

Standard Development Roadmap

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

Modified to address Order No. 693 Directives contained in paragraphs 404, 415, 420.

Development Steps Completed:

1. SAR posted for comment (June 18, 2010 through July 13, 2010).
2. First draft of proposed standard posted (June 18, 2010 through July 13, 2010).
3. Posted for 15-day pre-ballot review (June 18 – July 2, 2010).

Proposed Action Plan and Description of Current Draft:

This is the first draft of the proposed standard. The modifications included in this standard are being proposed through an expedited process in order to be responsive to directives from FERC Order No. 693.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Conduct initial ballot on a line-item basis.	July 3 – 13, 2010
2. Post response to comments on initial ballot.	July 20, 2010
3. Conduct recirculation ballot.	July 20 – 30, 2010
4. Submit standard to BOT for adoption.	August 2010
5. File standard with regulatory authorities.	September 2010

DEFINITIONS OF TERMS USED IN STANDARD

This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the Reliability Standards Glossary of Terms are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.

Automatic Generation Control (AGC): ~~Equipment that automatically adjusts generation in a Balancing Authority Area from a central location to maintain the Balancing Authority's interchange schedule plus Frequency Bias. AGC may also accommodate automatic inadvertent payback and time error correction. See ARC.~~

Automatic Resource Control (ARC): Automatic adjustment of resources in a Balancing Authority Area to maintain the Balancing Authority's interchange schedule plus Frequency Bias. ARC may also accommodate automatic inadvertent payback and time error correction.

Regulating Reserve: ~~An amount of r~~Reserve that is responsive to Automatic ~~Generation Resource~~ Control, which is sufficient to provide normal regulating margin. Regulating Reserve may be comprised of generation, controllable load resources, Demand Side Management (DSM), or other resources that have comparable response characteristics.

A. Introduction

1. **Title:** Automatic ~~Generation Resource~~ Control

2. **Number:** BAL-005-~~0.1b1~~

3. **Purpose:**

This standard establishes requirements for Balancing Authority Automatic ~~Generation Resource~~ Control (~~AGC ARC~~) necessary to calculate Area Control Error (ACE) and to routinely deploy the Regulating Reserve. The standard also ensures that all facilities and load electrically synchronized to the Interconnection are included within the metered boundary of a Balancing Area so that balancing of resources and demand can be achieved.

4. **Applicability:**

4.1. Balancing Authorities

4.2. Generator Operators

4.3. Transmission Operators

4.4. Load Serving Entities

5. **(Proposed) Effective Date:** The first day of the first calendar quarter six months after applicable regulatory approval; or in those jurisdictions where no regulatory approval is required, the first day of the first calendar quarter six months after Board of Trustees' adoption, May 13, 2009

B. Requirements

R1. All generation, transmission, and load operating within an Interconnection must be included within the metered boundaries of a Balancing Authority Area.

R1.1. Each Generator Operator with generation facilities operating in an Interconnection shall ensure that those generation facilities are included within the metered boundaries of a Balancing Authority Area.

R1.2. Each Transmission Operator with transmission facilities operating in an Interconnection shall ensure that those transmission facilities are included within the metered boundaries of a Balancing Authority Area.

R1.3. Each Load-Serving Entity with load operating in an Interconnection shall ensure that those loads are included within the metered boundaries of a Balancing Authority Area.

R2. Each Balancing Authority shall maintain Regulating Reserve that can be controlled by ~~AGC ARC~~ to meet the Control Performance Standard.

R3. A Balancing Authority providing Regulation Service shall ensure that adequate metering, communications, and control equipment are employed to prevent such service from becoming a Burden on the Interconnection or other Balancing Authority Areas.

R4. A Balancing Authority providing Regulation Service shall notify the Host Balancing Authority for whom it is controlling if it is unable to provide the service, as well as any Intermediate Balancing Authorities.

R5. A Balancing Authority receiving Regulation Service shall ensure that backup plans are in place to provide replacement Regulation Service should either the supplying Balancing Authority no longer be able to provide this service or the service is no longer deliverable due to transmission constraints impacting non-firm transmission service.

