

Note: an Interpretation cannot be used to change a standard.

Request for an Interpretation of a Reliability Standard	
Date submitted:	April 15, 2009
Date accepted:	September 15, 2009
Contact information for person requesting the interpretation:	
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Identify the standard that needs clarification:	
Standard Number (include version number):	BAL-003-0.1b , BAL-003-0a , BAL-003-0b
Standard Title:	Frequency Response and Bias
Identify specifically what needs clarification (If a category is not applicable, please leave it blank):	
Requirement Number and Text of Requirement:	
Requirement R2:	
R2. Each Balancing Authority shall establish and maintain a Frequency Bias Setting that is as close as practical to, or greater than, the Balancing Authority's Frequency Response. Frequency Bias may be calculated several ways:	
R2.1. The Balancing Authority may use a fixed Frequency Bias value which is based on a fixed, straight-line function of Tie Line deviation versus Frequency Deviation. The Balancing Authority shall determine the fixed value by observing and averaging the Frequency Response for several Disturbances during on-peak hours.	
R2.2. The Balancing Authority may use a variable (linear or non-linear) bias value, which is based on a variable function of Tie Line deviation to Frequency Deviation. The Balancing Authority shall determine the variable frequency bias value by analyzing Frequency Response as it varies with factors such as load, generation, governor characteristics, and frequency.	
Requirement R5:	
R5. Balancing Authorities that serve native load shall have a monthly average Frequency Bias	

Setting that is at least 1% of the Balancing Authority's estimated yearly peak demand per 0.1 Hz change.

R5.1. Balancing Authorities that do not serve native load shall have a monthly average Frequency Bias Setting that is at least 1% of its estimated maximum generation level in the coming year per 0.1 Hz change.

Clarification needed:

Clarification 1:

Does NERC BAL-003 require every Balancing Authority to have a Frequency Response close to 1% of its projected peak load?

Clarification 2:

Requirement R2 mandates that each Balancing Authority "establish and maintain a Frequency Bias Setting that is as close as practical to, or greater than, the Balancing Authority's Frequency Response". Given the sign convention of the Frequency Bias Setting as applied in the ACE equation, is the Frequency Bias Setting required to be a negative value as close as practical to, or greater than (in absolute terms), the estimated Frequency Response so that AGC will not move resources in a manner that would negate the primary response provided by frequency responsive resources?

Clarification 3:

When making the comparison between Frequency Response and Frequency Bias in R2, what is the proper method for this comparison? Should the estimated Frequency Response and Frequency Bias Setting be compared with their typical negative sign convention or in terms of their absolute values? In other words, in order to ensure that AGC does not drive resources to negate the primary response to frequency deviation provided by system resources, including governor response, does Requirement R2 require that the absolute value of the Frequency Bias Setting be as close as practical to, or greater than, the absolute value of the estimated Frequency Response per 0.1 Hz change?

Clarification 4:

Is there any defined measure to determine what "as close as practical" means?

Requirement R5 mandates that each Balancing Authority that serves native load shall "have a monthly average Frequency Bias Setting that is at least 1% of the Balancing Authority's estimated yearly peak demand per 0.1 Hz change Does Requirement R5 require that the absolute value of the Balancing Authority's monthly average Frequency Bias Setting be at least 1% of the Balancing Authority's estimated yearly peak demand per 0.1 Hz change.

Clarification 5:

As the Frequency Bias Setting is typically calculated and applied as a negative value under R2, yet in R5 it is compared against a percentage of a Balancing Authority's estimated yearly peak demand load and is typically a positive value, is the absolute value of the monthly average Frequency Bias Setting required to be at least 1% of the Balancing Authority's estimated yearly peak demand per 0.1 Hz change? If not, how does one reconcile the sign convention differences between R2 and R5?

Clarification 6:

Does BAL-003 have any requirements that would set a value on the amount of Frequency Response that a Balancing Authority must provide?

Identify the material impact associated with this interpretation:

Identify the material impact to your organization or others caused by the lack of clarity or an incorrect interpretation of this standard.

Many Balancing Authorities may be non-compliant to BAL-003 unless the interpretation confirms that the current Standard does not require any level of Frequency Response, and that the comparison of the values should be in absolute terms.

If Balancing Authorities implement a Frequency Bias Setting smaller (in absolute terms) than its estimated Frequency Response, this could cause an amount of primary Frequency Response to be negated by generation movement under AGC, rather than having AGC reinforce primary Frequency Response with additional secondary response to the extent Frequency Bias is set larger (in absolute terms) than the Frequency Response.

**Project 2009-20: Response to Request for an Interpretation of
 BAL-003-0.1b for EnergyMark, Inc.**

The following interpretation of BAL-003-0.1b — Frequency Response and Bias was developed by the Frequency Response Standard Drafting Team.

