individual.)	
Name:	Peter Burke [on behalf of ATC's John Ratajczyk (jratajczyk@atcllc.com, 262-506-6769)]
Organization:	American Transmission Company
Telephone:	262-506-6863
Email:	PBurke@atcllc.com

NERC Region		Registered Ballot Body Segment
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Group Comments (Complete this page if comments are from a group.)

Group Name:

Lead Contact:

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

Based on the NERC white paper **Frequency Response Standard Whitepaper** dated April 6, 2004 that was prepared by the Frequency task Force of the NERC Resources Subcommittee, it would appear that the decline in frequency response of both the Eastern and Western Interconnections is a reliability concern. As a transmission provider, however, there is probably little that can be done other than make sure that governor response and load modeling can be made as accurate as reasonably possible in conducting dynamic simulations and be aware of this issue in studying existing as well as new generating facilities. The control area, generation operators and turbine-generator manufacturers need guidance provided as to their responsibilities and obligations regarding frequency response. Changes in the load characteristics (e.g. fewer large motors, variable speed drives, etc) over time, plus changes in reserve sharing practices brought on by deregulation and competition are and will affect load response to frequency excursions. The type of generation (e.g. combustion turbine units, combined-cycle units) being interconnected to the system as well as the operation of the governors (e.g. blocked or improper settings) and turbines (e.g. sliding pressure, boiler-follower, etc.) of existing generators have a significant effect on the system frequency response.

Question 2: Do you agree with the scope and applicability of the proposed standard?

☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

The Frequency control standard needs to address levels required for reliability, be consistent and verifiable, and be simple to monitor for compliance purposes.

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☒ Yes

☐ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

II.B.S1M5, Test results of speed/load governor controls.

Comments

It may be appropriate to include this standard in the Phase III/IV standards that address speed/load governor controls (II.B.S1M5, Test results of speed/load governor controls). The three following customer demand related standards would be helpful in defining load response to frequency excursions:

II.E.S1.M1, Plans for the evaluation and reporting of voltage & Frequency characteristics of customer demands.

IIE.S1.M2 Documentation or requirements for determining dynamic characteristics of customer demands.

II.E.S1.M3, Customer (dynamic) demand data.

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☐ Yes

☒ No

If yes, please share those comments in the space provided below.

COMMENT FORM
Proposed Frequency Response Standard

This form is to be used to submit comments on the proposed Frequency Response Standard Authorization Request. Comments must be submitted by **February 17, 2005**. You may submit the completed form by emailing it to: sarcomm@nerc.com with the words "Frequency Response SAR Comments" in the subject line. If you have questions please contact Mark Ladrow at mark.ladrow@nerc.net or by telephone at 609-452-8060.

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Do not submit a response in an unprotected copy of this form.

Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:		
Organization:		
Telephone:		
Email:		
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT ☐ ECAR ☐ FRCC ☐ MAAC ☐ MAIN ☐ MAPP ☐ NPCC X SERC ☐ SPP ☐ WECC ☐ NA - Not Applicable	☐	1 - Transmission Owners
	☐	2 - RTOs, ISOs, Regional Reliability Councils
	☐	3 - Load-serving Entities
	☐	4 - Transmission-dependent Utilities
	X	5 - Electric Generators
	X	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

Group Comments (Complete this page if comments are from a group.)

Group Name: Southern Co. Generation

Lead Contact: **Roman Carter**

Contact Organization: **Southern Co. Generation**

Contact Segment: **6**

Contact Telephone: **205.257.6027**

Contact Email: **jrcarter@southernco.com**

Additional Member Name	Additional Member Organization	Region*	Segment*
Roman Carter	**Southern Generation**	**SERC**	**6**
Tony Reed	**Southern Generation**	**SERC**	**6**
Joel Dison	**Southern Generation**	**SERC**	**6**
Lucius Burris	**Southern Generation**	**SERC**	**6**
Lloyd Barnes	**Southern Generation**	**SERC**	**6**
Clifford Shepard	**Southern Generation**	**SERC**	**6**
Terry Crawley	**Southern Generation**	**SERC**	**5**
Roger Green	**Southern Generation**	**SERC**	**5**
Tom Higgins	**Southern Generation**	**SERC**	**5**

* If more than one Region or Segment applies, indicate the best fit for the purpose of these comments. Regional acronyms and segment numbers are shown on prior page.

