Comment Report

Project Name:	2017-01 Modifications to BAL-003, Phase II | Whitepaper
Comment Period Start Date:	3/30/2021
Comment Period End Date:	4/27/2021
Associated Ballots:	

There were 31 sets of responses, including comments from approximately 85 different people from approximately 63 companies representing 7 of the Industry Segments as shown in the table on the following pages.

Questions

1. Concerns related to the current performance metric for Balancing Authorities, where the median performance of all Operating Year selected events is used to determine compliance, potentially allows for an entity to perform well in the first half of the year and then "detune" their performance for the second half of the year. Discussions related to the current requirement (Requirement R1) concluded that the after-the-fact methodology, with a median performance metric, is the preferred method to measure performance.

To address the concern of Balancing Authorities only performing for a partial year, the Standards Drafting Team (SDT) is proposing a requirement similar to BAL-002-3, Requirement R2. This new requirement in BAL-003 would mandate that an entity must have an Operating Process as part of its Operating Plan to address the needed Frequency Responsive reserves (See BA-R3 in White Paper).

Based on discussions in the White Paper, do you agree or disagree that there is a need to add the requirement BA-R3 as described in the White Paper? Please provide the reasoning or justification for your position.

2. Comments have been made that the Balancing Authorities are not seeing the Frequency Response expected from resources. To address this concern, the drafting team has discussed whether the Balancing Authorities should be directing the Generator Owners to set droop and deadband characteristics, within certain parameters, and have a process to allow for exemption from these parameters. In the White Paper, BA-R4 and BA-R5 would address this process.

a. Do you support adding requirements similar to BA-R4 and BA-R5 in the White Paper to BAL-003? Please provide the reasoning or justification to your position.

b. Instead of BA-R4 and R5, do you support a requirement for the BA to request the governor droop and deadband settings (or functional equivalent) information from the Generator Owner and a companion requirement for the Generator Owner to provide this information? Please provide the reasoning or justification to your position.

3. The SAR directs the SDT to review the applicability of the standard to determine if other entities should have some obligation under BAL-003. Most of the comments related to this issue focus on a concern that the majority of the response comes from generators and that Balancing Authorities cannot provide response without the generators performing as expected. Therefore, the SDT discussed if the GO/GOP should be an applicable entity to the standard and if performance requirements for generators are necessary.

a. The SDT has discussed this issue as documented in Section 3 of the White Paper. After reading Section 3, do you believe generator performance requirements are needed? Please provide the reasoning or justification for your position

b. If a generator performance requirement moves forward, what option detailed in Section 3 of the White Paper would be best? Please provide the reasoning or justification for your position

4. During the SDT discussions, it has been identified that the Balancing Authority would be better able to plan to operate with adequate responsive reserves if the Balancing Authority has knowledge of the resources that have the Frequency Response capability in service, and notification if the capability is not in service. Do you agree with adding requirements to BAL-003 for the Generator Owner to have the Frequency Response capability in service and for the Generator Operator to notify the Balancing Authority if there is a change in capability status? Please provide the reasoning or justification for your position.

5. Is there any other feedback you would like to provide, which you haven't already provided, to the SDT at this time related to potential modifications to the standard for a Balancing Authority, Generator Owner, and/or Generator Operator?

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
MRO	Dana Klem	1,2,3,4,5,6	MRO	MRO NSRF	Joseph DePoorter	Madison Gas & Electric	3,4,5,6	MRO
					Larry Heckert	Alliant Energy	4	MRO
					Michael Brytowski	Great River Energy	1,3,5,6	MRO
					Jodi Jensen	Western Area Power Administration	1,6	MRO
					Andy Crooks	SaskPower Corporation	1	MRO
					Bryan Sherrow	Kansas City Board of Public Utilities	1	MRO
					Bobbi Welch	Omaha Public Power District	1,3,5,6	MRO
					Jeremy Voll	Basin Electric Power Cooperative	1	MRO
					Bobbi Welch	Midcontinent ISO	2	MRO
					Douglas Webb	Kansas City Power & Light	1,3,5,6	MRO
					Fred Meyer	Algonquin Power Co.	1	MRO
					John Chang	Manitoba Hydro	1,3,6	MRO
					James Williams	Southwest Power Pool, Inc.	2	MRO
					Jamie Monette	Minnesota Power / ALLETE	1	MRO
					Jamison Cawley	Nebraska Public Power	1,3,5	MRO
					Sing Tay	Oklahoma Gas & Electric	1,3,5,6	MRO
					Terry Harbour	MidAmerican Energy	1,3	MRO

					Troy Brumfield	American Transmission Company	1	MRO
PJM Interconnection, L.L.C.	Elizabeth Davis	2	RF	ISO/RTO Council (IRC) Standards Review Committee (SRC)	Mike Del Viscio	PJM Interconnection	2	RF
					Becky Davis	PJM Interconnection	2	RF
					Gregory Campoli	New York Independent System Operator	2	NPCC
					Charles Yeung	Southwest Power Pool, Inc. (RTO)	2	MRO
					Kathleen Goodman	ISO-NE	2	NPCC
					Helen Lainis	IESO	2	NPCC
					Bobbi Welch	Midcontinent ISO, Inc.	2	RF
DTE Energy - Detroit Edison Company	Karie Barczak	3,4,5		DTE Energy - DTE Electric	Adrian Raducea	DTE Energy - Detroit Edison Company	5	RF
					Daniel Herring	DTE Energy - DTE Electric	4	RF
					Karie Barczak	DTE Energy - DTE Electric	3	RF
MRO	Kendra Buesgens	1,2,3,4,5	MRO	MRO NSRF	Bobbi Welch	Midcontinent ISO, Inc.	2	MRO
					Christopher Bills	City of Independence Power & Light	4	MRO
					Fred Meyer	Algonquin Power Co.	1	MRO
					Jamie Monette	Allete - Minnesota Power, Inc.	1	MRO
					Jodi Jensen	Western Area Power Administration - Upper Great Plains East (WAPA)	1,6	MRO
					John Chang	Manitoba Hydro	1,3,6	MRO

					Larry Heckert	Alliant Energy Corporation Services, Inc.	4	MRO
					Marc Gomez	Southwestern Power Administration	1	MRO
					Matthew Harward	Southwest Power Pool, Inc.	2	MRO
					LaTroy Brumfield	American Transmission Company, LLC	1	MRO
					Bryan Sherrow	Kansas City Board Of Public Utilities	1	MRO
					Terry Harbour	MidAmerican Energy	1,3	MRO
					Jamison Cawley	Nebraska Public Power	1,3,5	MRO
					Seth Shoemaker	Muscatine Power & Water	1,3,5,6	MRO
					Michael Brytowski	Great River Energy	1,3,5,6	MRO
					Jeremy Voll	Basin Electric Power Cooperative	1,3,5	MRO
					Joe DePoorter	Madison Gas and Electric	4	MRO
					David Heins	Omaha Public Power District	1,3,5,6	MRO
Duke Energy	Kim Thomas	1,3,5,6	FRCC,RF,SERC,Texas RE	Duke Energy	Laura Lee	Duke Energy	1	SERC
					Dale Goodwine	Duke Energy	5	SERC
					Greg Cecil	Duke Energy	6	RF
Southern Company - Southern Company Services, Inc.	Pamela Frazier	1,3,5,6	MRO,RF,SERC,Texas RE,WECC	Southern Company	Matt Carden	Southern Company - Southern Company Services, Inc.	1	SERC
					Joel Dembowski	Southern Company - Alabama Power Company	3	SERC
					Ron Carlsen	Southern Company -	6	SERC

						Southern Company Generation		
					James Howell	Southern Company - Southern Company Generation	5	SERC
OGE Energy - Oklahoma Gas and Electric Co.	Sing Tay	1,3,5,6	SPP RE	OKGE	Sing Tay	OGE Energy - Oklahoma	6	MRO
					Terri Pyle	OGE Energy - Oklahoma Gas and Electric Co.	1	MRO
					Donald Hargrove	OGE Energy - Oklahoma Gas and Electric Co.	3	MRO
					Patrick Wells	OGE Energy - Oklahoma Gas and Electric Co.	5	MRO

1. Concerns related to the current performance metric for Balancing Authorities, where the median performance of all Operating Year selected events is used to determine compliance, potentially allows for an entity to perform well in the first half of the year and then "detune" their performance for the second half of the year. Discussions related to the current requirement (Requirement R1) concluded that the after-the-fact methodology, with a median performance metric, is the preferred method to measure performance.

To address the concern of Balancing Authorities only performing for a partial year, the Standards Drafting Team (SDT) is proposing a requirement similar to BAL-002-3, Requirement R2. This new requirement in BAL-003 would mandate that an entity must have an Operating Process as part of its Operating Plan to address the needed Frequency Responsive reserves (See BA-R3 in White Paper).

Based on discussions in the White Paper, do you agree or disagree that there is a need to add the requirement BA-R3 as described in the White Paper? Please provide the reasoning or justification for your position.

Donald Lock - Talen Generation, LLC - 5	
Answer	
Document Name	
Comment	
No opinion	
Likes 0	
Dislikes 0	
Response	

Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	
Document Name	
Comment	
Texas RE seeks clarity regarding when this Operating Process would be implemented by the BA. Would this Operating Process be implemented as part of the Operating Plan(s) for the next-day under TOP-002-4, or is this a stand-alone process that could be conducted as part of seasonal studies performed to ensure adequate Frequency Responsive reserves are available based on expected conditions?	
Likes 0	
Dislikes 0	
Response	

Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	Agree
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Maryanne Darling-Reich - Black Hills Corporation - 1,3,5,6 - MRO,WECC	
Answer	Agree
Document Name	
Comment	
Nothing additional, as if is felt by industry that the SDT in the white paper addressed this reasoning/justification. Additionally as noted for “Performance” on Page 19 of the White Paper; Black Hills Corporation agrees that a GO/GOP requirement should not replace the BA requirement	
Likes 0	
Dislikes 0	
Response	
Kendra Buesgens - MRO - 1,2,3,4,5 - MRO, Group Name MRO NSRF	
Answer	Agree
Document Name	
Comment	
It is reasonable for the BA to implement an operating process that includes a forward looking assessment to ensure frequency responsible reserves are available. However, while we agree this standard should be implemented in the operations planning horizon, the standard should not become a requirement to calculate frequency responsive reserves in real-time.	
Likes 0	
Dislikes 0	
Response	

Larry Heckert - Alliant Energy Corporation Services, Inc. - 4	
Answer	Agree
Document Name	
Comment	
Alliant Energy supports the comments submitted by the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	
Answer	Agree
Document Name	
Comment	
It is reasonable for the BA to implement an operating process that includes a forward looking assessment to ensure frequency responsible reserves are available. However, while we agree this standard should be implememnted in the operations planning horizon, the standard should not become a requirement to calculate frequency responsive reserves in real-time.	
Likes 0	
Dislikes 0	
Response	
Sing Tay - OGE Energy - Oklahoma Gas and Electric Co. - 1,3,5,6, Group Name OKGE	
Answer	Agree
Document Name	
Comment	
Oklahoma Gas & Electric supports the comments submitted by the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Wendy Center - U.S. Bureau of Reclamation - 1,5	

Answer	Agree
Document Name	
Comment	
Reclamation believes that the proposed process should include compensation for a GO/GOP's provision of reserve frequency.	
Likes 0	
Dislikes 0	
Response	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	Agree
Document Name	
Comment	
The proposed requirement for BAs as developed and described in the white paper are appropriate and have been sufficiently justified. This requirement, coupled with information to be shared with the BA regarding the ability of the GO to provide frequency response, will better allow the BA to identify and plan for adequate frequency response reserves.	
Likes 0	
Dislikes 0	
Response	
Pamela Frazier - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name Southern Company	
Answer	Agree
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Karie Barczak - DTE Energy - Detroit Edison Company - 3,4,5, Group Name DTE Energy - DTE Electric	
Answer	Agree

Document Name	
Comment	
We agree that the proposed requirement for Balancing Authorities (BAs) as developed and described in the white paper are appropriate and have been sufficiently justified. This requirement, coupled with information to be shared with the BA regarding the ability of the GO to provide frequency response, will better allow the BA to identify and plan for adequate frequency response reserves.	
Likes 0	
Dislikes 0	
Response	
Daniel Gacek - Exelon - 1,3,5,6	
Answer	Agree
Document Name	
Comment	
Exelon supports the need to add the requirement for the BA to have an Operating Process as part of its Operating Plan to address the needed Frequency Responsive reserves.	
Likes 0	
Dislikes 0	
Response	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Agree
Document Name	
Comment	
BPA shares the concerns related to the median performance metric presented in this question and believes the standard could do a better job at establishing frequency responsive reserves as a reserve, and not just a median compliance metric. BPA offers a couple potential solutions to address this. 1) the SDT could change the median metric to a higher pass rate for all selected frequency events, thereby increasing the pressure for Balancing Authorities to have frequency responsive reserves online to meet a higher percentage of events. 2) If the pass rate is not going to be increased in the standard, then requiring an operating plan to have frequency responsive reserves capable of meeting FRO and obligations of transferred frequency response is the next best option. In regards to FERC's recent approval to retire BAL-002-WECC-2a, Requirement R2 (and current Project WECC-0142, which aims to retire BAL-002-WECC in full), a retirement BPA supports, BPA believes that this operating plan would help to cement in industry that frequency responsive reserves are a reserve and not just a median compliance metric.	
Likes 0	

Dislikes 0	
Response	
Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	Agree
Document Name	
Comment	
EEI agrees that the proposed requirement (Ref.: BA-R3) for BAs described in the white paper is appropriate and has been sufficiently justified. However, the term “develop” appears to unnecessary to BA-R3 since development is assumed for an Operating Process to be implemented and maintained. As an alternative, please consider the following revised language for BA-R3 which removes the term “develop” and add the term “maintain”, adding more appropriate performance-based requirements for the BA. “Each Balancing Authority shall **implement and maintain** an Operating Process at least annually, as part of its Operating Plan to schedule frequency responsive resources sufficient to maintain interconnection frequency equal to or greater than its Frequency Responsive Reserve Obligation.”	
Likes 0	
Dislikes 0	
Response	
Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC	
Answer	Disagree
Document Name	
Comment	
The frequency response performance in each interconnection has been sufficient. This is also reflected in the NERC performed analyses described in the White Paper. As a matter of fact, the interconnection performance is stable or has slightly improved over the last four years since the BAL-003-1 became effective. It means the current BAL-003-2 standard is already sufficient. It is even difficult to find qualified frequency disburbance events to do the annual frequency response survey for Eastern Interconnection and Western Interconnection due to their large sizes. There is no need to copy what TRE (the Taxas region) is doing to the multi-BA Eastern Interconnection and Western Interconnection. The proposed new/modified requirements will significantly increase the compliance effort, operation cost, and administrative burden for resource planning, real time operation and measurement, and data reporting. There are more urgent operating issues the industry is facing and more challenging tasks the industry need to do. The money and resources should be allocated wisely.	
Likes 0	
Dislikes 0	
Response	
Greg Berning - PPL - Louisville Gas and Electric Co. - NA - Not Applicable - NA - Not Applicable	
Answer	Disagree

Document Name	

Comment

While it may be possible for a BA to operate in such a way, to do so would be against a BA's interests, and thus the risk of such operation having a negative impact on system frequency is negligible, if it exists at all. Furthermore, this is not discussed as a possible justification for BA-R3 in the White Paper, presumably because the risk is so small.

