

**Compliance Questionnaire and**

**Reliability Standard Audit Worksheet**

**BAL-005-0.2b — Automatic Generation Control**

**Registered Entity:** *(Must be completed by the Compliance Enforcement Authority)*

**NCR Number:** *(Must be completed by the Compliance Enforcement Authority)*

**Applicable Function(s): BA, GOP, TOP, LSE**

**Auditors:**

**Disclaimer**

NERC developed this Reliability Standard Audit Worksheet (RSAW) language in order to facilitate NERC’s and the Regional Entities’ assessment of a registered entity’s compliance with this Reliability Standard. The NERC RSAW language is written to specific versions of each NERC Reliability Standard. Entities using this RSAW should choose the version of the RSAW applicable to the Reliability Standard being assessed. While the information included in this RSAW provides some of the methodology that NERC has elected to use to assess compliance with the requirements of the Reliability Standard, this document should not be treated as a substitute for the Reliability Standard or viewed as additional Reliability Standard requirements. In all cases, the Regional Entity should rely on the language contained in the Reliability Standard itself, and not on the language contained in this RSAW, to determine compliance with the Reliability Standard. NERC’s Reliability Standards can be found on NERC’s website. Additionally, NERC Reliability Standards are updated frequently, and this RSAW may not necessarily be updated with the same frequency. Therefore, it is imperative that entities treat this RSAW as a reference document only, and not as a substitute or replacement for the Reliability Standard. It is the responsibility of the registered entity to verify its compliance with the latest approved version of the Reliability Standards, by the applicable governmental authority, relevant to its registration status.

The NERC RSAW language contained within this document provides a non‑exclusive list, for informational purposes only, of examples of the types of evidence a registered entity may produce or may be asked to produce to demonstrate compliance with the Reliability Standard. A registered entity’s adherence to the examples contained within this RSAW does not necessarily constitute compliance with the applicable Reliability Standard, and NERC and the Regional Entity using this RSAW reserves the right to request additional evidence from the registered entity that is not included in this RSAW. Additionally, this RSAW includes excerpts from FERC Orders and other regulatory references. The FERC Order cites are provided for ease of reference only, and this document does not necessarily include all applicable Order provisions. In the event of a discrepancy between FERC Orders, and the language included in this document, FERC Orders shall prevail.

# Subject Matter Experts

Identify your company’s subject matter expert(s) responsible for this Reliability Standard. Include the person's title, organization and the requirement(s) for which they are responsible. Insert additional lines if necessary.

**Response: *(Registered Entity Response Required)***

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| **SME Name** | **Title** | **Organization** | **Requirement** |
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# Reliability Standard Language

 **BAL-005-0.2b — Automatic Generation Control**

**Purpose:**

This standard establishes requirements for Balancing Authority Automatic Generation Control (AGC) 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.

**Applicability:**

 Balancing Authorities

 Generator Operators

 Transmission Operators

 Load Serving Entities

**NERC BOT Approval Date: 2/12/2008**

**FERC Approval Date: 7/21/2008**

**Reliability Standard Enforcement Date in the United States: 8/28/2008**

**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.

**Describe, in narrative form, how you meet compliance with this requirement: *(Registered Entity Response Required)***

# R1 Supporting Evidence and Documentation

**Response: *(Registered Entity Response Required)***

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**This section must be completed by the Compliance Enforcement Authority.**

**Compliance Assessment Approach Specific to BAL-005-0.2b R1.**

\_\_\_\_ Determine if the entity being audited has any generation, transmission, or load that is not included within the boundaries of a Balancing Authority area

\_\_\_\_ Determine if the Generator Operator has all generation facilities included within the metered boundaries of a Balancing Authority Area.

\_\_\_\_ Determine if the Transmission Operator has all transmission facilities included within the metered boundaries of a Balancing Authority Area.

\_\_\_\_ Determine if the Load-Serving Entity has all loads included within the metered boundaries of a Balancing Authority Area.

**Detailed notes:**

**R2.** Each Balancing Authority shall maintain Regulating Reserve that can be controlled by AGC to meet the Control Performance Standard. (Per Paragraph 81 this requirement is to no longer to be monitored. Removal should be documented in final Compliance Audit Report.)

(Retirement approved by FERC effective January 21, 2014.)

**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.

**Describe, in narrative form, how you meet compliance with this requirement: *(Registered Entity Response Required)***

# R3 Supporting Evidence and Documentation

**Response: *(Registered Entity Response Required)***

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**This section must be completed by the Compliance Enforcement Authority.**

**Compliance Assessment Approach Specific to BAL-005-0.2b R3.**

\_\_\_\_ Determine if the Balancing Authority provided Regulation Service to another Balancing Authority.