Background Information:

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

Trends in Eastern and Western Interconnection Turbine Governor Response and primary frequency response over the past two decades (as documented by EPRI Project RP2473-53 and Decline of Eastern Interconnection Frequency Response by Ingleson and Nagle) as well as trends in frequency error magnitude and variance over the past five years (as documented by the NERC Resources Subcommittee at URL http://www.nerc.com/~filez/rs.html) indicate that frequency response degradation is occurring, particularly in the Eastern Interconnection. While not yet a crisis, these trends are indicative of significant changes in design and operational practices on the interconnected electrical systems of North America which, if not managed intelligently, can cause degradation in reliability. We support this SAR in an effort to begin the process of controlled management before the processes behind these trends reach crisis proportion.

Question 2: Do you agree with the scope and applicability of the proposed standard?

☒ Yes
☐ No

If no, please explain in the space provided below.

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☒ Yes

☐ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

The Frequency Response Standard could be included as part of the Balance Resources and Demand Standard.

Comments

Since both the Frequency Response Standard and the Balance Resources and Demand Standard address frequency, they obviously must work together closely. If they are crafted, as originally intended by the Frequency Taskforce, to utilize the same CPS database, there may be savings in administrative overhead in putting them both in the same standard.

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☒ Yes

☐ No

If yes, please share those comments in the space provided below.

It is believed that the industry will be exposing the interconnected electrical systems of North America to a significant degree of reliability risk if a Frequency Response Standard similar to the one proposed by this SAR is not adopted. This risk can be mitigated somewhat by the turbine governor requirements of Standard MOD-014-1 from the Phase III/IV Standards SAR, if passed. However, the risk can be managed properly (and in the most economical manner) on an interconnection/Balancing Authority basis, not on an individual generator basis as required by Standard MOD-014-1.

The governor response in MW for generators is not just dependent on the governor droop and dead-band settings, but on the design of the plant control system (sliding pressure boiler, nuclear pressurized water reactor, etc.). For example, nuclear plant operators must control reactivity changes in the core and generally cannot allow external controls to increase or decrease power levels on demand. This standard should take such factors into account and address frequency & MW response at the Balancing Authority level, not at the individual generator level**.**

What is important is that the interconnections maintain sufficient frequency responsive resources to ensure the stability of interconnection frequency under first contingency conditions. The Frequency Response Standard, as proposed, sets requirements for the management and deployment of frequency responsive resources that achieve this goal without unduly interfering with the on going operation of the interconnection. We support this SAR.

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Proposed Frequency Response Standard

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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:		
Organization:		
Telephone:		
Email:		
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT ☐ ECAR ☐ FRCC ☐ MAAC ☐ MAIN ☐ MAPP ☒ NPCC ☐ SERC ☐ SPP ☐ WECC ☐ NA - Not Applicable	☐	1 - Transmission Owners
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	☐	5 - Electric Generators
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	☐	8 - Small Electricity End Users
	☐	9 - Federal, State, Provincial Regulatory or other Government Entities

Group Comments (Complete this page if comments are from a group.)

Group Name: NPCC CP9, Reliability Standards Working Group

Lead Contact: **Guy V. Zito**

Contact Organization: **Northeast Power Coordinating Council**

Contact Segment: **2**

Contact Telephone: **212-840-1070**

Contact Email: **gzito@npcc.org**

Additional Member Name	Additional Member Organization	Region*	Segment*
Ralph Rufrano	**New York Power Authority**	**NPCC**	**1**
Kathleen Goodman	**ISO-New England**	**NPCC**	**2**
Al Adamson	**New York State Reliability Council**	**NPCC**	**2**
Bob Pelligrini	**United Illuminating**	**NPCC**	**1**
David Kiguel	**Hydro One Networks, (Ontario)**	**NPCC**	**1**
Peter Lebro	**US National Grid**	**NPCC**	**1**
Roger Champagne	**TransEnergie, (Quebec)**	**NPCC**	**1**
Brian Hogue	**NPCC**	**NPCC**	**2**
Guy Zito	**NPCC**	**NPCC**	**2**
Khaqan Khan	**The IESO, (Ontario)**	**NPCC**	**2**
Michael Potisnak	**ISO-NewEngland**	**NPCC**	**2**
Greg Campoli	**New York ISO**	**NPCC**	**2**