According to the White Paper, while such a requirement "does not necessarily guarantee performance during an event, it does reduce the risk that a BA might operate in a state with inadequate Frequency Response." (P.9). That risk, though, has not been demonstrated and has, in fact, been shown not to exist. The Justification in the White Paper for this very requirement states that "these studies assure us that our past performance in each interconnection has been sufficient." (P.12). And while the White Paper raises the concern of "the changing resource mix", it produces no evidence or data for this concern. The only data presented is evidence that the concernis unfounded, since the sufficiency of each Interconnection's performance has continued despite on-going changes to the resource mix.

Likes 0	
Dislikes 0	

Response

Bruce Reimer - Manitoba Hydro - 1,3,5,6

Answer	Disagree
Document Name	

Comment

Likes 0	
Dislikes 0	

Response

Brian Evans-Mongeon - Utility Services, Inc. - 4

Answer	Disagree
Document Name	

Comment

Agree that BA should maintain a plan to maintain frequency reserves, the concern is that it could be at the expense of the units that are next to be dispatched. If a unit is held in reserve for frequency response, but it would be economically dispatched, then the unit should be compensated for the reserve it is providing. A Reliability Standard will not address this market concern.

Likes 0	
Dislikes 0	

Response	
Amber Parker - Tucson Electric Power - NA - Not Applicable - WECC	
Answer	Disagree
Document Name	
Comment	
The existing BAL-003 already requires BAs to meet a certain FRO; this requirement is not only redundant but essentially requires a 100% pass rate on all frequency events, when the existing standard requires the median response to be considered compliant.	
Likes 0	
Dislikes 0	
Response	
Leonard Kula - Independent Electricity System Operator - 2	
Answer	Disagree
Document Name	
Comment	

• **Assuming this requirement applies to the day-ahead and real-time operations timeframes, the anticipated cost and effort required to develop the necessary tools (for continuous monitoring of frequency response), infrastructure, documentation, and after-the-fact assessments required to support these requirements is not justified, given the evidence that frequency response performance has remained stable, if not improved, over the last 4 years (FRAA reports, Generator Surveys in 2017 and 2019).**
• **At this time, The IESO would only support seasonal assessments of adequacy of Frequency Response as part of Resource Planning.**
• **Additionally, we believe that many of the proposed requirements are premature for the following reasons:**
  ○ **The 2020 State of Reliability Report says that, despite increasing percentages of inverter interfaced generation, frequency response has generally improved or remained stable for all Interconnections.**
  ○ **The proposed standard requirements described in the whitepaper are similar to current requirements listed in BAL-001-TRE. The Texas Interconnection is a single BA interconnection. Though it has a relatively high percentage of inverter-connected resources, not all of the lessons learned in Texas are applicable in the other interconnections which must consider the nuances of numerous BAs. Consideration must be taken for the differences that occur in a multi-BA interconnection; for example, noisy NAI data (Texas does not have this problem) as well as the mechanics of implementation over a wide range of entities.**	

Likes 0	
Dislikes 0	
Response	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6	
Answer	Disagree

Document Name	
Comment	
AZPS appreciates the details and optionalities described within the White Paper by the SDT. AZPS respectfully counters that the frequency response BA requirement 3 fits more appriopriately with the Generator Owner and Generator Operator. The addition of BA R3 will create complexitities within operations as the governor droop settings and deadband is handled by the Generator Owner and/or Generator Operator.	
Likes 0	
Dislikes 0	
Response	
Elizabeth Davis - PJM Interconnection, L.L.C. - 2 - RF, Group Name ISO/RTO Council (IRC) Standards Review Committee (SRC)	
Answer	Disagree
Document Name	
Comment	
The IRC/SRC agrees with having an Operating Process to set recommended bias and deadband settings for the BA as well as communication of exceptions or outages to PFR equipment. However, establishment of a BA requirement and scheduling of frequency responsive resources to meet the BA Frequency Responsive Reserve Obligation is imprecise and not cost effective. This has the potential of scheduling excessive reserves on the system to meet expected PFR requirements (including maintaining headroom on specific resources to provide PFR that may or may not provide PFR). *Please note: MISO did not sign on to this response (question 1)*	
Likes 0	
Dislikes 0	
Response	
Bobbi Welch - Midcontinent ISO, Inc. - 2	
Answer	Disagree
Document Name	
Comment	
The White Paper Fails to Justify the Immediate Need for a Mandatory Operational Planning Process to Schedule Frequency Response (BA-R3) As compliance requires resources and increases the cost to consumers, new compliance requirements should only be created once a need and commensurate benefit to reliability has been rigorously established. The justification provided in the White Paper (pages 10-12) does not establish the immediate need or immediate reliability benefit. While existing standard may not explicitly compel entities to not detune, the data provided by the White Paper does not indicate entities in fact detune; i.e. "*these studies assure us that our past performance in each interconnection has been sufficient*."	

Recommendation: Establish Quarterly Reporting, in addition to existing Annual Assessment, for Early Detection of Degradation in Frequency Response

Another justification for BA-R3 provided in the White Paper is the changing resource mix (page 12): *"While these studies assure us that our past performance in each interconnection has been sufficient, they do not necessarily represent the changing resource mix and the potential future performance."*

To that end, MISO supports the establishment of quarterly reporting to identify early any degradation in frequency response. This would compliment the existing annual assessment process, in support of compliance with BAL-003-2, R1. This proposed approach would address the potential for performance detuning alluded to in the White Paper. Moreover, increasing the periodicity for reporting would provide the right incentive to “keep entities honest” while giving the entities and NERC a tool for early detection of performance "detuning" and degradation of frequency response. Under this recommendation, compliance with BAL-003-2 R1 would still be assessed on an annual basis to ensure adequacy of frequency response while providing leniency in a quarter where there may have been an occasional “poor” performance. Finally, this recommendation offers a more cost effective approach than BA-R3, given it pulls forward reporting that is already performed annually with the quarterly cadence, rather than creating a new process as proposed in BA-R3.

Likes 0	
Dislikes 0	

Response

Lindsay Wickizer - Berkshire Hathaway - PacifiCorp - 6

Answer	Disagree
Document Name	

Comment

Scheduling frequency response into a BA does not guarantee that the scheduled resources will respond. Units can be ramping in real time, or have no headroom. This would effectively require BAs to set aside additional generation specifically for frequency response. Additionally, AGC should not be relied upon for arrestment of decaying frequency. As noted in the white paper, it operates in the 30-45s time frame. AGC is a post-contingency solution to recover ACE.

Likes 0	
Dislikes 0	

Response

Amy Casuscelli - Xcel Energy, Inc. - 1,3,5,6 - MRO,WECC

Answer	Disagree
Document Name	

Comment

Xcel Energy disagrees that there is a need to add this proposed requirement described in the White Paper. We are concerned that the proposal would likely come at significant financial cost in that BA's may be compelled to unnecessarily purchase frequency response and/or dispatch out of order when the interconnection is not shown to lack sufficient frequency response. Inconsistent generator frequency response performance further complicates creating an operating process that estimates frequency response.

In short, our concerns are as follows:

- May have to dispatch out of order or place more synchronous generation online based on a "guesstimate" of what our response may be.
- Much of our fleet is not consistently responsive, hence making predicting FR difficult.
- Cannot predict load dampening
- If we utilize a FRRO smaller than our FRO, we may have a difficult time justifying this in compliance engagements

BAL-003 is sufficient as it stands in gauging a BA's FR

- The interconnection's FR has slightly improved since the implementation of BAL-003, even though renewable penetration has increased.

Likes 0	
Dislikes 0	

Response

Amy Jones - Public Utility District No. 2 of Grant County, Washington - 1,4,5,6

Answer	Disagree
Document Name	

Comment

BAs are in different positions and one size fits all may not be the best way to address GO and GOP issues. Since the BA will retain the R1 obligation, any requirements for a GO or GOP to report should be at the discretion of the BA. This will give the BA the right but not the obligation to collect the data. The timeline and method for the BA to inform the applicable GO or GOP can be laid out in the standard. The BA could also be given the right to only ask for the info for all generators above a certain size to allow for the BA to limit the data in a nondiscriminatory manner.

Likes 0	
Dislikes 0	

Response

2. Comments have been made that the Balancing Authorities are not seeing the Frequency Response expected from resources. To address this concern, the drafting team has discussed whether the Balancing Authorities should be directing the Generator Owners to set droop and deadband characteristics, within certain parameters, and have a process to allow for exemption from these parameters. In the White Paper, BA-R4 and BA-R5 would address this process.

a. Do you support adding requirements similar to BA-R4 and BA-R5 in the White Paper to BAL-003? Please provide the reasoning or justification to your position.

Amy Jones - Public Utility District No. 2 of Grant County, Washington - 1,4,5,6	
Answer	No
Document Name	
Comment	
Any future standard will need to differentiate between GO and GOP in all cases. References to a GO/GOP in the white paper should be differentiated as the white paper is more fully developed.	
Likes 0	
Dislikes 0	
Response	

Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	No
Document Name	
Comment	
BAs should not be specifying minimum droop and deadband settings for resources under their purview. GOs are more knowledgeable of the capability of their individual generator resources and should be the entity responsible for droop and deadband settings.	
Likes 0	
Dislikes 0	
Response	

Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	No
Document Name	
Comment	

As BPA understands it, there are already multiple agreements and guidelines that govern the setting of droop and deadband. The most influential being the newer pro forma LGIA and SGIA. It is the responsibility of the TOP to ensure that all newly connected generators meet the interconnection agreements. BPA recommends outreach be done to TOPs and Interconnection Customers to make them aware of their responsibility for ensuring that new generators operate with frequency controls, as defined in their agreements. In essence, this already makes GOs and TOPs responsible for ensuring there is adequate frequency response capability as the resource mix changes across the interconnections. BPA believes it is up to the BAs to schedule and dispatch these resources in order to meet the BAL-003 standard requirements. If interconnection agreements are not enforced, a BA may be left without enough frequency response capability within their BAA to meet its BAL-003 reliability compliance obligations.

Likes 0	
Dislikes 0	

Response

Cassie Sims - Entergy - NA - Not Applicable - SERC

Answer	No
Document Name	

Comment

2b is a better option and solution

Likes 0	
Dislikes 0	

Response

Lindsay Wickizer - Berkshire Hathaway - PacifiCorp - 6

Answer	No
Document Name	

Comment

This requirement would be redundant with FERC Order 842, requiring both synchronous and non-synchronus generators to install, maintain, and operate equipment capable of primary frequency response. BA-R5 bullet point 2 being enforced (i.e. requiring all generators to operate with governor droop control in service and not blocked by an outer loop) would be the best solution for ensuring adequate frequency response.

Likes 0	
Dislikes 0	

Response

Bobbi Welch - Midcontinent ISO, Inc. - 2

Answer	No
Document Name	
Comment	

Individual Approaches to Frequency Response Undermine Reliable Interconnection-wide Operations

Frequency is an interconnection attribute and not a Balancing Authority (BA) attribute. This means the performance of one entity impacts every other entity. As such, requirements such as BA-R4 and BA-R5, that replace interconnection-wide minimum requirements with BA-specific minimum requirements can undermine fairness across BAs within an Interconnection.

Recommendation: MISO recommends uniform, across-the-board minimum droop and deadband characteristics set by NERC to ensure reliability, consistency, and fairness across each BA within the Interconnection, with flexibility for an individual BA to require higher characteristics and/or develop other solutions to ensure adequate frequency response if needed. The minimum settings for each Interconnection should be defined in the standard.

This recommendation allows for the creativity and flexibility (alluded to in the White Paper) for the industry to develop a variety of options to ensue adequacy of frequency response.

Likes 0	
Dislikes 0	
Response	

Daniel Gacek - Exelon - 1,3,5,6

Answer	No
Document Name	
Comment	

Although Exelon supports the concept of the BAs providing target droop and deadbands to the Generator Owners, there needs to be explicit guidance for allowing an exemption from these parameters (similar to MOD-027-1) if the applicable unit is not responsive to frequency excursion events. The language cannot dictate that the Generator Owner shall meet the "direction" of the Balancing Authority when there may be a valid regulatory or equipment limitation that will not allow the generating unit to meet the requested parameters. In addition, MOD-027-1 Requirement R3 already provides a requirement that the GO must address technical concerns from its Transmission Planner. Given MOD-027-1 already provides a vehicle to address technical concerns with the turbine/governor control model, the SDT should evaluate if this project should be extended to include applicability to the Transmission Planner (TP) in addition to the Balancing Authority. It is therefore Exelon's preference that the SDT leave the GO requirement to provide individual unit turbine/governor and load control or active power/frequency control models to the Transmission Planner (TP) as required by MOD-027-1.