\_\_\_\_Determine if the Balancing Authority had adequate:

\_\_\_\_Metering

\_\_\_\_Communications

\_\_\_\_Control Equipment

to prevent such service from becoming a burden on the Interconnection or other Balancing Authority Areas

**Detailed notes:**

**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.

**Describe, in narrative form, how you meet compliance with this requirement: *(Registered Entity Response Required)***

# R4 Supporting Evidence and Documentation

**Response: *(Registered Entity Response Required)***

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**This section must be completed by the Compliance Enforcement Authority.**

**Compliance Assessment Approach Specific to BAL-005-0.2b R4.**

\_\_\_\_ Determine if the Balancing Authority is Providing Regulation Service to another Balancing Authority.

If yes to the above:

\_\_\_\_\_Determine if the Balancing Authority was unable to provide the service to the Host Balancing Authority at any time during the audit period.

If yes to the above:

\_\_\_\_\_Determine if the Balancing Authority notified the Host Balancing Authority that it was unable to provide the service.

\_\_\_\_\_ Determine if the Balancing Authority notified any Intermediate Balancing Authorities.

**Detailed notes:**

**R5.** A Balancing Authority receiving Regulation Service shall ensure that backup plans are in place to provide replacement Regulation Service should the supplying Balancing Authority no longer be able to provide this service.

**Describe, in narrative form, how you meet compliance with this requirement: *(Registered Entity Response Required)***

# R5 Supporting Evidence and Documentation

**Response: *(Registered Entity Response Required)***

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**This section must be completed by the Compliance Enforcement Authority.**

**Compliance Assessment Approach Specific to BAL-005-0.2b R5.**

\_\_\_\_ Determine if the Balancing Authority is receiving Regulation Service.

If yes to the above:

\_\_\_\_\_Determine if the Balancing Authority has backup plans to provide replacement Regulation Service should the supplying Balancing Authority no longer be able to provide the service.

**Detailed notes:**

**R6.** TheBalancing Authority’s AGC 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.

**Describe, in narrative form, how you meet compliance with this requirement: *(Registered Entity Response Required)***

# R6 Supporting Evidence and Documentation

**Response: *(Registered Entity Response Required)***

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**This section must be completed by the Compliance Enforcement Authority.**

**Compliance Assessment Approach Specific to BAL-005-0.2b R6.**

\_\_\_\_ Determine if the Balancing Authority’s AGC compares total Net Actual Interchange to total Net Scheduled Interchange plus Frequency Bias obligation to determine the Balancing Authority’s ACE;

OR

If a single Balancing Authority is operating asynchronously and did not conform to the above:

\_\_\_\_\_Determine if alternative ACE calculations such as (but not limited to) flat frequency control were

 used.

\_\_\_\_\_Determine if a Balancing Authority is unable to calculate ACE for more than 30 minutes.

If yes to the above:

\_\_\_\_\_Determine if the Balancing Authority notified its Reliability Coordinator of its inability to calculate ACE for more than 30 minutes.

**Detailed notes:**

**R7.** The Balancing Authority shall operate AGC continuously unless such operation adversely impacts the reliability of the Interconnection. If AGC has become inoperative, the Balancing Authority shall use manual control to adjust generation to maintain the Net Scheduled Interchange.

**Describe, in narrative form, how you meet compliance with this requirement: *(Registered Entity Response Required)***

# R7 Supporting Evidence and Documentation

**Response: *(Registered Entity Response Required)***

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**This section must be completed by the Compliance Enforcement Authority.**

**Compliance Assessment Approach Specific to BAL-005-0.2b R7.**

\_\_\_\_ Determine if the Balancing Authority operated AGC continuously unless such operation impacted the reliability of the Interconnection.

\_\_\_\_\_Determine if the Balancing Authorities AGC became inoperative at any time during the audit period.

If yes to the above:

\_\_\_\_\_Did the Balancing Authority use manual control to adjust generation to maintain the Net Scheduled Interchange?

**Detailed notes:**

**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%.

**Describe, in narrative form, how you meet compliance with this requirement: *(Registered Entity Response Required)***

# R8 Supporting Evidence and Documentation

**Response: *(Registered Entity Response Required)***

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**This section must be completed by the Compliance Enforcement Authority.**

**Compliance Assessment Approach Specific to BAL-005-0.2b R8.**

\_\_\_\_Determine if the Balancing Authority acquires data needed for the calculation of ACE at least every 6 seconds.