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The requestor would like to receive industry comments on this SAR and to obtain the input of the industry prior to determining the final scope and requirements of the SAR. Accordingly, we request your comments included on this form, emailed with the subject "Frequency Response SAR Comments" by February 17, 2005.

Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

Question 2: Do you agree with the scope and applicability of the proposed standard?

☐ Yes
☒ No

If no, please explain in the space provided below.

The applicability of this Standard to the LSE should be considered.

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☐ Yes

☒ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Comments

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☒ Yes

☐ No

If yes, please share those comments in the space provided below.

CHANGE
This SAR is proposed to develop a standard to measure sub-minute responses to changes in frequency and to set minimum acceptable responses to system these events.
TO
This SAR is proposed to develop a standard to measure sub-minute responses to changes in frequency and to set minimum acceptable responses to these system events.

COMMENT FORM
Proposed Frequency Response Standard

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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:	Howard F. Illian	
Organization:	Energy Mark, Inc.	
Telephone:	847-910-9510	
Email:	howard.illian@energymark.com	
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT	☐	1 - Transmission Owners
☐ ECAR	☐	2 - RTOs, ISOs, Regional Reliability Councils
☐ FRCC	☐	3 - Load-serving Entities
☐ MAAC	☐	4 - Transmission-dependent Utilities
☐ MAIN	☐	5 - Electric Generators
☐ MAPP	☐	6 - Electricity Brokers, Aggregators, and Marketers
☐ NPCC	☐	7 - Large Electricity End Users
☐ SERC	☒	8 - Small Electricity End Users
☐ SPP	☐	9 - Federal, State, Provincial Regulatory or other Government Entities
☐ WECC		
☒ NA - Not Applicable		

Group Comments (Complete this page if comments are from a group.)

Group Name:

Lead Contact:

Contact Organization:

Contact Segment:

Contact Telephone:

Contact Email:

Additional Member Name	Additional Member Organization	Region*	Segment*

* If more than one Region or Segment applies, indicate the best fit for the purpose of these comments. Regional acronyms and segment numbers are shown on prior page.

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

There is a reliability need but it is not an immediate reliability need for all of the interconnections. The amount of Frequency Response on the Texas Interconnection is close to the minimum acceptable amount, and therefore, there is an immediate need for a FRS on the Texas Interconnection. On the Western Interconnection, the WECC keeps close tabs on Frequency Response and takes immediate action when a problem arises with frequency response on that interconnection. Although there is no immediate need for a Frequency Response Standard on the Western Interconnection at this time, the observed reductions in Frequency Response on that interconnection make this issue an ongoing concern. Finally, there is no current need for a Frequency Response Standard on the Eastern Interconnection because current Frequency Response is adequate. However, it takes significant time to develop an effective standard and put it in place. The Balancing Resources and Demand Standard is entering its fourth year of development with expectations of at least another year before implementation. A Frequency Response Standard would be expected to take a similar period to develop. That means that it will be at least 2010 before a new FRS would be put in place. There is no question that adequate Frequency Response is required for reliability. There is no question that Frequency Response on the Eastern Interconnection is declining. There are two paths of action available; 1) Wait until adequate Frequency Response causes reliability problems and then begin the five year process to develop a standard; 2) Begin development of a FRS and determine the final need for implementation during the five year development process. I would rather have a standard that requires measurement that does not result in enforcement action, and therefore, has no effect on operations, than not have a standard when there are definite reliability problems. It will be much easier to implement a standard for Frequency Response before reliability problems occur than to implement a standard after reliability problems occur. NERC should develop a Frequency Response Standard and continue to investigate the need for the standard during its development.