R6. The Balancing Authority's ~~AGC ARC~~ shall compare total Net Actual Interchange to total Net Scheduled Interchange plus Frequency Bias obligation to determine the Balancing Authority's ACE. Single Balancing Authorities operating asynchronously may employ

alternative ACE calculations such as (but not limited to) flat frequency control. If a Balancing Authority is unable to calculate ACE for more than 30 minutes it shall notify its Reliability Coordinator.

- R7.** The Balancing Authority shall operate ~~AGC-ARC~~ continuously unless such operation adversely impacts the reliability of the Interconnection. If ~~AGC-ARC~~ has become inoperative, the Balancing Authority shall use manual control to adjust generation to maintain the Net Scheduled Interchange.
- R8.** The Balancing Authority shall ensure that data acquisition for and calculation of ACE occur at least every six seconds.
 - R8.1.** Each Balancing Authority shall provide redundant and independent frequency metering equipment that shall automatically activate upon detection of failure of the primary source. This overall installation shall provide a minimum availability of 99.95%.
- R9.** The Balancing Authority shall include all Interchange Schedules with Adjacent Balancing Authorities in the calculation of Net Scheduled Interchange for the ACE equation.
 - R9.1.** Balancing Authorities with a high voltage direct current (HVDC) link to another Balancing Authority connected asynchronously to their Interconnection may choose to omit the Interchange Schedule related to the HVDC link from the ACE equation if it is modeled as internal generation or load.
- R10.** The Balancing Authority shall include all Dynamic Schedules in the calculation of Net Scheduled Interchange for the ACE equation.
- R11.** Balancing Authorities shall include the effect of ramp rates, which shall be identical and agreed to between affected Balancing Authorities, in the Scheduled Interchange values to calculate ACE.
- R12.** Each Balancing Authority shall include all Tie Line flows with Adjacent Balancing Authority Areas in the ACE calculation.
 - R12.1.** Balancing Authorities that share a tie shall ensure Tie Line MW metering is telemetered to both control centers, and emanates from a common, agreed-upon source using common primary metering equipment. Balancing Authorities shall ensure that megawatt-hour data is telemetered or reported at the end of each hour.
 - R12.2.** Balancing Authorities shall ensure the power flow and ACE signals that are utilized for calculating Balancing Authority performance or that are transmitted for Regulation Service are not filtered prior to transmission, except for the Anti-aliasing Filters of Tie Lines.
 - R12.3.** Balancing Authorities shall install common metering equipment where Dynamic Schedules or Pseudo-Ties are implemented between two or more Balancing Authorities to deliver the output of Jointly Owned Units or to serve remote load.
- R13.** Each Balancing Authority shall perform hourly error checks using Tie Line megawatt-hour meters with common time synchronization to determine the accuracy of its control equipment. The Balancing Authority shall adjust the component (e.g., Tie Line meter) of ACE that is in error (if known) or use the interchange meter error (I_{ME}) term of the ACE equation to compensate for any equipment error until repairs can be made.
- R14.** The Balancing Authority shall provide its operating personnel with sufficient instrumentation and data recording equipment to facilitate monitoring of control performance, generation response, and after-the-fact analysis of area performance. As a minimum, the Balancing Authority shall provide its operating personnel with real-time values for ACE, Interconnection frequency and Net Actual Interchange with each Adjacent Balancing Authority Area.

R15. The Balancing Authority shall provide adequate and reliable backup power supplies and shall periodically test these supplies at the Balancing Authority’s control center and other critical locations to ensure continuous operation of ~~AGC-ARC~~ and vital data recording equipment during loss of the normal power supply.

R16. The Balancing Authority shall sample data at least at the same periodicity with which ACE is calculated. The Balancing Authority shall flag missing or bad data for operator display and archival purposes. The Balancing Authority shall collect coincident data to the greatest practical extent, i.e., ACE, Interconnection frequency, Net Actual Interchange, and other data shall all be sampled at the same time.