Likes 0	
Dislikes 0	
Response	

Karie Barczak - DTE Energy - Detroit Edison Company - 3,4,5, Group Name DTE Energy - DTE Electric

Answer	No

Document Name	
Comment	
DTE and the NAGF does not agree that BAs should be specifying minimum droop and deadband settings for generating resources in their balancing area. Generator Owners are more knowledgeable of the capability of their individual generator resources and should be the entity responsible for determining such settings. GOs can provide individual unit primary frequency responsiveness information to the BAs where needed.	
Likes 0	
Dislikes 0	
Response	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6	
Answer	No
Document Name	
Comment	
AZPS does not agree that Balancing Authorities should specify minimum droop and deadband settings for resources or direct governor settings. This responsibility should be determined by the Generator Owner and/or Generator Operator as they are the entity responsible for managing these settings.	
Likes 0	
Dislikes 0	
Response	
Amber Parker - Tucson Electric Power - NA - Not Applicable - WECC	
Answer	No
Document Name	
Comment	
It is more prudent to require GO/GOPs to provide some measure of response and let them figure out how to provide it; it may be different than what a BA considers the correct settings.	
Likes 0	
Dislikes 0	
Response	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	

Answer	No
Document Name	
Comment	

The NAGF does not agree that BAs should be specifying minimum droop and deadband settings for generating resources in their balancing area. GOs are more knowledgeable of the capability of their individual generator resources and should be the entity responsible for determining such settings. GOs can provide individual unit primary frequency responsiveness information to the BAs where needed.

Likes 0	
Dislikes 0	
Response	

Brian Evans-Mongeon - Utility Services, Inc. - 4

Answer	No
Document Name	
Comment	

This can be accomplished through the Modeling process of Mod-027 which “Each Generator Owner shall provide, for each applicable unit, a verified turbine/governor and load control or active power/frequency control model, including documentation and data..” If the setting and deadband are not sufficient to achive the desired results than the setting would have to be changed in order for the Model to work.

This is already accomplished through market rules and then verified using MOD-027.

Likes 0	
Dislikes 0	
Response	

Wendy Center - U.S. Bureau of Reclamation - 1,5

Answer	No
Document Name	
Comment	

Reclamation observes that droop and deadband are set according to the limitations of the generator and operating procedures and cannot be directed by a Balancing Authority/Transmission Operator. Reclamation recommends BAs and TOPs should utilize the speed droop and deadband settings obtained from GOs to account for the varied types and ages of generators in an entity’s footprint.

Reclamation also recommends market-based solutions should be preferred over enforced compliance through regulation. The white paper discusses market-based solutions to incentivize Frequency Response. The paper projects that market-based solutions would result in Frequency Response from

intermittent renewable resources, alleviating a concern that only a portion of generators will bear the responsibility and associated cost in lost power sales in the long term. For example, the phasing out of fossil fuels would place a larger portion of responsibility under this standard on hydropower.

Likes 0	
Dislikes 0	

Response

Dan Roethemeyer - Vistra Energy - 5

Answer	No
Document Name	

Comment

Some ISOs already specify droop and deadband settings. A new NERC Standard would be a duplication of efforts.

Likes 0	
Dislikes 0	

Response

Bruce Reimer - Manitoba Hydro - 1,3,5,6

Answer	No
Document Name	

Comment

Only GO/GOP understands the potential impact of the droop and deadband settings on their units as a whole. MH agrees that droop setting and governor deadband range at the contingency reserves and regulating reserves generation resources may impact the frequency performance response. However, these governor settings at non-reserves generation resources of the Interconnection generation resources will have a minimum impact on the low-frequency performance response event as most of these generation resources have a limited contribution due to not have adequate up headroom. Meeting the required droop and deadband characteristics may present GOs with the need for changes in equipment and control modes. Therefore, the generators may incur expenses to address these requirements with minimum potential reliability benefit where the existing frequency responsiveness is adequate and with no clear process for compensation. In addition, directing the Generator Owners to set droop and deadband characteristics, within certain parameters may not address the stated concerns as the governor response will also depend on the other governor controller settings such as the PID controller (response time) and control/operation constraints.

Likes 0	
Dislikes 0	

Response

Donald Lock - Talen Generation, LLC - 5

Answer	No
Document Name	
Comment	

Some existing generation units are unresponsive as-designed, in which case droop and deadband criteria are not applicable. Other units become unresponsive when running at an operational limit (e.g. CTGs under firing temperature control), causing droop and deadband requirements to create expectations that will continuously and confusingly vary between being fulfilled and unfulfilled. The massive thermal inertia of fossil units causes their response to not be sustaineable for large disturbances (throttle reserve limitations), as hinted-at in the White Paper. Attempting to deal with these circumstances via an exceptions process, rather than setting fair and technologically valid rules up-front, is unrealistic and likely to prove unduly burdensome.

Likes 0	
Dislikes 0	
Response	

Greg Berning - PPL - Louisville Gas and Electric Co. - NA - Not Applicable - NA - Not Applicable

Answer	No
Document Name	
Comment	

The Standard Drafting Team has presented no evidence for such a concern regarding sufficient primary frequency response or a risk to any Interconnection's reliability. Again, the only evidence provided by the SDT or by NERC committees shows the sufficiency of each Interconnection's performance.

Likes 0	
Dislikes 0	
Response	

Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC

Answer	No
Document Name	
Comment	

The frequency response performance in each interconnection has been sufficient. This is also reflected in the NERC performed analyses described in the White Paper. As a matter of fact, the interconnection performance is stable or has slightly improved over the last four years since the BAL-003-1 became effective. It means the current BAL-003-2 standard is already sufficient.

FERC Order 842 requires minimum interconnection requirements for new units/facilities, including the installation, maintenance, and operation of a functioning governor. If GO/GOPs follow FERC Order 842, there is no need for BAs to define Governor Settings and Operation Exemptions for

individual generators. What BAs need is the governor droop and deadband settings (or functional equivalent) information from the Generator Owner. This is why the 2(b) below is preferred.	
Likes 0	
Dislikes 0	
Response	
Anthony Jablonski - ReliabilityFirst - 10	
Answer	Yes
Document Name	
Comment	
ReliabilityFirst generally agrees with adding requirements similar to BA-R4 and BA-R5 in the White Paper to BAL-003 but it is not clear how terms such as “governor”, “droop” and “deadband” apply to inverter based resources (the applicability of these terms is clear with a conventional synchronous generator that has governor). The white paper briefly mentions inverters, but not in a lot of detail. The white paper suggests “market based solutions” for inverter based resources, but it is not clear how the SAR and ultimately the revised Standard will apply to inverter based resources.	
Likes 0	
Dislikes 0	
Response	
Amy Casuscelli - Xcel Energy, Inc. - 1,3,5,6 - MRO,WECC	
Answer	Yes
Document Name	
Comment	
With increasing renewable penetration, BAs may require a more aggressive response from online synchronous facilities. BA coordination with GOPs to create exceptions would be key, but exceptions should be created thoughtfully as they could render the requirement ineffective. We would support Part B to have a requirement for the BAs to request governor droop and deadband settings.	
Likes 0	
Dislikes 0	
Response	
Elizabeth Davis - PJM Interconnection, L.L.C. - 2 - RF, Group Name ISO/RTO Council (IRC) Standards Review Committee (SRC)	
Answer	Yes
Document Name	

Comment
This requirement would provide consistency in droop settings and deadbands within a BA and provide the BA with more visibility into the status and amounts of Primary Frequency Response. *Please note: MISO did not sign on to this response (question 2a).*

Likes 0	
Dislikes 0	

Response

Rachel Coyne - Texas Reliability Entity, Inc. - 10

Answer	Yes
Document Name	

Comment
Texas RE agrees it would be appropriate for the BA to specify minimum droop and deadband settings as proposed in the white paper. Texas RE recommends adding an additional requirement for the GO to adhere to these settings specified by the BA. Texas RE also suggests the SDT consider adding an exception process for the GOs if, for operating conditions that may support exclusion, the governors cannot be fully responsive to these settings. BAL-001-TRE-2 includes the following, non-exclusive examples of legitimate operating conditions that may support the exclusion of a GOs performance during a Frequency Measurable Event: “Operation at or near auxiliary equipment operating limits (such as boiler feed pumps, condensate pumps, pulverizers, and forced draft fans)” and “failed telemetry.”

Likes 0	
Dislikes 0	

Response

Pamela Frazier - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name Southern Company

Answer	Yes
Document Name	

Comment
This can also be accomplished by establishing the minimum settings by interconnection and establishing a GO requirement for each generator to demonstrate compliance. This option would provide the most resiliency during times of high generator outages or loss.

Likes 0	
Dislikes 0	

Response

Leonard Kula - Independent Electricity System Operator - 2	
Answer	Yes
Document Name	
Comment	
• **Requirements that specify BA responsibilities to establish deadband and droop settings with exemption criteria would positively contribute to ensuring sufficient frequency response within BAs and across the interconnect.** • **The proposed requirements will allow the BA to assess and ensure that there are enough frequency responsive resources available to immediately respond to any circumstance.**	
Likes 0	
Dislikes 0	
Response	
Sing Tay - OGE Energy - Oklahoma Gas and Electric Co. - 1,3,5,6, Group Name OKGE	
Answer	Yes
Document Name	
Comment	
Oklahoma Gas & Electric supports the comments submitted by the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	
Answer	Yes
Document Name	
Comment	
As the BA is the applicable entity to apply this standard, it is reasonable for the BA to provide minimal settings to the GO/GOP so they can determine a minimal expected response and have clear critieria for exemption from the minimal settings. However, the SDT should clarify that the BA is only setting minimal expected response and not “directing” the GO/GOP to set specific droop and deadband characteristics within certain perameters.	
Likes 0	
Dislikes 0	
Response	

Larry Heckert - Alliant Energy Corporation Services, Inc. - 4	
Answer	Yes
Document Name	
Comment	
Alliant Energy supports the comments submitted by the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Kendra Buesgens - MRO - 1,2,3,4,5 - MRO, Group Name MRO NSRF	
Answer	Yes
Document Name	
Comment	
As the BA is the applicable entity to apply this standard, it is reasonable for the BA to provide minimal settings to the GO/GOP so they can determine a minimal expected response and have clear critieria for exemption from the minimal settings. However, the SDT should clarify that the BA is only setting minimal expected response and not “directing” the GO/GOP to set specific droop and deadband characteristics within certain parameters.	
Likes 0	
Dislikes 0	
Response	
Maryanne Darling-Reich - Black Hills Corporation - 1,3,5,6 - MRO,WECC	
Answer	Yes
Document Name	
Comment	
Black Hills Corporation already follows the WECC PRC-001-WECC-CRT, which is criteria for setting our Governor Droop Setting within the Western Interconnect; thus it is felt having a BA requirement similar to that – with the BA doing the calculation(s) for all GO/GOP’s in their area is acceptable.	
Likes 0	
Dislikes 0	
Response	

Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

b. Instead of BA-R4 and R5, do you support a requirement for the BA to request the governor droop and deadband settings (or functional equivalent) information from the Generator Owner and a companion requirement for the Generator Owner to provide this information? Please provide the reasoning or justification to your position.

Kendra Buesgens - MRO - 1,2,3,4,5 - MRO, Group Name MRO NSRF

Answer	No
Document Name	

Comment

As BA-R4 and BA-R5 set minimum expectations and exemptions, simply requesting the GO/GOP governor provide its drop and deadband settings does not provide any assurance or control for the BA to meet its Frequency Reserve obligations.

Likes 0	
Dislikes 0	

Response

Larry Heckert - Alliant Energy Corporation Services, Inc. - 4

Answer	No
Document Name	

Comment

Alliant Energy supports the comments submitted by the MRO NSRF.

Likes 0	
Dislikes 0	

Response

Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF

Answer	No
Document Name	

Comment

As BA-R4 and BA-R5 set minimum expectations and exemptions, simply requesting the GO/GOP governor provide its drop and deadband settings does not provide any assurance or control for the BA to meet its Frequency Reserve obligations .

Likes 0	
Dislikes 0	

Response	
Sing Tay - OGE Energy - Oklahoma Gas and Electric Co. - 1,3,5,6, Group Name OKGE	
Answer	No
Document Name	
Comment	
Oklahoma Gas & Electric supports the comments submitted by the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Greg Berning - PPL - Louisville Gas and Electric Co. - NA - Not Applicable - NA - Not Applicable	
Answer	No
Document Name	
Comment	
There already exists in TOP-003 a requirement that gives BAs the ability to direct GOs to provide governor droop and deadband settings (or functional equivalent) information for their units. Another such requirement would simply be added cost, complexity, and risk, with no added reliability benefit.	
Likes 0	
Dislikes 0	
Response	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	No
Document Name	
Comment	
The NAGF agrees that GOs should be responsive to BA requests for governor droop and deadband settings, however, modifications to BAL-003 are not necessary to accomplish that need. Presently, TOP-003-4, provides a means for the BA to itemize and solicit data necessary for the BA to perform its analysis and Real-time monitoring, and also requires the GOs to provide the data specified in the BA request. For these reasons, modifications to BAL-003 are not necessary for BAs to obtain generator droop and deadband settings (or functional equivalent) from GOs.	
Likes 0	
Dislikes 0	

Response

Leonard Kula - Independent Electricity System Operator - 2	
Answer	No
Document Name	

Comment
N/A.