Question 2: Do you agree with the scope and applicability of the proposed standard?

☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

Planning standards are not enough by themselves. Without continuous measurement, there can be no assurance that those responsible for meeting the reliability need for Frequency Response are fulfilling those responsibilities. Only a Frequency Response Standard that continuously measures response can insure that the response is available when required.

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☒ Yes

☐ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Frequency Response is closely related to the Frequency Bias used in the Balancing Resources and Demand Standard and therefore this standard should be included as an addition to that standard. If it is not included in the BRD Standard, a separate standard would require coordination between the two standards. This would make the process of updating the standards more complex.

Comments

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☒ Yes

☐ No

If yes, please share those comments in the space provided below.

NERC has the responsibility of maintaining reliability on the North American Interconnections. NERC cannot perform that function effectively if it waits for reliability problems to become apparent in system operations before it takes actions to address those problems. NERC must be a forward looking organization that anticipates future reliability problems and takes actions to resolve those problems before they affect interconnection reliability.

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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:	Terry Bilke	
Organization:	Midwest ISO	
Telephone:	317-249-5463	
Email:	tbilke@midwestiso.org	
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT ☐ ECAR ☐ FRCC ☐ MAAC ☐ MAIN ☐ MAPP ☐ NPCC ☐ SERC ☐ SPP ☐ WECC ☒ NA - Not Applicable	☐	1 - Transmission Owners
	☐	2 - RTOs, ISOs, Regional Reliability Councils
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Group Comments (Complete this page if comments are from a group.)

Group Name:

Lead Contact:

Contact Organization:

Contact Segment:

Contact Telephone:

Contact Email:

Additional Member Name	Additional Member Organization	Region*	Segment*

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

These are my individual comments as a member of the NERC Resources subcommittee and not those of representing any organization.

There is a reliability need for a light-handed standard that allows us to do a better job of ensuring response is available when required. As some entities might comment, there is adequate response in all interconnections during "system normal" conditions. The problem is what occurs during major disturbances and restoration.

A primary reason the industry needs to do a better job of tracking frequency response is the fact that response is declining when it should actually be increasing with load and generation growth.

The standard should not be structured such that it finds BAs noncompliant if response is below average or if response is low for a given event. Frequency response at the BA level is extremely variable as the measure is mingled with load fluctuation.

The standard should guide a technically sound calculation of response at the BA level and track interconnection performance over time to enable informed decisions.

If a BA performs significantly below an Interconnection norm, the standard should require the BA do an internal assessment of its key generation to verify governors are working as designed and that there will be frequency responsive resources for disturbances and restoration.

If Interconnection response significantly changes over time, the standard should be reevaluated.

Question 2: Do you agree with the scope and applicability of the proposed standard?

☒ Yes

☐ No

If no, please explain in the space provided below.

I agree, with some qualification. While the standard shouldn't preclude market solutions, I don't think it must enable a market as the scope implies. A little more clarity on the goals of the standard is needed.

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☒ Yes

☐ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Comments

It's not a major issue. It appears it should be include in the Version 0 (BAL-003-0 — Frequency Response and Bias).

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☒ Yes

☐ No

If yes, please share those comments in the space provided below.

Thanks for the opportunity to comment. I hope the SAC puts all comments in perspective. We are in a period where the industry is reluctant to adopt new standards that generate extra work and compliance exposure. The reliability of the Interconnections can benefit with minimal impact to most BAs with a light-handed standard.

Rather than implementing a complicated process, why not embed most of the effort in the NERC ACE-monitoring application? Only those BAs with unusually low response would need to drill down and do an internal assessment to determine their ability to withstand disturbances and whether they have responsive resources for blackstart.

Knowing where and when performance is substandard will likely arrest the decline in performance. Minimum performance standards could be implemented once the industry has identified what is reasonably achievable and technically justified.