R17. Each Balancing Authority shall at least annually ~~check and calibrate~~ verify against a common reference the calibration of its time error and frequency devices that provide input into the reporting or compliance ACE equation or provide real-time error or frequency information to the system operator against a common reference.

R17.1. ~~The~~ If the calibration of a frequency device described above is found to not be accurate within +/- 0.001 Hz, the Balancing Authority shall within 60 calendar days adhere to the minimum values for measuring devices as listed below either:

- Calibrate the device to within +/- 0.001 Hz, or
- Replace the device

<u>Device</u>	<u>Accuracy</u>
<u>Digital frequency transducer</u>	<u>≤ 0.001 Hz</u>
<u>MW, MVAR, and voltage transducer</u>	<u>≤ 0.25 % of full scale</u>
<u>Remote terminal unit</u>	<u>≤ 0.25 % of full scale</u>
<u>Potential transformer</u>	<u>≤ 0.30 % of full scale</u>
<u>Current transformer</u>	<u>≤ 0.50 % of full scale</u>

C. Measures

Not specified.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance ~~Monitoring Responsibility~~ Enforcement Authority

Balancing Authorities shall be prepared to supply data to ~~NERC~~ NERC and -their Regional Entity in the format defined below:

1.1.1. Within one week upon request, Balancing Authorities shall provide NERC or the Regional Reliability Organization Entity CPS source data in daily CSV files with time stamped one minute averages of: 1) ACE and 2) Frequency Error.

1.1.2. Within one week upon request, Balancing Authorities shall provide NERC or the Regional Reliability Organization Entity DCS source data in CSV files with time stamped scan rate values for: 1) ACE and 2) Frequency Error for a time period of two minutes prior to thirty minutes after the identified Disturbance.

1.2. Compliance Monitoring Period and Reset Timeframe

Not applicable. Not specified.

1.3. Compliance Monitoring and Enforcement Processes:

[Compliance Audits](#)

[Self-Certifications](#)

[Spot Checking](#)

[Compliance Violation Investigations](#)

[Self-Reporting](#)

[Complaints](#)

1.3.1.4. Data Retention

- 1.3.1.** Each Balancing Authority shall retain its ACE, actual frequency, Scheduled Frequency, Net Actual Interchange, Net Scheduled Interchange, Tie Line meter error correction and Frequency Bias Setting data in digital format at the same scan rate at which the data is collected for at least one year.
- 1.3.2.** Each Balancing Authority or Reserve Sharing Group shall retain documentation of the magnitude of each Reportable Disturbance as well as the ACE charts and/or samples used to calculate Balancing Authority or Reserve Sharing Group disturbance recovery values. The data shall be retained for one year following the reporting quarter for which the data was recorded.

1.4. Additional Compliance Information

~~Not specified.~~[None.](#)

2. ~~Levels of Non-Compliance~~ Violation Severity Levels (changes only)

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
R2	N/A	N/A	N/A	The Balancing Authority failed to maintain Regulating Reserve that can be controlled by AGC <u>ARC</u> to meet Control Performance Standard.
R7	N/A	N/A	N/A	The Balancing Authority failed to operate ARGC <u>ARC</u> continuously when there were no adverse impacts. OR If its AGC-ARC was inoperative the Balancing Authority failed to use manual control to adjust generation to maintain the Net Scheduled Interchange.
R15	N/A	N/A	The Balancing Authority failed to periodically test backup power supplies at the Balancing Authority's control center and other critical locations to ensure continuous operation of AGC <u>ARC</u> and vital data recording equipment during loss of the normal power supply.	The Balancing Authority failed to provide adequate and reliable backup power supplies to ensure continuous operation of AGC-ARC <u>ARC</u> and vital data recording equipment during loss of the normal power supply.
R17	<u>The Balancing authority identified a frequency device that was found to not be accurate within +/- 0.001 Hz, and within 60 calendar days neither calibrated the device to be within +/- 0.001 Hz nor replaced the device, but did take</u>	<u>The Balancing authority identified a frequency device that was found to not be accurate within +/- 0.001 Hz, and within 90 calendar days neither calibrated the device to be within +/- 0.001 Hz nor replaced the device, but did take</u>	<u>The Balancing authority identified a frequency device that was found to not be accurate within +/- 0.001 Hz, and within 120 calendar days neither calibrated the device to be within +/- 0.001 Hz nor replaced the device, but did take</u>	The Balancing Authority failed to at least annually check and calibrate its time error and frequency devices against a common reference. OR <u>The Balancing authority</u>