Likes 0	
Dislikes 0	

Response

Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6	
Answer	No
Document Name	

Comment
AZPS agrees that GOs should be responsive to BA requests however AZPS does not agree with creating a requirement for the BA to request the governor droop and deadband settings from the GO. AZPS agrees with EEI's comments that modifications to BAL-003 are not necessary for BAs to obtain generator droop and deadband settings from the GOs as there are data specifications within TOP-003-4 that capture the ability for BA's to make such requests. Specifically, TOP-003-4, R4 entails BA distributing its data specifications to entities and R5 requires GO and other entities receiving those specifications to satistfy the obligations of the BA specifications.

Likes 0	
Dislikes 0	

Response

Karie Barczak - DTE Energy - Detroit Edison Company - 3,4,5, Group Name DTE Energy - DTE Electric	
Answer	No
Document Name	

Comment
DTE and NAGF agrees that GOs should be responsive to BA requests for governor droop and deadband settings, however, modifications to BAL-003 are not necessary to accomplish that need. Presently, TOP-003-4, provides a means for the BA to itemize and solicit data necessary for the BA to perform its analysis and Real-time monitoring, and also requires the GOs to provide the data specified in the BA request. For these reasons, modifications to BAL-003 are not necessary for BAs to obtain generator droop and deadband settings (or functional equivalent) from GOs.

Likes 0	
Dislikes 0	
Response	
Lindsay Wickizer - Berkshire Hathaway - PacifiCorp - 6	
Answer	No
Document Name	
Comment	
TOP-003-4 R2 already gives TOPs the authority to request this data.	
Likes 0	
Dislikes 0	
Response	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	No
Document Name	
Comment	
BPA believes the Balancing Authority should be able to quantify expected frequency response from an existing generator through analysis of past events. Per FERC order 842, a Balancing Authority should be able to receive frequency control test data from the TOP for each newly connected generator. Droop and deadband settings should be within the range specified in the pro forma LGIA and SGIA and in NERC guidelines.	
Likes 0	
Dislikes 0	
Response	
Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	No
Document Name	
Comment	
GOs should be responsive to BA requests for governor droop and deadband settings, however, modifications to BAL-003 are not necessary to accomplish this. Presently, TOP-003-4, Requirement R2 requires each BA to maintain a documented specification for data necessary for it to perform its analysis and Real-time monitoring. Additionally, R4 requires the BA to distribute the specification to those entities that have the required data, and	

R5 requires GOs and other entities receiving those specifications from R3 and R4 to satisfy the obligations of those requests. For these reasons, modifications to BAL-003 are not necessary for BAs to obtain generator droop and deadband settings (or functional equivalent) from GOs.	
Likes 0	
Dislikes 0	
Response	
John Allen - City Utilities of Springfield, Missouri - 1,3,4	
Answer	No
Document Name	
Comment	
If the BA needs information on governor droop and deadband settings, then it can be obtained using the data specifications in accordance with TOP-003. If clarity is needed regarding if frequency response is one of the BA's "analysis functions", then this should be addressed by the Operational Data Exchange Simplification SAR from the SER Phase 2 team that is currently on the list of upcoming projects. Creating more data exchange requirements in BAL-003 is contrary to purpose of the SER SAR.	
Likes 0	
Dislikes 0	
Response	
Amy Jones - Public Utility District No. 2 of Grant County, Washington - 1,4,5,6	
Answer	No
Document Name	
Comment	
An entity should not be required to submit any data which they may not have access to.	
Likes 0	
Dislikes 0	
Response	
Maryanne Darling-Reich - Black Hills Corporation - 1,3,5,6 - MRO,WECC	
Answer	Yes
Document Name	
Comment	

Regarding “Requirement to provide the data – Options 4(a) and 4(b)” as discussed on page 20 of the white paper, Black Hills Corporation is OK with either option. Black Hills Corporation provides this data to our TOP & TP (via MOD-027) along with our MOD testing/Generator Certification work.

Likes 0	
Dislikes 0	

Response

Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC

Answer	Yes
Document Name	

Comment

Same as above 2(a)

Likes 0	
Dislikes 0	

Response

Donald Lock - Talen Generation, LLC - 5

Answer	Yes
Document Name	

Comment

GOs should also be allowed, and in fact encouraged, to inform the BA of inherent response limitations, ref. our response above to question 2a.

Likes 0	
Dislikes 0	

Response

Bruce Reimer - Manitoba Hydro - 1,3,5,6

Answer	Yes
Document Name	

Comment

GO/GOP owns such information. MH support a requirement for the BA to request the governor droop settings (and the droop types and based value) and total measured deadband including any intentional deadband settings (or functional equivalent) (also, it could be beneficial to request the

governor expected response time for certain frequencies deviation) information from the Generator Owner and a companion requirement for the Generator Owner to provide this information. This information could be used as an input to the BA process to evaluate the available adequate Frequency Response and in choosing to carry Operating Reserve on the most effective location and efficient resources. We think that any governor control settings change should be addressed by the Planning Coordinators as it may have much wider system implications.

Likes 0	
Dislikes 0	

Response

Wendy Center - U.S. Bureau of Reclamation - 1,5

Answer	Yes
Document Name	

Comment

Ideally this data should be added to the TOP-003 standard for reporting. BAL-003 should require the BA to request the data from the TOP and the TOP to provide the requested data to the BA.

Likes 0	
Dislikes 0	

Response

Brian Evans-Mongeon - Utility Services, Inc. - 4

Answer	Yes
Document Name	

Comment

Instead of R4 & R5 this is already accomplished when you submit the Data for Mod 027. This information has also been request a number of time through the NERC alert process.

Likes 0	
Dislikes 0	

Response

Amber Parker - Tucson Electric Power - NA - Not Applicable - WECC

Answer	Yes
Document Name	

Comment

Yes, as this allows the GO/GOP lattitude with settings but gives the BA an understanding of why a unit may respond the way it does.	
Likes 0	
Dislikes 0	
Response	
Pamela Frazier - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name Southern Company	
Answer	Yes
Document Name	
Comment	
This option can work as well, but in order to get the desired effect there needs to be an established minimum requirement that generators must comply with. Just requesting the information does not guarantee that the BA will have the needed frequency response based on the generation mix.	
Likes 0	
Dislikes 0	
Response	
Daniel Gacek - Exelon - 1,3,5,6	
Answer	Yes
Document Name	
Comment	
Exelon is not against a new requirement for the BA to request the governor droop and deadband settings information from the Generator Owner; however, this is duplicative to data that is already provided to the TP in accordance with existing requirements of MOD-027-1 which mandates a verified turbine/governor and load control or active power/frequency control model be provided for each applicable unit. In addition, TOP-003-4 also provides a means for the BA to request data as necessary to fulfill its operational and planning responsibilities.	
Likes 0	
Dislikes 0	
Response	
Cassie Sims - Entergy - NA - Not Applicable - SERC	
Answer	Yes
Document Name	

Comment	
This is a more reasonable approach and still allows for cross-communication.	
Likes 0	
Dislikes 0	
Response	
Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Dan Roethemeyer - Vistra Energy - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	
Document Name	
Comment	
Texas RE prefers BA R4 and R5 rather than the BA requesting the governor droop and deadband settings (or functional equivalent) information from the Generator Owner. Texas RE is concerned that simply requesting data does not ensure that the data meets the operational requirements for a BA to	

utilize effectively in the planning and operation of generator responsiveness. Furthermore, the BA currently has a mechanism to request such data through the TOP-00-3 data specification requirements.	
Likes 0	
Dislikes 0	
Response	
Elizabeth Davis - PJM Interconnection, L.L.C. - 2 - RF, Group Name ISO/RTO Council (IRC) Standards Review Committee (SRC)	
Answer	
Document Name	
Comment	
This type of requirement does not go far enough to provide expectations and consistency in the generator PFR settings. The BA would be aware of the settings but have no recourse to coordinate or enforce them. *Please note: MISO did not sign on to this response (question 2b)*	
Likes 0	
Dislikes 0	
Response	
Bobbi Welch - Midcontinent ISO, Inc. - 2	
Answer	
Document Name	
Comment	
MISO supports a NERC requirement for generators to provide governor droop and deadband settings to the BA.	
Likes 0	
Dislikes 0	
Response	
Amy Casuscelli - Xcel Energy, Inc. - 1,3,5,6 - MRO,WECC	
Answer	
Document Name	
Comment	

Having the BA determine more aggressive settings if needed is the preferred approach. Currently generator owners typically readily provide this information. However, there should not be an expectation that an awareness of governor droop and deadband settings will result in predicable generator response.	
Likes 0	
Dislikes 0	
Response	

3. The SAR directs the SDT to review the applicability of the standard to determine if other entities should have some obligation under BAL-003. Most of the comments related to this issue focus on a concern that the majority of the response comes from generators and that Balancing Authorities cannot provide response without the generators performing as expected. Therefore, the SDT discussed if the GO/GOP should be an applicable entity to the standard and if performance requirements for generators are necessary.

a. The SDT has discussed this issue as documented in Section 3 of the White Paper. After reading Section 3, do you believe generator performance requirements are needed? Please provide the reasoning or justification for your position

Amy Jones - Public Utility District No. 2 of Grant County, Washington - 1,4,5,6

Answer	No
Document Name	

Comment

New BA requirements may require a BA to demonstrate the availability of a certain amount of frequency responsive reserves. If this requirement is deemed necessary, the requirement should be based on the FRO for the BA and not a metric based data related to the FRM. The delta frequency used to determine the necessary reserves should not be any larger than is necessary and fully take into account under frequency load shedding as the solution for low probability frequency events with a higher delta frequency.

Likes 0	
Dislikes 0	

Response

Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable

Answer	No
Document Name	

Comment

EEI does not support primary frequency response performance requirements at this time because not all resources can provide primary frequency response, as currently equipped, or designed. Placing obligations on all generation resources when primary frequency response has been identified as stable or improving is unnecessary. EEI supports NERC efforts to continue to monitor primary frequency response, particularly while the resource mix continues to change.

Likes 0	
Dislikes 0	

Response

Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC

Answer	No

Document Name	
Comment	
BPA does not believe a performance requirement should be added to the GO for BAL 003. If it becomes apparent that new generators are not adhering to their interconnection agreements for frequency response capability, a separate standard (similar to the VAR standards; i.e., **VAR-002-4.1**) should be drafted or modified to enforce that a generator installed past the date of FERC order 842 must operate with frequency control enabled. This is a stopgap if there is a failure in enforcing LGIA and SGIA across industry.	
Likes 0	
Dislikes 0	
Response	
Cassie Sims - Entergy - NA - Not Applicable - SERC	
Answer	No
Document Name	
Comment	
Certain circumstances could require a generator to automatically halt frequency correction due to temperature or other constraints. Requiring GO/GOPs to report every instance in which this case occurs would be overly taxing on operations already focused on running a unit. Temperatures, operating at max load, even the operation of AGC while near or bouncing in and out of max load could cause undue reporting stress on the GO/GOP. Option 4 is more reasonable, but is already reported to the Transmission Planner, who models these responses of the units.	
Likes 0	
Dislikes 0	
Response	
Daniel Gacek - Exelon - 1,3,5,6	
Answer	No
Document Name	
Comment	
Generating unit performance is already scrutinized by the TP via data provided under the requirements of MOD-027-1. Adding additional requirements for the GO under BAL-003 is duplicative and would create unnecessary burden for the GO.	
Likes 0	
Dislikes 0	
Response	

Karie Barczak - DTE Energy - Detroit Edison Company - 3,4,5, Group Name DTE Energy - DTE Electric	
Answer	No
Document Name	
Comment	
DTE and NAGF does not support primary frequency response performance requirements for the following reasons: --Not all existing resources can provide primary frequency response, as currently equipped, or designed. --In the NERC 2020 State of Reliability Report, Key Finding #5 states that “For all Interconnections, frequency response performance improved or was stable in the arresting and stabilizing periods” during system disturbances. Therefore, placing governor obligations on all existing resources is unnecessary.	
Likes 0	
Dislikes 0	
Response	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6	
Answer	No
Document Name	
Comment	
AZPS agrees that generator performance should be monitored as the Balancing Authority needs to know the availability of resources however not all resources can provide primary frequency response.	
Likes 0	
Dislikes 0	
Response	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	No
Document Name	
Comment	
The NAGF does not support primary frequency response performance requirements for several reasons: • Not all existing resources can provide primary frequency response, as currently equipped, or designed.	

- In the NERC 2020 State of Reliability Report, Key Finding #5 states that “For all Interconnections, frequency response performance improved or was stable in the arresting and stabilizing periods” during system disturbances. Therefore, placing governor obligations on all existing resources is unnecessary.

Likes 0	
Dislikes 0	

Response

Wendy Center - U.S. Bureau of Reclamation - 1,5

Answer	No
Document Name	

Comment

Reclamation recommends that the BA/TOP should use data already submitted under other standards, such as MOD-027, for these purposes. If the data provided under existing standards is insufficient, Reclamation recommends the existing standards be modified to require the pertinent data.

Reclamation also recommends that GO/GOPs supply notifications to the TOP instead of directly to the BA. BAL-003 should require the BA to request the data from the TOP and the TOP to provide the requested data to the BA.

Likes 0	
Dislikes 0	

Response

Dan Roethemeyer - Vistra Energy - 5

Answer	No
Document Name	

Comment

Frequency cannot be controlled without the participation of the generators. However, frequency response is already being provided today without a NERC Standard. Some ISOs have requirements for governor settings and this topic may be better left to them.