Requirement Number and Text of Requirement

BAL-003-0.1b:

R2. Each Balancing Authority shall establish and maintain a Frequency Bias Setting that is as close as practical to, or greater than, the Balancing Authority's Frequency Response. Frequency Bias may be calculated several ways:

R2.1. The Balancing Authority may use a fixed Frequency Bias value which is based on a fixed, straight-line function of Tie Line deviation versus Frequency Deviation. The Balancing Authority shall determine the fixed value by observing and averaging the Frequency Response for several Disturbances during on-peak hours.

R2.2. The Balancing Authority may use a variable (linear or non-linear) bias value, which is based on a variable function of Tie Line deviation to Frequency Deviation. The Balancing Authority shall determine the variable frequency bias value by analyzing Frequency Response as it varies with factors such as load, generation, governor characteristics, and frequency.

R5. Balancing Authorities that serve native load shall have a monthly average Frequency Bias Setting that is at least 1% of the Balancing Authority's estimated yearly peak demand per 0.1 Hz change.

R5.1. Balancing Authorities that do not serve native load shall have a monthly average Frequency Bias Setting that is at least 1% of its estimated maximum generation level in the coming year per 0.1 Hz change.

Response

Clarification 1:

Does NERC BAL-003 require every Balancing Authority to have a Frequency Response close to 1% of its projected peak load?

Response: BAL-003-0.1b does not have a Frequency Response performance obligation.

Clarification 2:

Requirement R2 mandates that each Balancing Authority "establish and maintain a Frequency Bias Setting that is as close as practical to, or greater than, the Balancing Authority's Frequency Response". Given the sign convention of the Frequency Bias Setting as applied in the ACE equation, is the Frequency Bias Setting required to be a negative value as close as practical to, or greater than (in absolute terms), the estimated Frequency Response so that AGC will not move resources in a manner that would negate the primary response provided by frequency responsive resources?

Response: Yes, the Balancing Authority Frequency Bias Setting within the ACE equation is a negative value, expressed in MW/0.1 Hz and should be as close as practical to the natural Frequency Response. If Requirement R2 is met at all times by the Balancing Authority, AGC in Tie Line Bias mode will not move resources in a manner that would withdraw natural Frequency Response.

Clarification 3:

1) When making the comparison between Frequency Response and Frequency Bias in R2, what is the proper method for this comparison? Should the estimated Frequency Response and Frequency Bias Setting be compared with their typical negative sign convention or in terms of their absolute values? 2) In other words, in order to ensure that AGC does not drive resources to negate the primary response to frequency deviation provided by system resources, including governor response, does Requirement R2 require that the absolute value of the Frequency Bias Setting be as close as practical to, or greater than, the absolute value of the estimated Frequency Response per 0.1 Hz change?

Response: 1) Frequency Response and Frequency Bias should be compared with their typical sign convention and not an absolute value. 2) Yes, Requirement R2 mandates that the absolute value of Frequency Bias be as close as practical to the absolute value of Frequency Response. Thus, matching Frequency Response and Frequency Bias helps ensure proper AGC performance.

Clarification 4:

Is there any defined measure to determine what “as close as practical” means? Requirement R5 mandates that each Balancing Authority that serves native load shall “have a monthly average Frequency Bias Setting that is at least 1% of the Balancing Authority’s estimated yearly peak demand per 0.1 Hz change. Does Requirement R5 require that the absolute value of the Balancing Authority’s monthly average Frequency Bias Setting be at least 1% of the Balancing Authority’s estimated yearly peak demand per 0.1 Hz change.

Response: There is not a defined measure to determine what “as close as practical” means.

Yes, Requirement R5 of the standard, as an alternate method of determining a Balancing Authority’s Frequency Bias Setting, uses the Balancing Authority’s estimated yearly peak demand, or the Balancing Authority’s estimated maximum generation level in the coming year for Balancing Authorities that do not serve native load, as a proxy to determine the Balancing Authority’s Frequency Bias obligation per 0.1 Hz change. A 1% value of yearly peak demand per 0.1 Hz or 1% value of estimated maximum generation level in the coming year per 0.1 Hz must be used as the minimum Frequency Bias Setting.

Clarification 5:

As the Frequency Bias Setting is typically calculated and applied as a negative value under R2, yet in R5 it is compared against a percentage of a Balancing Authority’s estimated yearly peak demand and is typically a positive value, is the absolute value of the monthly average Frequency Bias Setting required to be at least 1% of the Balancing Authority’s estimated yearly peak demand per 0.1 Hz change? If not, how does one reconcile the sign convention differences between R2 and R5?

Response: Yes, the absolute value of the monthly average Frequency Bias Setting is required to be at least 1% of the Balancing Authority’s estimated yearly peak demand or at least 1% of the Balancing Authority’s estimated maximum generation level in the coming year for Balancing Authorities that do not serve native load.

Clarification 6:

Does BAL-003 have any requirements that would set a value on the amount of Frequency Response that a Balancing Authority must provide?

Response: BAL-003-0.1b does not have any requirements mandating a specific magnitude of Frequency Response by the Balancing Authority.