\_\_\_\_\_ Determine if the Balancing Authority has redundant and independent frequency metering equipment.

\_\_\_\_\_ Determine if the redundant frequency metering equipment will automatically activate upon detection of the failure of the primary frequency metering equipment.

\_\_\_\_\_ Determine if the overall installation provided a minimum frequency metering availability of 99.95%.

**Detailed notes:**

**R9.** The Balancing Authority shall include all Interchange Schedules with Adjacent Balancing Authoritiesin 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.

**Describe, in narrative form, how you meet compliance with this requirement: *(Registered Entity Response Required)***

# R9 Supporting Evidence and Documentation

**Response: *(Registered Entity Response Required)***

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**This section must be completed by the Compliance Enforcement Authority.**

**Compliance Assessment Approach Specific to BAL-005-0.2b R9.**

\_\_\_\_ Determine if the Balancing Authority included all Interchange Schedules with Adjacent Balancing Authorities in its calculation of Net Scheduled Interchange for the ACE equation.

\_\_\_\_ Determine if the Balancing Authority has a high voltage direct current (HVDC) link to another Balancing Authority that is connected asynchronously to their interconnection.

If yes to the above:

\_\_\_\_Determine if the Balancing Authority omitted an Interchange Schedule related to the HVDC link in its ACE equation.

If yes to the above:

\_\_\_\_Determine if it modeled the Interchange Schedule as internal generation or load.

**Detailed notes:**

**R10.**  The Balancing Authority shall include all Dynamic Schedules in the calculation of Net Scheduled Interchange for the ACE equation.

**Describe, in narrative form, how you meet compliance with this requirement: *(Registered Entity Response Required)***

# R10 Supporting Evidence and Documentation

**Response: *(Registered Entity Response Required)***

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**This section must be completed by the Compliance Enforcement Authority.**

**Compliance Assessment Approach Specific to BAL-005-0.2b R10.**

 \_\_\_\_\_Determine if the Balancing Authority included all Dynamic Schedules in the calculation of Net Scheduled Interchange for the ACE equation.

**Detailed notes:**

**R11.** Balancing Authoritiesshall 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.

**Describe, in narrative form, how you meet compliance with this requirement: *(Registered Entity Response Required)***

# R11 Supporting Evidence and Documentation

**Response: *(Registered Entity Response Required)***

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**Question:** Describe how you coordinate net schedule interchange with adjacent Balancing

 Authorities and verify its accuracy including dynamic schedules and effects of ramp rates.

**Entity** **Response: *(Registered Entity Response Required)***

**This section must be completed by the Compliance Enforcement Authority.**

**Compliance Assessment Approach Specific to BAL-005-0.2b R11.**

 \_\_\_\_\_ Determine if the Balancing Authority included the effect of ramp rates in the Scheduled Interchange values to calculate ACE.

 \_\_\_\_\_ Determine if the ramp rates of scheduled interchange are identical and agreed to between affected Balancing Authorities.

**Detailed notes:**

**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.

 **12.3.** 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.

**Describe, in narrative form, how you meet compliance with this requirement: *(Registered Entity Response Required)***

# R12 Supporting Evidence and Documentation

**Response: *(Registered Entity Response Required)***

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**This section must be completed by the Compliance Enforcement Authority.**

**Compliance Assessment Approach Specific to BAL-005-0.2b R12.**

\_\_\_\_ Determine if the Balancing Authority included all Tie Line flows with Adjacent Balancing Authority areas in the ACE equation.

\_\_\_\_ Determine if the Balancing Authority has Tie Line MW metering that is telemetered to both control centers, and emanates from a common, agreed-upon source using common primary metering equipment on shared ties.

\_\_\_\_Determine if the Balancing Authority megawatt-hour data is telemetered or reported at the end of each hour.

\_\_\_\_ Determine if the power flow and ACE signals that are used to calculate 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.

\_\_\_\_ Determine if the Balancing Authority has installed 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.

**Detailed notes:**

**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 (IME) term of the ACE equation to compensate for any equipment error until repairs can be made.

**Describe, in narrative form, how you meet compliance with this requirement: *(Registered Entity Response Required)***

# R13 Supporting Evidence and Documentation

**Response: *(Registered Entity Response Required)***

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**This section must be completed by the Compliance Enforcement Authority.**

**Compliance Assessment Approach Specific to BAL-005-0.2b R13.**

\_\_\_\_ Determine if the Balancing Authority performs an hourly error check using Tie Line megawatt-hour meters with common time synchronization to determine the accuracy of its control equipment.