Likes 0	
Dislikes 0	

Response

Donald Lock - Talen Generation, LLC - 5

Answer	No

Document Name	
Comment	
See our response for question 2a above. Requirements must match reality; and, as stated in the White Paper, generation units differ in their inherent capabilities to provide sustained PFR. One-size-fits-all criteria do little other than to confer unfair market advantages on certain generation plant types.	
Likes 0	
Dislikes 0	
Response	
Greg Berning - PPL - Louisville Gas and Electric Co. - NA - Not Applicable - NA - Not Applicable	
Answer	No
Document Name	
Comment	
The Standard Drafting Team has presented no evidence of demonstrable risk of Balancing Authorities being unable to provide sufficient primary frequency response or risk to any Interconncetion's reliability. Again, the only evidence provided by the SDT or by NERC committees show the sufficiency of each Interconnection's performance. As such, adding GO/GOP as an applicable entity at this time would simply add cost, complexity, and risk.	
Likes 0	
Dislikes 0	
Response	
Sing Tay - OGE Energy - Oklahoma Gas and Electric Co. - 1,3,5,6, Group Name OKGE	
Answer	No
Document Name	
Comment	
Oklahoma Gas & Electric supports the comments submitted by the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	
Answer	No

Document Name	
Comment	
The BA is the appropriate entity, and is in the best position, to determine how to meet its obligations for Frequency Response; which may include market products/solutions or other mechanisms (e.g., new technology capabilities, internal Frequency response adequacy measures and estimations, etc.) to ensure it its frequency response obligations are sufficient to meet its regional needs.	
Likes 0	
Dislikes 0	
Response	
Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC	
Answer	No
Document Name	
Comment	
The BAs have ultimate responsibility for ensuring all reserve requirements are met at the BA level. For those entities, who are both BA and GO/GOP, this is not an issue. For those BAs, which have multiple GO/GOPs within their BA foot prints, it is a coordination issue between the BA and GO/GOPs. It is not necessary to create a new requirement for all GO/GOPs.	
Likes 0	
Dislikes 0	
Response	
Larry Heckert - Alliant Energy Corporation Services, Inc. - 4	
Answer	No
Document Name	
Comment	
Alliant Energy supports the comments submitted by the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Kendra Buesgens - MRO - 1,2,3,4,5 - MRO, Group Name MRO NSRF	
Answer	No

Document Name	
Comment	
The BA is the appropriate entity, and is in the best position, to determine how to meet its obligations for Frequency Response; which may include market products/solutions or other mechanisms (e.g., new technology capabilities, internal Frequency response adequacy measures and estimations, etc.) to ensure it its frequency response obligations are sufficient to meet its regional needs.	
Likes 0	
Dislikes 0	
Response	
Lindsay Wickizer - Berkshire Hathaway - PacifiCorp - 6	
Answer	Yes
Document Name	
Comment	
GO/GOPs should be required to have functioning governor droop response, have that governor enabled, and not blocked by an outer loop controller (such as market dispatch). This is the most reasonable way to ensure adequate frequency response.	
Likes 0	
Dislikes 0	
Response	
Bobbi Welch - Midcontinent ISO, Inc. - 2	
Answer	Yes
Document Name	
Comment	
There is value in Generator Performance Requirements when the immediate benefits outweighs the costs As compliance requires resources and increases the cost to consumers, new compliance requirements should only be created once a need and commensurate benefit to reliability has been rigorously established. Compliance with the generator performance requirements, as proposed by the White Paper, could be burdensome without immediate commensurate reliability benefit in some cases. Option 1 and Option 2, in particular, would be extremely onerous to admister and comply with, even by the White Paper's own admission, with limited immediate benefit. Option 3 and Option 4 provide immediate benefit when BAs are provided flexibility in determining how to meet a results-based outcome.	
Likes 0	
Dislikes 0	
Response	

Elizabeth Davis - PJM Interconnection, L.L.C. - 2 - RF, Group Name ISO/RTO Council (IRC) Standards Review Committee (SRC)	
Answer	Yes
Document Name	
Comment	
In a competitive market environment, generators will operate their resources in the most efficient and reliable manner as possible. While normally this is a positive, there may be cases where primary frequency control equipment is bypassed to improve unit efficiency. Absent a generator performance requirement, while generators may have the plant equipment to provide PFR, they may operate in a manner that would prevent delivery of PFR.	
Likes 0	
Dislikes 0	
Response	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	Yes
Document Name	
Comment	
Texas RE agrees that generator performance requirements are needed. Since this project proposes to require the BA to schedule frequency responsive resources sufficient to maintain interconnection frequency equal to or great than its Frequency Response Reserve Obligation, the generators should be accountable for performance to adhere to the BA's schedule.	
Likes 0	
Dislikes 0	
Response	
Pamela Frazier - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name Southern Company	
Answer	Yes
Document Name	
Comment	
This response should be set to No. We do not support a requirement for the BA to request the governor droop and deadband settings.	

Likes 0	
Dislikes 0	

Response

Leonard Kula - Independent Electricity System Operator - 2

Answer	Yes
Document Name	

Comment

- **The IESO supports similar performance/testing requirements as in MOD-027-1: Verification of Models and Data for Turbine/Governor and Load Control or Active Power/Frequency Control Functions.**

Likes 0	
Dislikes 0	

Response

Amber Parker - Tucson Electric Power - NA - Not Applicable - WECC

Answer	Yes
Document Name	

Comment

The BA cannot manufacture Frequency Response without resources, therefore those resources should have some responsibility to support interconnection frequency.

Likes 0	
Dislikes 0	

Response

Brian Evans-Mongeon - Utility Services, Inc. - 4

Answer	Yes
Document Name	

Comment

Generator performance is already required to be modeled and verified under MOD-027

Likes 0	
Dislikes 0	

Response	
Bruce Reimer - Manitoba Hydro - 1,3,5,6	
Answer	Yes
Document Name	
Comment	
Generators equipped with adequate governors are the primary frequency response providers. MH agrees that a GO/GOP requirement should not replace the existing BA requirement. Shifting these requirements to GO/GOP will add a compliance burden that may be greater than the potential reliability benefit. In a large interconnected network such as Eastern interconnection, the overall response of the connect generation resources will determine the overall system frequency response following a frequency event and not be the individual generator resource responses. However, some generator performance requirements are needed to enhance the ability of the BAs to evaluate the adequacy of frequency response will require some input from a GO/GOP such as the droop and deadband characteristics of the generating resource and generating resource operating position and available frequency response mainly at the contingency reserves and regulating reserves generation resources.	
Likes 0	
Dislikes 0	
Response	
Maryanne Darling-Reich - Black Hills Corporation - 1,3,5,6 - MRO,WECC	
Answer	Yes
Document Name	
Comment	
SDT addressed in section 3 of the White Paper, Black Hills Corporation has nothing further to add	
Likes 0	
Dislikes 0	
Response	
Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Amy Casuscelli - Xcel Energy, Inc. - 1,3,5,6 - MRO,WECC	
Answer	
Document Name	
Comment	
Performance calculations will be burdensome to the entity that is required to perform them, whether it is the BA or the GO/GOP. Data quality issues could lead to incorrect analysis. Events selected must be sufficiently large to exceed deadbands and produce an expected response from a unit that is both measurable and large enough to exceed natural load fluctuations. This requirement may limit the number of events that would actually apply. Event selection for individual units must take into account variables that affect a generator's response but are outside of the GO/GOP's control (load level, load ramp, temporary equipment derates, etc). Due to the complexity of the individual calculations, there is a high probability of introducing unintended and undesirable consequences as a GO/GOP attempts to maintain compliance. However, we do ackowledg that without consistent response from generators it is difficult to predict a BA's total frequency response. Exceptions should be considered for generators that cannot provide this service.	
Likes 0	
Dislikes 0	
Response	

b. If a generator performance requirement moves forward, what option detailed in Section 3 of the White Paper would be best? Please provide the reasoning or justification for your position

Rachel Coyne - Texas Reliability Entity, Inc. - 10

Answer	
Document Name	

Comment

Texas RE's preference is to utilize a combination of options 1, 3, and 4, with the following provisions:

- Please clarify whether performance requirements referenced in Option 1 includes setting droop and deadband parameters according to BA specifications, operating with Governor in-service, and providing notification of Governor status changes, but all of these are needed in addition to the BA calculated score.
- Please clarify how exemptions are granted for specific events. Texas RE's experience reflects a need for clarity with the exemption process to mitigate a future focus on how to evaluate exemptions rather than focusing on Frequency Response performance.
- Recommend the SDT consider the timing for the exemption process.

Likes 0	
Dislikes 0	

Response

Amy Casuscelli - Xcel Energy, Inc. - 1,3,5,6 - MRO,WECC

Answer	
Document Name	

Comment

We could support Option 4 to create requirements for the GO/GOP to provide the droop, deadband and other requested data to the BA if question #1 is approved. The information would be simple to provide but would be more limited in determining the MW response expected from a generator.

We could also support a combination of Option 1 & 2 as the generator's data and the BA's oversight and review would be required.

Likes 0	
Dislikes 0	

Response

Amy Jones - Public Utility District No. 2 of Grant County, Washington - 1,4,5,6

Answer	
Document Name	

Comment

If a new standard requires a GO or GOP to communicate settings and capabilities to a BA, the following data should be considered

a. Headroom (realtime)

b. Deadband (annually for when altered)

c. Droop (annually or when altered)

A requirement is being considered in R4 to have a BA specify a minimum droop and deadband setting. Any requirement regarding minimum droop should be clear that a larger droop value is less response. (ie 3% is more responsive than 5%)

Likes 0	
Dislikes 0	

Response

Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy

Answer	Option 4
Document Name	

Comment

Duke Energy response selects Option 5 per the White Paper (i.e., Combined Options 3 and 4).

Note that White Paper Option 5 or the ability to simultaneously select Options 3 and 4 are not viable options as noted above.

Likes 0	
Dislikes 0	

Response

Maryanne Darling-Reich - Black Hills Corporation - 1,3,5,6 - MRO,WECC

Answer	Option 4
Document Name	

Comment

Black Hills Corporation feels that a **combination of Options 3 & 4** as described on the bottom of page 14 of the White Paper is the best option. However, the calculation method remains the BA responsibility, not GO/GOPs.

Likes 0	
Dislikes 0	

Response

Kendra Buesgens - MRO - 1,2,3,4,5 - MRO, Group Name MRO NSRF	
Answer	Option 4
Document Name	
Comment	
Option 4 is the preferred option because it focuses on notifications from the GO/GOP to provide the BA with information to perform its operational planning analysis; however, the droop and deadband limits should not be pursuant to a directive from the BA. Rather, consistent with proposed BA-R4, the BA specifies the minimum “default” droop and deadband setting which are provided to the GO/GOP, and the GO/GOP should determine to meet the default droop and deadband or whether some other threshold is both appropriate and available under the exemption criteria of proposed BA-R5. Option 4 should not be expanded to include a real-time requirement.	
Likes 0	
Dislikes 0	
Response	
Larry Heckert - Alliant Energy Corporation Services, Inc. - 4	
Answer	Option 4
Document Name	
Comment	
Alliant Energy supports the comments submitted by the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC	
Answer	Option 4
Document Name	
Comment	
There is no need to add new generator performance requirement. If we have to choose an option, the Option 4 probably will minimize the additional compliance burden for our entity. As commented in 1(a), the compliance burden may be greater than the potential reliability benefit by placing a compliance obligation on all GO/GOPs. The frequency response performance in each interconnection has been sufficient. This is also reflected in the NERC performed analyses described in the White Paper. As a matter of fact, the interconnection performance is stable or has slightly improved over the last four years since the BAL-003-1 became effective. It means the current BAL-003-2 standard is already sufficient. There are more urgent operating issues the industry is facing and more challenging tasks the industry need to do. The money and resources should be allocated wisely.	

Likes 0	
Dislikes 0	
Response	
Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	
Answer	Option 4
Document Name	
Comment	
Option 4 is the preferred option because it focuses on notifications from the GO/GOP to provide the BA with information to perform its operational planning analysis; however, the droop and deadband limits should not be pursuant to a directive from the BA. Rather, consistent with proposed BA-R4, the BA specifies the minimum “default” droop and deadband setting which are provided to the GO/GOP, and the GO/GOP should determine to meet the default droop and deadband or whether some other threshold is both appropriate and available under the exemption criteria of proposed BA-R5. Option 4 should not be expanded to include a real-time requirement.	
Likes 0	
Dislikes 0	
Response	
Sing Tay - OGE Energy - Oklahoma Gas and Electric Co. - 1,3,5,6, Group Name OKGE	
Answer	Option 4
Document Name	
Comment	
Oklahoma Gas & Electric supports the comments submitted by the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Donald Lock - Talen Generation, LLC - 5	
Answer	Option 4
Document Name	
Comment	

Option 1 ignores the fact that expectations must be based on inherent PFR capability, which varies with plant type, especially as regards thermal intertia effects and throttle reserve limitations. It also failts to account for constraints imposed by operational ceilings.

Option 2 has the same failings as Option 1, and imposes a burden on GOs of having to reprogram plant historians for accurate PFR scoring.

The Option 3 requirement, “notify the BA of frequency controlling device status changes,” is unworkable. CTGs in particular may wander into firing temperature control (unresponsive) and back out (responsive) several times each day.

Option 4 is the only realistic alternative, because it is based on having those that own and operate equipment describe what their plants can actually do, rather than beginning by setting uninformed and invalid expectations.

Likes 0	
Dislikes 0	

Response

Bruce Reimer - Manitoba Hydro - 1,3,5,6

Answer	Option 4
Document Name	

Comment

This makes similar requirements for governors in BAL-003 like the ones for AVR in VAR-004.

MH support a requirement for the BA to request the governor droop settings (and the droop types and based value) and total measured deadband including any intentional deadband settings (or functional equivalent) (also, it could be beneficial to request the governor expected response time for certain frequencies deviation) information from the Generator Owner and a companion requirement for the Generator Owner to provide this information. This information could be used as an input to the BA process to evaluate the available adequate Frequency Response and in choosing to carry Operating Reserve on the most effective location and efficient resources.