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
	<u>such action in 90 calendar days or less.N/A</u>	<u>such action in 120 calendar days or less.N/A</u>	<u>such action in 150 calendar days or less.N/A</u>	<u>identified a frequency device that was found to not be accurate within +/- 0.001 Hz, and within 150 days neither calibrated the device to be within +/- 0.001 Hz nor replaced the device.</u>

~~Not specified.~~

E. Regional Differences

None identified.

F. Associated Documents

1. Appendix 1 – Interpretation of Requirement R17 (February 12, 2008).

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New
0	August 8, 2005	Removed “Proposed” from Effective Date	Errata
0a	December 19, 2007	Added Appendix 1 – Interpretation of R17 approved by BOT on May 2, 2007	Addition
0a	January 16, 2008	Section F: added “1.”; changed hyphen to “en dash.” Changed font style for “Appendix 1” to Arial.	Errata
0b	February 12, 2008	Replaced Appendix 1 – Interpretation of R17 approved by BOT on February 12, 2008.	Replacement
0.1b	October 29, 2008	BOT approved errata changes; updated version number to “0.1b”	Errata
0.1b	May 13, 2009	FERC approved – Updated Effective Date and Footer	Addition
<u>1</u>	<u>TBD</u>	<u>Modified to address Order No. 693 Directives contained in paragraphs 404, 415, and 420.</u>	<u>Revised.</u>

Appendix 1

Request: *PGE requests clarification regarding the measuring devices for which the requirement applies, specifically clarification if the requirement applies to the following measuring devices:*

- *Only equipment within the operations control room*
- *Only equipment that provides values used to calculate AGC/ACE*
- *Only equipment that provides values to its SCADA system*
- *Only equipment owned or operated by the BA*
- *Only to new or replacement equipment*
- *To all equipment that a BA owns or operates*

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R17. Each Balancing Authority shall at least annually check and calibrate its time error and frequency devices against a common reference. The Balancing Authority shall adhere to the minimum values for measuring devices as listed below:

Device	Accuracy
Digital frequency transducer	≤ 0.001 Hz
MW, MVAR, and voltage transducer	$\leq 0.25\%$ of full scale
Remote terminal unit	$\leq 0.25\%$ of full scale
Potential transformer	$\leq 0.30\%$ of full scale
Current transformer	$\leq 0.50\%$ of full scale

Existing Interpretation Approved by Board of Trustees May 2, 2007

BAL-005-0, Requirement 17 requires that the Balancing Authority check and calibrate its control room time error and frequency devices against a common reference at least annually. The requirement to “annually check and calibrate” does not address any devices outside of the operations control room.

The table represents the design accuracy of the listed devices. There is no requirement within the standard to “annually check and calibrate” the devices listed in the table, unless they are included in the control center time error and frequency devices.

Interpretation:

As noted in the existing interpretation, BAL-005-1 Requirement 17 applies only to the time error and frequency devices that provide, or in the case of back-up equipment may provide, input into the reporting or compliance ACE equation or provide real-time time error or frequency information to the system operator. Frequency inputs from other sources that are for reference only are excluded. The time error and frequency measurement devices may not necessarily be located in the system operations control room or owned by the Balancing Authority; however the Balancing Authority has the responsibility for the accuracy of the frequency and time error measurement devices. No other devices are included in R-17. The other devices listed in the table at the end of R17 are for reference only and do not have any mandatory calibration or accuracy requirements.

New or replacement equipment that provides the same functions noted above requires the same calibrations. Some devices used for time error and frequency measurement cannot be calibrated as such. In this case, these devices should be cross-checked against other properly calibrated equipment and replaced if the devices do not meet the required level of accuracy.