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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:	John Horakh – 02-15-2005	
Organization:	MAAC	
Telephone:	609-625-6014	
Email:	john.horakh@conectiv.com	
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT ☐ ECAR ☐ FRCC X☐ MAAC ☐ MAIN ☐ MAPP ☐ NPCC ☐ SERC ☐ SPP ☐ WECC ☐ NA - Not Applicable	☐	1 - Transmission Owners
	X ☐	2 - RTOs, ISOs, Regional Reliability Councils
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	☐	8 - Small Electricity End Users
	☐	9 - Federal, State, Provincial Regulatory or other Government Entities

Group Comments (Complete this page if comments are from a group.)

Group Name:

Lead Contact:

Contact Organization:

Contact Segment:

Contact Telephone:

Contact Email:

Additional Member Name	Additional Member Organization	Region*	Segment*

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

X☐ Yes

☐ No

If no, please explain in the space provided below.

Comments

There may be a reliability need in the near future. The Whitepaper does an excellent job of making that case. For the purpose of commenting on a SAR that has not yet produced a proposed Standard, I can give it the benefit of the doubt and say yes, there is reliability need.

Question 2: Do you agree with the scope and applicability of the proposed standard?

☐ Yes

X☐ No

If no, please explain in the space provided below.

Quoted from the SAR (with corrections): This SAR is proposed to develop a standard to measure sub-minute responses to changes in frequency and to set minimum acceptable responses of the system to these events. Also quoted: The measurement selected must be accurate and, to the extent practical, easy to implement. This seems more like a research project than a request for a standard. There is no mention of any possible measurements that might be in the standard. I'm afraid that proceeding with such a vague idea of a measurement will lead the SAR or later Standard to become bogged down with research and field testing even more so than the Balance Load and Demand Standard. And Balance Load and Demand did have definite measurements in mind, thereby not requiring much research, mainly field testing. Come back with a SAR after the research is done, or at least started.

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☐ Yes

X☐ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Comments

Adding this requirement to another standard would only slow down the progress of both.

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

X☐ Yes

☐ No

If yes, please share those comments in the space provided below.

It appears Frequency Response is an accepted term used for this requirement, and therefore might be difficult to change. However, Frequency Response is not a very good description of the requirement. A term such as Transient Generator and Load Response would be more descriptive.

COMMENT FORM
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Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:	Kathy Davis	
Organization:	Tennessee Valley Authority	
Telephone:	423-751-6172	
Email:	kadavis@tva.gov	
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT ☐ ECAR ☐ FRCC ☐ MAAC ☐ MAIN ☐ MAPP ☐ NPCC x SERC ☐ SPP ☐ WECC ☐ NA - Not Applicable	x	1 - Transmission Owners
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Group Comments (Complete this page if comments are from a group.)

Group Name: Electric System Operations

Lead Contact:

Contact Organization:

Contact Segment:

Contact Telephone:

Contact Email:

Additional Member Name	Additional Member Organization	Region*	Segment*
Larry Akens	**TVA**	**SERC**	**1**
Mitch Needham	**TVA**	**SERC**	**1**
Chuck Feagans	**TVA**	**SERC**	**1**
Edd Forsythe	**TVA**	**SERC**	**1**

* If more than one Region or Segment applies, indicate the best fit for the purpose of these comments. Regional acronyms and segment numbers are shown on prior page.

Background Information:

Posted for comments is the first posting of the Frequency Response SAR. The Frequency Task Force of the NERC Resources Subcommittee has identified the transient frequency response characteristics as degrading over time and potentially threatening the reliability of the bulk electric system. This Standard Authorization Request was initiated to address this concern by developing a standard to specify a measuring convention for frequency response and by specifying a minimum required response to system disturbances based on the convention.

The requestor would like to receive industry comments on this SAR and to obtain the input of the industry prior to determining the final scope and requirements of the SAR. Accordingly, we request your comments included on this form, emailed with the subject "Frequency Response SAR Comments" by February 17, 2005.

Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

x Yes

No

If no, please explain in the space provided below.

Comments

Question 2: Do you agree with the scope and applicability of the proposed standard?