Likes 0	
Dislikes 0	

Response

Wendy Center - U.S. Bureau of Reclamation - 1,5

Answer	Option 4
Document Name	

Comment

Under Option 4b, Reclamation recommends that the GO would communicate the current droop and deadband settings of the unit.

Option 5 (reference page 14 of the whitepaper, a combination of options 3 and 4) was left off this list. Option 5 has the benefit of modeling an approach after the VAR standards for voltage support. Option 5 would allow for the TOP/BA to adapt to situations where the frequency control is not in service at facilities and may be more generally accepted than Options 1, 2, 3, or 4 individually.

Likes 0	
Dislikes 0	

Response

Pamela Frazier - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name Southern Company

Answer	Option 4
Document Name	

Comment

We would like to revise the above response. Option 3 should be selected

A combination of Options 3 & 4a should be considered. Option 1 has technical limitations that would prevent implemenation and cause strain on EMS vendors if increased scan rates are required.

Option 1 – will be very difficult to implement due to the scan rates required. These may not be supported by the installed EMS and could be a large cost to BA's due to telecommunication upgrades, EMS replacements, etc.

Option 3 – should be modified to include specific references to inverter-based technologies and the associated setting along with any outer loop control modifications that would prevent frequency response from traditional generators.

Option 4 – 4(a) Seems to be the cleanest approach of option 4– if a recommended minimum setting is established by interconnection and a BA has additional needs then they have the flexibility to adjust for increased response. 4(B) We do not agree with the following statement because we feel there should be a set droop or deadband expectation. "There would not be a set droop or deadband expectation for each resource"

Likes 0	
Dislikes 0	

Response

Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6

Answer	Option 4
Document Name	

Comment

AZPS does not agree with the modificiations to BAL-003 however would support either a combination of GO requirements of Option 3 and 4, or GO Requirement Option 4.

Likes 0	
Dislikes 0	

Response

Daniel Gacek - Exelon - 1,3,5,6

Answer	Option 4
Document Name	

Comment

Of the options detailed in Section 3 of the White Paper, Option 4 seems the most reasonable; however, as previously stated the turbine/governor and load control or active power/frequency control modeling information is currently provided to the TP under MOD-027-1.

Likes 0	
Dislikes 0	

Response

Bobbi Welch - Midcontinent ISO, Inc. - 2

Answer	Option 4
Document Name	

Comment

MISO supports Option #5 (a combination of Option #3 and Option #4)

MISO supports a combination of Option #3 and Option #4, proposed as Option #5 on page 14 of the White Paper, where the Generator Owner (GO) / Generator Operator (GOP) is required to operate with their governor in service and to notify its BA when it is out of service (Option #3) and the BA is able to create requirements for the GO/GOP to provide the droop, deadband and other requested data to the BA.

MISO supports aspects of Option #4; i.e. generator reporting, but does not support individual BAs setting their own droop requirements as this can undermine reliable Interconnection-wide operations.

Frequency is an interconnection attribute and not a Balancing Authority (BA) attribute. This means insufficient performance by one entity impacts every other entity. As such, MISO does not support requirements such as BA-R4 and BA-R5, that replace interconnection-wide minimum settings with BA-specific minimum settings. MISO believes it is essential to have uniform, minimum requirements across an Interconnection to ensure consistency and fairness across BAs within an Interconnection. MISO is open to a provision that would provide an individual BA with the flexibility to require settings higher than the interconnection minimum to meet its frequency response obligation if needed; however, not less. If uniform, minimum settings are not required, it could lead to inequities in terms of response and undermine the coordination of reliable operations.

Recommendation: MISO recommends uniform, across-the-board minimum droop and deadband characteristics set by NERC to ensure reliability, consistency and fairness across each Balancing Authority within the Interconnection, with flexibility for an individual BA to require higher characteristics if needed. The minimum settings for each Interconnection should be defined in the standard.

Option #1 is Not Designed for Use in Multi-BA Interconnections

Of the generator performance requirement options presented in the White Paper, Option #1 is least suited for application in the Eastern Interconnection as it proposes to **copy *all* BAL-001-TRE performance requirements** to form the basis for compliance in multi-BA Interconnections. As **BAL-001-TRE: Frequency Response in the ERCOT Region** was designed for use in an Interconnection with a single BA; i.e. ERCOT, it cannot be assumed that these requirements would ensure reliable operations in either the Eastern Interconnection or Western Interconnection. An abundance of caution should be exercised in directly adopting any provisions from **BAL-001-TRE** until they are modified for use in a multi-BA Interconnection; i.e. in either the Eastern Interconnection or Western Interconnection.	
Likes 0	
Dislikes 0	
Response	
Cassie Sims - Entergy - NA - Not Applicable - SERC	
Answer	Option 4
Document Name	
Comment	
Option 4 is the only viable option.	
Likes 0	
Dislikes 0	
Response	
Greg Berning - PPL - Louisville Gas and Electric Co. - NA - Not Applicable - NA - Not Applicable	
Answer	Option 3
Document Name	
Comment	
Option 3 is the least intrusive option that does not introduce compliance obligations that already exist in other requirements (cf. Option 4). Option 3 would be the best choice (other than maintaining the current Standard) for continuing to provide an adequate level of reliability.	
Likes 0	
Dislikes 0	
Response	
Dan Roethemeyer - Vistra Energy - 5	
Answer	Option 3
Document Name	

Comment	
Option 3 is similar to the voltage requirements of VAR-002, a Standard that has been in force for some time. This seems to be a midpoint between overly prescriptive limits of Option 1 and Option 2 and simply providing settings in Option 4.	
Likes 0	
Dislikes 0	
Response	
Brian Evans-Mongeon - Utility Services, Inc. - 4	
Answer	Option 3
Document Name	
Comment	
Option 1 – Continues to put burden on the frequency response units of which you are trying to save Option 2 – Continues to put burden on the frequency response units of which you are trying to save. Compensation needs o be provided for the benefit that is being mandated. Option 3 – Aligns with VAR-002 AVR status requests. This makes the most sense operationally Option 4 - Already provided through MOD-027	
Likes 0	
Dislikes 0	
Response	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	Option 3
Document Name	
Comment	
The NAGF does not believe that generator performance requirements are needed at this time and therefore supports “Option 3 – Resource Governor In-Service Requirement” which would provide adequate frequency control ability. This option will enhance BES reliability through improved data/system awareness. Providing BAs governor data allows them to better plan and model generating resource capability. In addition, this approach will provide clear requirements that would compel GOs to notify the BAs whenever generator governors are out of service providing a higher level of situational awareness so that load and generation balance can be more effectively maintained.	
Likes 0	
Dislikes 0	

Response	
Amber Parker - Tucson Electric Power - NA - Not Applicable - WECC	
Answer	Option 3
Document Name	
Comment	
GO/GOPs should monitor their own frequency response so they can make adjustments and improve performance.	
Likes 0	
Dislikes 0	
Response	
Leonard Kula - Independent Electricity System Operator - 2	
Answer	Option 3
Document Name	
Comment	

- **The IESO supports Option 3:**
  - **This option ensures that there are enough frequency responsive resources available to immediately respond to any circumstance without undue compliance burden**
  - **This option would seem to align with FERC order 842 which requires that all new generating facilities install, maintain and operate a functioning governor or equivalent controls as a precondition of interconnection. Also requiring agreements to include certain operating requirements such as maximum droop and deadband parameters, and sustained response provisions.**
  - **The IESO does not support Options 1 and 2 because the associated calculation processes are too onerous for both BAs and GOs/GOPs relative to the potential reliability benerfits, based on the results of the Generator Surveys in 2017 and 2019.**
  - **The IESO does not support Option 4b if it results in a real-time visibility requirement, but would support 4a as a one-time/infrequent submission of droop and deadband settings to BAs from GOs/GOPs. We believe 4a would be sufficient to determine the amount of frequency responsive reserve available to the BA.**

Likes 0	
Dislikes 0	
Response	
Karie Barczak - DTE Energy - Detroit Edison Company - 3,4,5, Group Name DTE Energy - DTE Electric	
Answer	Option 3
Document Name	
Comment	

DTE and the NAGF does not believe that generator performance requirements are needed at this time and therefore supports “Option 3 – Resource Governor In-Service Requirement” which would provide adequate frequency control ability. This option will enhance BES reliability through improved data/system awareness. Providing BAs governor data allows them to better plan and model generating resource capability. In addition, this approach will provide clear requirements that would compel GOs to notify the BAs whenever generator governors are out of service providing a higher level of situational awareness so that load and generation balance can be more effectively maintained.

Likes 0	
Dislikes 0	

Response

Elizabeth Davis - PJM Interconnection, L.L.C. - 2 - RF, Group Name ISO/RTO Council (IRC) Standards Review Committee (SRC)

Answer	Option 3
Document Name	

Comment

A combination of Option 3 and Option 4 balances the need for generators to have and operate the generator with PFR capability enabled with the expense and administrative burden of specific generator performance measurement. More stringent performance requirements could be added if needed upon gaining experience on the effectiveness of **Options 3 and 4.**

Likes 0	
Dislikes 0	

Response

Lindsay Wickizer - Berkshire Hathaway - PacifiCorp - 6

Answer	Option 3
Document Name	

Comment

Option 3 provides the minimum requirement of the GO/GOP. It allows for the greatest risk management and flexibility, and the BA can decide how to operate if a generator has it’s governor response out of service or non-functional.

Likes 0	
Dislikes 0	

Response

Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC

Answer	Option 3

Document Name	
Comment	
BPA reiterates its response to question 3 (a) for question 3(b).	
Likes 0	
Dislikes 0	
Response	
Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	Option 3
Document Name	
Comment	
While EEI does not agree that generator performance requirements are needed at this time, if a generator performance requirement moves forward, EEI recommends “Option 3” which would provide an approach that emulates the requirements contained in Reliability Standard, VAR-002, regarding voltage control. Applying a similar obligation on GOs for frequency response would be an option to ensure that generation resources scheduled to provide frequency response by the Balancing Authority do so, while not encumbering those that do not have the ability to provide Frequency Response. This would also ensure that regulatory burdens that might otherwise obligate existing resources, which are incapable of providing primary frequency response, from modifying their generating resources in ways that would be costly and likely provide little incremental reliability benefit.	
Likes 0	
Dislikes 0	
Response	

4. During the SDT discussions, it has been identified that the Balancing Authority would be better able to plan to operate with adequate responsive reserves if the Balancing Authority has knowledge of the resources that have the Frequency Response capability in service, and notification if the capability is not in service. Do you agree with adding requirements to BAL-003 for the Generator Owner to have the Frequency Response capability in service and for the Generator Operator to notify the Balancing Authority if there is a change in capability status? Please provide the reasoning or justification for your position.

Amy Casuscelli - Xcel Energy, Inc. - 1,3,5,6 - MRO,WECC

Answer	
Document Name	

Comment

We agree to adding a requirement to have the Frequency Response capability in service, but we don't agree with the 2nd part of the question to have the GOP notify the BA of a change of capability status. We do not feel that there is a sufficient definition of "capability status" and that plants may not have sufficient controls in place to know if there has been a change in capability status. Within the recommendations section of the white paper, item 4 mentions the establishment of market incentives where additional reserve is desired. Due to the complexity of this problem, market incentives could be the best approach to ensuring improvements.

Likes 0	
Dislikes 0	

Response

Amy Jones - Public Utility District No. 2 of Grant County, Washington - 1,4,5,6

Answer	Disagree
Document Name	

Comment

Compensation for generators is being considered. This is a complicated topic that does not lend itself to a short requirement in a reliability standard. When a generator is in a BA, it increases the FRO of the BA. The generator will likely supply more response than the obligation it creates. The BA may or may not gain materially from this extra supply. Any obligation of a BA to compensate a generator for frequency response seems to be more of an issue for FERC to address rather than NERC.

Likes 0	
Dislikes 0	

Response

Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC

Answer	Disagree
Document Name	

Comment
Per FERC Order 842, nearly all newly connected generation shall "…ensure the primary frequency response capability of its Small/Large Generating Facility by installing, maintaining, and operating a functioning governor or equivalent controls." This implies a BA can assume and verify that a newly connected generator is operating with its frequency controls enabled. If the generator is not, the Balancing Authority should contact the TOP to enforce its LGIA/SGIA with the transmission customer. It must be noted that some BAs for a generator are not neccesarily the TOP as well. It will be up to the Balancing Authority to study and monitor actual frequency response performance from generators (previously and newly connected).BPA suggests enforcement of the LGIA/SGIA, rightfully, should come from the TOP via those agreements. BPA believes this process will break down if TOPs 1) do not ensure that the frequency controls are installed by the new generators, or 2) are not able to get their customers to resolve issues if they are not operating with the controls enabled.

Likes 0	
Dislikes 0	

Response

Cassie Sims - Entergy - NA - Not Applicable - SERC	
Answer	Disagree
Document Name	

Comment
If units are operated at full load or at a temperature/pressure max, unit response to under-frequency events could be disabled, while still enabling unit response to over-frequency events. In the Eastern Interconnect, it is extremely rare for an over-frequency event to occur. If a unit is operated close to, but not entirely at, their maximum range, this capability could be automatically turned off and on. This would cause undue strain on operations, whose focus should be on the operation of the unit.

Likes 0	
Dislikes 0	

Response

Daniel Gacek - Exelon - 1,3,5,6	
Answer	Disagree
Document Name	

Comment
Exelon does not support requiring the GO to notify the BA of a change in capability status subject to evidence requirements. It is standard industry practice for applicable generating units to operate with Frequency Response capability (e.g., turbine/governors) in service at all times (dependent on design).

Likes 0	
Dislikes 0	

Response

Leonard Kula - Independent Electricity System Operator - 2	
Answer	Disagree
Document Name	

Comment

- **This will likely require a sea-change in both BA and GO requirements and processes (e.g. potential for BAs to have to implement real-time monitoring of resource/system frequency response capability).**
  - **The compliance burden is far much greater than the potential reliability benefits.**
  - **The effort required to develop, pass, implement, and enforce such fundamental changes might be better spent on proposals that better serve reliability needs such as requiring:**
    - **tighter deadbands,**
    - **frequency response from inverter connected load and generation**
    - **all resources to provide frequency response**

Likes 0	
Dislikes 0	

Response

Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	Disagree
Document Name	

Comment

The NAGF agrees that GOs whose generating resources have functioning governors should set those governors and operate them in support of BES primary frequency response unless there is a technical reason for not doing so.

The NAGF does not support requiring the Generator Owner (GO) to notify the Balancing Authority if there is a change in capability status. Such notifications could become onerous for the GO depending upon the data/information to be provided and the generator operating conditions that impact frequency response capability.

Likes 0	
Dislikes 0	

Response

Wendy Center - U.S. Bureau of Reclamation - 1,5	
Answer	Disagree
Document Name	

Comment

Reclamation already provides this data to the TOP, including outage schedules, equipment failures, and other operating limitations. Adding additional notification requirements to the BA would not be an efficient use of resources. Reclamation requests the SDT clarify what is meant by “capability not in service.” Is it talking about unit availability or spinning reserves?

Additionally, Reclamation believes that neither BA-supplied settings nor new lines of communication to the BA are valid paths to pursue.

Likes 0	
Dislikes 0	

Response

Bruce Reimer - Manitoba Hydro - 1,3,5,6

Answer	Disagree
Document Name	

Comment

MH does not agree with adding this requirement to all generation resources in the BA footprint. This wide requirement (applicable to all generation resources) may add compliance burden, the potential for penalizing GO/GOP, and a potential to have significant data exchange requirements between the generator and BA with not necessarily increase Frequency Response for the non-reserve generation resources. We think that these data exchange requirements should only between the identified reserve resource facilities and BA.

Likes 0	
Dislikes 0	

Response

Donald Lock - Talen Generation, LLC - 5

Answer	Disagree
Document Name	

Comment

The expression, “capability in service,” is confusing. Governor are always in service; what varies are the inherent response capabilities of a unit (the maximum ramp rate near full load may be different from the value at min load, for example) and operational ceilings (e.g. coming under CTG firing temperature control). The MW value at which the latter issue comes into play varies with ambient air temperature and the use of power augmentation systems (e.g. inlet air cooling), and could be addressed in part by telemetering a percent-load signal to the BA, if the BA is prepared to use these inputs in real time to adjust their PFR expectations. If the BA cannot or will not do so such a requirement would be pointless.

Likes 0	
Dislikes 0	

Response	
Greg Berning - PPL - Louisville Gas and Electric Co. - NA - Not Applicable - NA - Not Applicable	
Answer	Disagree
Document Name	
Comment	
The Standard Drafting Team has presented no evidence of demonstrable risk of Balancing Authorities being unable to provide sufficient primary frequency response or risk to any Interconncetion's reliability. Again, the only evidence provided by the SDT or by NERC committees show the sufficiency of each Interconnection's performance.	
Likes 0	
Dislikes 0	
Response	
Sing Tay - OGE Energy - Oklahoma Gas and Electric Co. - 1,3,5,6, Group Name OKGE	
Answer	Disagree
Document Name	
Comment	
Oklahoma Gas & Electric supports the comments submitted by the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	
Answer	Disagree
Document Name	
Comment	
With the exception of a blocked governor, it is reasonable for the BA to expect governers to be in service. While it may be benficial at some point to know the unit's capability of Frequency Response and changes in capability, at this time there is not sufficient evidence that this type of real-time requirement is needed for the BA to perform its operations planning.	
Likes 0	
Dislikes 0	

Response	
Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC	
Answer	Disagree
Document Name	
Comment	
Same as 3(b).	
Likes 0	
Dislikes 0	
Response	
Larry Heckert - Alliant Energy Corporation Services, Inc. - 4	
Answer	Disagree
Document Name	
Comment	
Alliant Energy supports the comments submitted by the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Kendra Buesgens - MRO - 1,2,3,4,5 - MRO, Group Name MRO NSRF	
Answer	Disagree
Document Name	
Comment	
With the exception of a blocked governor, it is reasonable for the BA to expect governers to be in service. While it may be benficial at some point to know the unit's capability of Frequency Response and changes in capability, at this time there is not sufficient evidence that this type of real-time requirement is needed for the BA to perform its operations planning.	
Likes 0	
Dislikes 0	
Response	

Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	Agree
Document Name	
Comment	
GOs that have generating resources with functioning governors should notify the Balancing Authority if there is a change in capability status. While modifications to BAL-003 is one possible solution, TOP-003, Requirement R4 also appears to contain the necessary tools to ensure that BAs are properly notified about changes in the capability of generator governors, but those requirements would need to be clearly identified by responsible BA within their data specifications to GOs (see Requirement R2).	
Likes 0	
Dislikes 0	
Response	
Lindsay Wickizer - Berkshire Hathaway - PacifiCorp - 6	
Answer	Agree
Document Name	
Comment	
Maintaining a functioning governor droop control with no outer-band blocking should be sufficient, unless every unit is running with no headroom whatsoever. The calculations in real time would be extremely onerous, and would have to take into account real-time assessments of ramp rate, droop, deadband, etc.	
Likes 0	
Dislikes 0	
Response	
Bobbi Welch - Midcontinent ISO, Inc. - 2	
Answer	Agree
Document Name	
Comment	
Notifications of Frequency Response Settings Support Situational Awareness and Enhance the Planning Process MISO agrees that having frequency response capability in service is critical and that knowing the frequency response capabilities of resources would enhance the BA’s ability to plan to operate with adequate responsive reserves.	

Likes 0	
Dislikes 0	
Response	
Elizabeth Davis - PJM Interconnection, L.L.C. - 2 - RF, Group Name ISO/RTO Council (IRC) Standards Review Committee (SRC)	
Answer	Agree
Document Name	
Comment	
This is important information for the BA to know in real time and for planning purposes. It also provides equity among generating resources to all have the same expectations and requirements.	
Likes 0	
Dislikes 0	
Response	
Karie Barczak - DTE Energy - Detroit Edison Company - 3,4,5, Group Name DTE Energy - DTE Electric	
Answer	Agree
Document Name	
Comment	
DTE agrees that GOs whose generating resources have functioning governors should set those governors and operate them in support of BES primary frequency response unless there is a technical reason for not doing so.	
Likes 0	
Dislikes 0	
Response	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	Agree
Document Name	
Comment	
Texas RE agrees with adding this requirement as the knowledge of capability is an important aspect of situational awareness, which in turn is needed to develop appropriate actions to maintain reliability. Without this data, it is unclear how a BA would monitor its Balancing Authority Area to support interconnection frequency.	

Likes 0	
Dislikes 0	
Response	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6	
Answer	Agree
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Pamela Frazier - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name Southern Company	
Answer	Agree
Document Name	
Comment	
BAs need to have the situational awareness of what units can and cannot provide frequency response.	
Likes 0	
Dislikes 0	
Response	
Amber Parker - Tucson Electric Power - NA - Not Applicable - WECC	
Answer	Agree
Document Name	
Comment	
Giving the BA updates on FR capability would enable them to take action if frequency responsive reserves were low enough to be a concern.	
Likes 0	
Dislikes 0	
Response	

Brian Evans-Mongeon - Utility Services, Inc. - 4	
Answer	Agree
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Dan Roethemeyer - Vistra Energy - 5	
Answer	Agree
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Maryanne Darling-Reich - Black Hills Corporation - 1,3,5,6 - MRO,WECC	
Answer	Agree
Document Name	
Comment	
Black Hills Corporation already follows the WECC PRC-001-WECC-CRT for setting its Governor(s) and a BA Plan would follow our existing practices.	
Likes 0	
Dislikes 0	
Response	
Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	Agree
Document Name	

Comment	
Note: In applying Option 3, please note that the Duke Energy response is predicated on implementation of the “Limit the GO/GOP requirements to just “Operate with the Governor in Service” and “Notify if out of service” only.”	
Likes 0	
Dislikes 0	
Response	

5. Is there any other feedback you would like to provide, which you haven't already provided, to the SDT at this time related to potential modifications to the standard for a Balancing Authority, Generator Owner, and/or Generator Operator?

Leonard Kula - Independent Electricity System Operator - 2	
Answer	No
Document Name	
Comment	
N/A.	
Likes 0	
Dislikes 0	
Response	

Elizabeth Davis - PJM Interconnection, L.L.C. - 2 - RF, Group Name ISO/RTO Council (IRC) Standards Review Committee (SRC)	
Answer	No
Document Name	
Comment	
It is important for the SDT to recognize the joint effort of the GO/GOP and BA to ensure adequate PFR for the Interconnection. GO/GOPs need to have the capability to provide PFR before BAs can be successful in managing adequate PFR reserves on the system. It is important to establish GO/GOP requirements before or in coordination with additional BA requirements for PFR reserves. It is also important that the SDT takes a forward looking approach to this standard modifications to ensure we are capturing the changing resource mix in the updated requirements.	
Likes 0	
Dislikes 0	
Response	

Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Dan Roethemeyer - Vistra Energy - 5	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Lindsay Wickizer - Berkshire Hathaway - PacifiCorp - 6	
Answer	No
Document Name	

Comment	
Likes 0	
Dislikes 0	
Response	
NPCC - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Amy Jones - Public Utility District No. 2 of Grant County, Washington - 1,4,5,6	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Maryanne Darling-Reich - Black Hills Corporation - 1,3,5,6 - MRO,WECC	
Answer	Yes
Document Name	
Comment	
As stated within the white paper conclusion (pg. 28), Black Hills Corp agrees with the SDT’s 4 layered approach.	
Likes 0	
Dislikes 0	

Response

Kendra Buesgens - MRO - 1,2,3,4,5 - MRO, Group Name MRO NSRF	
Answer	Yes
Document Name	

Comment
We agree with a more forward looking approach to frequency response that would be similar in substance to what is required for contingency reserves under BAL-002, which does not set specific levels or requirements for Contingency Reserve. It is reasonable to require the BA to set minimum expectations for the GO/GOP droop and deadband settings, and for BAs to incorporate planning processes to meet those expectations; rather than dictating set parameters for generators when such stringent requirements are not necessary.

Likes 0	
Dislikes 0	

Response

Larry Heckert - Alliant Energy Corporation Services, Inc. - 4	
Answer	Yes
Document Name	

Comment
Alliant Energy supports the comments submitted by the MRO NSRF.

Likes 0	
Dislikes 0	

Response

Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	
Answer	Yes
Document Name	

Comment
We agree with a more forward looking approach to frequency response that would be similar in substance to what is required for contingency reserves under BAL-002, which does not set specific levels or requirements for Contingency Reserve.

It is reasonable to require the BA to set minimum expectations for the GO/GOP droop and deadband settings, and for BAs to incoroporate planning processes to meet those expectations; rather than dictating set perameters for generators when such stringent requirements are not necessary.

Likes 0	
Dislikes 0	

Response

Sing Tay - OGE Energy - Oklahoma Gas and Electric Co. - 1,3,5,6, Group Name OKGE

Answer	Yes
Document Name	

Comment

Oklahoma Gas & Electric supports the comments submitted by the MRO NSRF.

Likes 0	
Dislikes 0	

Response

Donald Lock - Talen Generation, LLC - 5

Answer	Yes
Document Name	

Comment

BAL-001-TRE is cited as a model for PFR requirements. We are deeply familiar with this regional standard, and we do not consider it to be suitable for continent-wide use, ref. our comments above.

Likes 0	
Dislikes 0	

Response

Bruce Reimer - Manitoba Hydro - 1,3,5,6

Answer	Yes
Document Name	

Comment

For BA-R4 on page 16 in the white paper, "…a minimum droop and deadband setting" should be changed to "…a maximum droop and deadband setting" because the droop and deadband settings equal to or lower than the maximum would be acceptable (and desireable). Refer to BAL-001-TRE-1, R6 for details.

The presented NERC generator surveys related to frequency response in 2017 and 2019 demonstrated that the existing frequency responsiveness is adequate. We thank that to address the expected potential future response issues due to changes in resource mix and to enhance the existing frequency response should be achieved with the combination of reliability standard requirements and market-based solutions.

Likes 0	
Dislikes 0	

Response

Wendy Center - U.S. Bureau of Reclamation - 1,5

Answer	Yes
Document Name	

Comment

Reclamation recommends potential modifications utilize the data already provided under the requirements of the MOD standards. Reclamation also recommends any standards modifications be coordinated with existing projects to minimize churn among standard versions.

Data from one geographic region/interconnection should not be used to develop a nationwide standard. The Texas interconnection is not an accurate representation of operations across the entire BES. Additionally, the data from Texas referenced in the white paper seems to be too scant to project across the entire nation. Eighty percent of generators "do not have an official compliance obligation for performance." It should be noted that the white paper failed to provide a source for this data or an explanation of the terms used in the paragraph about this data, both of which should be considered when forming an opinion of the relevance of the Texas example to the rest of the BES.

Reclamation recommends that the best way to improve the frequency response of the system is through market incentives. This approach avoids burdensome regulatory requirements while fairly compensating responsive generators for a valuable service.

Likes 0	
Dislikes 0	

Response

Brian Evans-Mongeon - Utility Services, Inc. - 4

Answer	Yes
Document Name	

Comment

The ongoing problem is that often the most beneficial generators that can provide voltage response, frequency response and spinning reserve get the most onerous NERC requirements and burden of proof and rarely receive any compensation for the capabilities provided. This creates an uneven market that favors the less responsive and beneficial units.

Likes 0	
Dislikes 0	

Response

Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF

Answer	Yes
Document Name	

Comment

The NAGF agrees that BAs should be provided accurate information on the capability of generating resources to provide primary frequency response where needed, yet believes that modifications to BAL-003 are unnecessary to accomplish that task as TOP-003 currently provides a means for the BA to itemize and solicit such data.