☐ Yes

x No

If no, please explain in the space provided below.

If the purpose is to purchase frequency response, then the Market Operator needs to be includes. Will this be considered an Ancillary Service?

Others that may need to be involved are Transmission Service Provider, Generator Owner, Planning Authority and Resource Planner.

Applicability should include #2

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☐ Yes

x No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Comments

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☐ Yes

x No

If yes, please share those comments in the space provided below.

COMMENT FORM
Proposed Frequency Response Standard

This form is to be used to submit comments on the proposed Frequency Response Standard Authorization Request. Comments must be submitted by **February 17, 2005**. You may submit the completed form by emailing it to: sarcomm@nerc.com with the words "Frequency Response SAR Comments" in the subject line. If you have questions please contact Mark Ladrow at mark.ladrow@nerc.net or by telephone at 609-452-8060.

ALL DATA ON THIS FORM WILL BE TRANSFERRED AUTOMATICALLY TO A DATABASE AND IT IS THEREFORE IMPORTANT TO ADHERE TO THE FOLLOWING REQUIREMENTS:

DO: **Do** enter text only, with no formatting or styles added.
Do use punctuation and capitalization as needed (except quotations).
Do use more than one form if responses do not fit in the spaces provided.
Do submit any formatted text or markups in a separate WORD file.

DO NOT: **Do not** insert tabs or paragraph returns in any data field.
Do not use numbering or bullets in any data field.
Do not use quotation marks in any data field.
Do not submit a response in an unprotected copy of this form.

Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name: Robert Blohm		
Organization:		
Telephone: 609 585 5451		
Email: rb112@columbia.edu		
NERC Region		**Registered Ballot Body Segment**
☐ ERCOT ☐ ECAR ☐ FRCC ☒ MAAC ☐ MAIN ☐ MAPP ☒ NPCC ☐ SERC ☐ SPP ☐ WECC ☐ NA - Not Applicable	☐	1 - Transmission Owners
	☐	2 - RTOs, ISOs, Regional Reliability Councils
	☐	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

Group Comments (Complete this page if comments are from a group.)

Group Name:

Lead Contact:

Contact Organization:

Contact Segment:

Contact Telephone:

Contact Email:

Additional Member Name	Additional Member Organization	Region*	Segment*

* If more than one Region or Segment applies, indicate the best fit for the purpose of these comments. Regional acronyms and segment numbers are shown on prior page.

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Question 1: Do you agree there is a reliability need for a specifying the quality and quantity of frequency response?

☒ Yes

☐ No

If no, please explain in the space provided below.

Comments

The CPS1 equation is a single equation in two variables, primary (governor) response and secondary response. Two variables require two equations in order to have a unique solution. That second equation does not currently exist and must be the proposed Frequency Response standard that pins down the value of primary (governor) response. Currently, the single CPS1 equation allows any Balancing Authority an infinity of solutions for any given CPS1 value. Accordingly, Balancing Authorities have been tending to reduce expensive primary response and increase cheaper secondary response (AGC, regulation, load following) to achieve a given CPS1 score, which is an average over time. The result has been a halving of system bias in the Eastern Interconnection and the rest of the case made for the standard in the supporting White Paper.

Question 2: Do you agree with the scope and applicability of the proposed standard?

☒ Yes
☐ No

If no, please explain in the space provided below.

Comments

Question 3: Do you believe these standards are more appropriately additions to existing standards as opposed to creating new standards?

☐ Yes

☒ No

If yes, please identify the location you believe would be the most appropriate for the proposed standard.

Comments

The SAR acknowledges that the proposed Standard not only is complementary to the Balancing Resources and Demand Standard, but also must be coordinated with that Standard. The two standards could be combined. But that is insufficient reason to oppose development of a separate Frequency Response Standard. Moreover, combining the standards would reverse the great progress made in consensus on the Balancing Resources and Demand Standard.

Question 4: Do you have any additional comments regarding the SAR that you believe should be addressed?

☐ Yes

☒ No

If yes, please share those comments in the space provided below.