Primary frequency response within all interconnections has been described as stable or improving in Key Finding 5 of NERC's 2020 State of Reliability Report. Given that frequency response improved or remained stable in all Interconnections in recent years, it is anticipated that frequency response will continue to improve with the changes to interconnection agreements as a result of FERC Order 842, which obligates new interconnecting generating facilities to install, maintain, and operate equipment capable of providing primary frequency response as a condition of interconnection to the grid.

Likes 0	
Dislikes 0	

Response

Amber Parker - Tucson Electric Power - NA - Not Applicable - WECC

Answer	Yes
Document Name	

Comment

A real-time calculation of frequency responsive reserves seems unrealistic without a major overhaul to EMS systems and/or data provided from the GO/GOP to the BA on a real-time basis. If that is where this effort is heading, then a long lead-time would be needed.

Likes 0	
Dislikes 0	

Response

Pamela Frazier - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name Southern Company	
Answer	Yes
Document Name	
Comment	
The general process flow should include provisions where the BA would establish requirements within interconnection minimums that would then be applied to all generators. GO/GOP should have the responsibility to establish the appropriate configurations, communicate the ability to meet the requirement.Consideration of the future generation mix should be given, when developing the standard. This includes the ability of inverter based technologies to develop and maintain the upward and downward movement needed to support frequency response.	
Likes 0	
Dislikes 0	

Response

Karie Barczak - DTE Energy - Detroit Edison Company - 3,4,5, Group Name DTE Energy - DTE Electric	
Answer	Yes
Document Name	
Comment	
DTE and the NAGF agree that BAs should be provided accurate information on the capability of generating resources to provide primary frequency response where needed, yet believes that modifications to BAL-003 are unnecessary to accomplish that task as TOP-003 currently provides a means for the BA to itemize and solicit such data. Primary frequency response within all interconnections has been described as stable or improving in Key Finding 5 of NERC's 2020 State of Reliability Report. Given that frequency response improved or remained stable in all Interconnections in recent years, it is anticipated that frequency response will continue to improve with the changes to interconnection agreements as a result of FERC Order 842, which obligates new interconnecting generating facilities to install, maintain, and operate equipment capable of providing primary frequency response as a condition of interconnection to the grid.	
Likes 0	
Dislikes 0	

Response

Daniel Gacek - Exelon - 1,3,5,6	
Answer	Yes
Document Name	

Comment

Exelon agrees that there may be an opportunity for market-based solutions to improve frequency response; however, given the highly diverse, competitive and complex energy market, Exelon does not support including market-based solutions in the NERC Reliability Standards.

Exelon also requests that the SDT evaluate each type of generating unit individually for any potential to support frequency response based on technology/design.

- Combined-cycle generating units typically operate at full load and therefore may not have the capability to respond and provide frequency support.
- Nuclear generating units have unique design and operating limitations that must be addressed by the SDT as this project moves forward.

Although Exelon appreciates that the SDT acknowledges that importance and focus to a nuclear generating unit the statement that "others intentionally have detuned the controls by various methods to prevent their operation, thereby increasing the stability of the reactor control" is flawed and does not provide an accurate explanation leading the reader to believe that not responding to grid frequency is a "choice". We suggest revising to: “Some controls on these units have shown the ability to provide some Frequency Response, while other unit control systems do not provide Frequency Response. This is based on the associated inherent design and operation of these units that limits undesired perturbations to reactor control.”

Exelon requests that the SDT review the Comments of the Nuclear Energy Institute (NEI) to the FERC in Docket NO. RM16-6-000 submitted on 2/18/16 to better understand and appreciate the position of the nuclear industry on primary frequency control. These issues have been explored at length with NERC and the FERC.

Specifically, Boiling Water Reactor (BWR) units and certain Pressurized Water Reactor (PWR) units have turbine controls that are designed to maintain steam pressure and do not respond to normal grid frequency deviations. As a result, a majority of these generating units do not provide governor models to the applicable Transmission Planner MOD-027-1, further acknowledges that certain generators do not respond to normal grid frequency deviations by providing a provision to meet the requirements in the Standard by submitting a written statement to that effect to the Transmission Planner.

It is recognized that certain PWRs have a limited response to frequency deviations; however, the amount of response is restricted to and based on the values in the NRC issued Operating License. Furthermore, even if a unit were to respond automatically based on the design, the licensed control room operators are required to take immediate action to lower the power level as a condition of the license. It is therefore imperative that the SDT be clear in the unique aspects of a nuclear generating unit as this project moves forward and coordinate with the NRC any proposed rulings that have the potential to affect nuclear generating units.

Likes 0	
Dislikes 0	

Response

Bobbi Welch - Midcontinent ISO, Inc. - 2	
Answer	Yes
Document Name	

Comment

Recommendation: MISO recommends BA-R3, BA-R4, BA-R5 and the findings associated with them be redirected to enhance NERC’s **Reliability Guideline for Primary Frequency Control** with best practices for maintaining frequency response in light of the transitioning resource-mix. The

industry and regulatory environment will benefit as entities adopt the best practices or develop other creative solutions to ensure continued compliance with **BAL-003-2** R1. In addition, this will provide entities with flexibility in devising the most cost-effective solution(s).

Option #1 is Not Designed for Use in Multi-BA Interconnections

It appears that a substantial portion of the requirements proposed in this White Paper are derived from **BAL-001-TRE: Frequency Response in the ERCOT Region** as indicated on page 1:

The SDT considered a generator performance requirement, …discussed in detail within this White Paper. If a Frequency Response performance requirement is determined to be proposed for the generators, the SDT believes it would be appropriate for the BAs to calculate the response for each generator within the Balancing Authority Area (BAA), similar to the process found in the BAL-001-TRE-2, Requirement R2.

While the experience in the Texas RE footprint is a valuable source of information, an abundance of caution should be exercised in directly adopting any provisions from **BAL-001-TRE** until they are evaluated and modified as necessary for use in a multi-BA Interconnection; i.e. in either the Eastern Interconnection or Western Interconnection. For example, of the generator performance requirement options presented in the White Paper, Option #1 is least suited for application in multi BA Interconnections.the Eastern Interconnection as it is designed for an Interconnection with a single BA; i.e. ERCOT.

Likes 0	
Dislikes 0	

Response

Cassie Sims - Entergy - NA - Not Applicable - SERC

Answer	Yes
Document Name	

Comment

With the heightend focus on frequency response in the past few years, coupled with the measured increase in unit responses to frequency events between the 2017 and 2019 reviews, it is questionable whether additional requirements for frequency response is actually needed. As standards such as MOD-027 continue in their implementation phase, it is important to continue to track unit responses in similar projects through completion. At the end of the MOD-027 implementation, a re-evaluation should be performed then. If that re-evaluation indicates that additional measures are necessary, that would be a much better time to determine requirements for the BA and the GO/GOP.

Likes 0	
Dislikes 0	

Response

Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC

Answer	Yes
Document Name	

Comment

There have been multiple problems identified with the FRM as measured at the interconnection. BPA believes BAs should be given the option to measure frequency response at the generator level. BPA recommends an option should be available to replace NIA with Net BA Generation in the FRM calculation.

Likes 0	
Dislikes 0	

Response

Rachel Coyne - Texas Reliability Entity, Inc. - 10

Answer	
Document Name	

Comment

While the implementation of BAL-001-TRE has been successful, Texas RE has noted several issues with Frequency Response performance scores related to inaccurate Real-time telemetered capability data. Texas RE recommends the SDT consider adding Requirements for the GO or GOP to provide accurate Frequency Response capability data to the BA so the BA can make decisions to maintain reliability based on quality data.

Texas RE noticed that the white paper states on page 15 that the “TRE standard does not have a BA performance requirement”. This is not accurate as BAL-001-TRE-2 Requirement R3 requires the BA to calculate an IMFR and BAL-001-TRE-2 Requirement R5 requires the BA to direct any necessary actions to improve Frequency Response if Frequency Response performance falls below the IMFR.

Likes 0	
Dislikes 0	

Response

Amy Casuscelli - Xcel Energy, Inc. - 1,3,5,6 - MRO,WECC

Answer	
Document Name	

Comment

We are concerned with the performance calculation being focused on past events. A GO/GOP that is determined to be in violation of the standard will have to undergo corrective actions to correct frequency response performance. Due to the iterative nature of control tuning, the entity could be in a non-compliance state for extended periods of time. Further, we believe the SDT should look at the event selection process and tighten up the standards for an acceptable event. Specifically, disqualify events that have B values within the NERC recommended deadband for generators, which would be between 60.0366Hz (for overfrequency events) and 59.964 Hz (for underfrequency events). Generators typically squelch their governor response once frequency fails with their deadband.

Likes 0	

Dislikes 0	
Response	

“Comments received from Cassie Sims – Entergy Services, LLC”
Question 1 (all other comments are included in report)
☒ Agree

N/A - Currently Entergy LBA does not have any Balancing Authority responsibilities per the MISO CFR

“Comments received from Ruida Shu – NPCC RSC”
Question 1
☒ Agree

Question 2a
☒ Yes

Question 2b
☒ Yes

Question 3a
☒ Yes

Question 3b (no response given)

Question 4
☒ Agree

Question 5
☒ Yes

Comments:
Several proposed standard requirements described in the whitepaper are similar to current requirements listed in BAL-001-TRE. It would provide useful context to identify that the Texas Interconnection is a single BA interconnection. Though it has a relatively high percentage of inverter-connected resources, not all of the lessons learned in Texas are applicable in the other interconnections which must consider the nuances of numerous BA’s. Consideration must be taken for the differences that occur in a multi-BA interconnection; for example, noisy NAI data (Texas does not have this problem) as well as the mechanics of implementation over a wide range of entities.

- Several proposed additions to BAL-003 Phase II (from the draft whitepaper) will likely require a sea-change in both BA and GO requirements and processes (e.g., potential for BAs to have to implement real-time monitoring of resource/system frequency response capability). While the changes might be necessary, the effort required to develop, pass, implement, and enforce such fundamental changes might be better spent on other ideas (e.g., requiring tighter dead bands, requiring frequency response from inverter connected load and generation, requiring all resources to provide frequency response, perhaps other ideas as well)
- The BAL standards used to be prescriptive and require BAs to do certain things even if there was no performance-based justification for these requirements, this gave way to performance-based standards. It seems we are now going back to prescriptive requirements. The justification for doing so is unclear.
- Is this revision of the BAL standard intended to be a direct response to FERC order 842?

- There are basically two options to ensure that there are enough frequency responsive resources available to immediately respond to any circumstance:
    A. (Option A) Require all resources that are capable of providing frequency response to do so – this means that under any scenario of supply and demand, the system would be secure.
        i. This is the model that some BAs/interconnections operate under, e.g., the Quebec interconnection
        ii. This could, for example include all modern inverter connected supply and demand (since frequency sensing is in-essence required for inverters to work in AC power systems)
        iii. This route would seem to align with FERC order 842 which requires that all new generating facilities install, maintain and operate a functioning governor or equivalent controls as a precondition of interconnection. Also requiring agreements to include certain operating requirements such as maximum droop and deadband parameters, and sustained response provisions.
    B. (Option B) Make frequency response a market product and then allow resources to offer into this market.
        i. This is the model that some BAs/interconnections operate under, e.g., the Texas Interconnection

The problem with Option B is that since it is a market product, there is pressure to ensure that the market is not wasteful – this means that there will be pressure to reduce the required amount of frequency response to the bare minimum that is required given the system conditions. System conditions can change very quickly and a market system takes time to react. This inherent market delay means that a contingency could quickly deplete the amount of frequency responsive resources available leading to risks in BPS reliability with potentially catastrophic results.

There would be additional market pressure to reduce the number of resources providing frequency response to those that do so in the most economical fashion, thereby narrowing the field of frequency responsive resources. Again, system conditions can change quickly and that could lead to deliverability issues from some (or more) of these resources which could again expose the interconnection to unacceptable frequency deviations. A perhaps incalculable benefit of Option A is that the widespread distribution of frequency response (across each BA and the Interconnection itself) can more easily mitigate large-scale disruptions as well as facilitate the faster recovery from large-scale events. Another well documented set of benefits of this wide distribution of frequency response (shown conclusively by Texas' fairly recent change to tighten governor deadbands) is:

- reduced movement and effort for any individual resource (the "many hands make light work" effect) and;
- improved BA and Interconnection frequency response.

In sum, there are a host of important reasons to have copious amounts of widely dispersed frequency response.

The whitepaper provides a good overview within the Background section of the core issues the effort is trying to address (i.e., it describes the main excerpts from the SAR). However, given the scope and extent of changes discussed in this paper for potentially a very large number of BPS Entities, more technical justification may be needed to put things into the 2020 and long term perspectives. For example, the 2016 Frequency Report Annual Analysis (FRAA) report is cited; how has the picture changed through each year into 2020, and where are we headed? The 2020 State of Reliability Report says that, despite increasing percentages of inverter interfaced generation, frequency response has generally improved or remained stable for all Interconnections: one would think nothing new is needed.

The problem the SDT is trying to address has many similarities to NERC and industry's work into resilience[1]: robustness ("the ability to absorb shocks and continue operations", resourcefulness ("the ability to detect and manage a crisis as it unfolds"), rapid recovery ("the ability to get services back as quickly as possible in a coordinated and controlled manner and taking into consideration the extent of the damage") and adaptability ("the ability to incorporate lessons learned from past events to improve resilience"). Answering the why question in this context could greatly benefit the SDT's ability to provide additional context to the whitepaper to help industry and the reader better understand why change is needed.

[1] https://www.nerc.com/comm/RISC/Related%20Files%20DL/RISC%20Resilience%20Report_Approved_RISC_Committee_November_8_2018_Board_Accepted.pdf