\_\_\_\_Determine if the Balancing Authority adjusted the component of ACE that is in error if known, or used the interchange meter error term in the ACE equation to compensate for equipment errors until repairs can be made.

**Detailed notes:**

**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.

**Describe, in narrative form, how you meet compliance with this requirement: *(Registered Entity Response Required)***

# R14 Supporting Evidence and Documentation

**Response: *(Registered Entity Response Required)***

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**This section must be completed by the Compliance Enforcement Authority.**

**Compliance Assessment Approach Specific to BAL-005-0.2b R14.**

Determine if the Balancing Authority has provided its operating personnel with:

\_\_\_\_Real time values for ACE

\_\_\_\_Interconnection frequency

\_\_\_\_Net Actual Interchange with each Adjacent Balancing Authority Area

Using professional judgment, determine if the above is sufficient to provide the operating personnel with enough data to facilitate monitoring of:

\_\_\_\_Control performance

\_\_\_\_Generation response

\_\_\_\_After the fact analysis of area performance

If not:

\_\_\_\_ Determine if the Balancing Authority provided its operating personnel with additional tools to provide sufficient instrumentation and data recording equipment to monitor:

\_\_\_\_Control performance

\_\_\_\_Generation response

\_\_\_\_After-the-fact analysis of area performance

**Detailed notes:**

**R15.** The Balancing Authorityshall 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 and vital data recording equipment during loss of the normal power supply.

**Describe, in narrative form, how you meet compliance with this requirement: *(Registered Entity Response Required)***

# R15 Supporting Evidence and Documentation

**Response: *(Registered Entity Response Required)***

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**Question:** Identify the frequency of testing your back‑up power supplies.

**Entity** **Response: *(Registered Entity Response Required)***

**Question:** Provide a description of your back‑up power supply to maintain continuous operation of your Balancing Authority operation.

**Entity** **Response: *(Registered Entity Response Required)***

**This section must be completed by the Compliance Enforcement Authority.**

**Compliance Assessment Approach Specific to BAL-005-0.2b R15.**

\_\_\_\_ Determine if the Balancing Authority has provided adequate and reliable backup power supplies.

\_\_\_\_Determine if the Balancing Authority has periodically tested these supplies at the Balancing Authority’s control center and other critical locations to ensure the continuous operation of:

\_\_\_\_\_ AGC

\_\_\_\_\_ vital data recording equipment during loss of the normal power supply.

**Detailed notes:**

**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.

**Describe, in narrative form, how you meet compliance with this requirement: *(Registered Entity Response Required)***

# R16 Supporting Evidence and Documentation

**Response: *(Registered Entity Response Required)***

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**This section must be completed by the Compliance Enforcement Authority.**

**Compliance Assessment Approach Specific to BAL-005-0.2b R16.**

\_\_\_\_ Determine if the Balancing Authority samples the following data with at least the same periodicity with which ACE is calculated:

 \_\_\_\_ACE

 \_\_\_\_Interconnection frequency

 \_\_\_\_Net Actual Interchange

\_\_\_\_Determine if the Balancing Authority flags missing or bad data for operator display and archival purposes.

\_\_\_\_Determine if the Balancing Authority collects coincident data to the greatest practical extent.

**Detailed notes:**

**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 ≤ 0.25 % of full scale

Remote terminal unit ≤ 0.25 % of full scale

Potential transformer ≤ 0.30 % of full scale

 Current transformer ≤ 0.50 % of full scale

**Describe, in narrative form, how you meet compliance with this requirement: *(Registered Entity Response Required)***

# R17 Supporting Evidence and Documentation

**Response: *(Registered Entity Response Required)***

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***This section must be completed by the Compliance Enforcement Authority.***

**Compliance Assessment Approach Specific to BAL-005-0.2b R17.**

\_\_\_\_ Determine if the Balancing Authority annually checked and calibrated its time error and frequency devices against a common reference.

\_\_\_\_ Determine if the Balancing Authority adhered to the minimum values for the following:

 Device Accuracy

\_\_\_\_Digital frequency transducer ≤ 0.001 Hz

\_\_\_\_MW, MVAR, and voltage transducer ≤ 0.25 % of full scale

\_\_\_\_Remote terminal unit ≤ 0.25 % of full scale

\_\_\_\_Potential transformer ≤ 0.30 % of full scale

\_\_\_\_Current transformer ≤ 0.50 % of full scale

Note: See interpretation on page 29 of this document for additional information.

**Detailed notes:**

# Supplemental Information

**Other ‑** The list of questions above is not all inclusive of evidence required to show compliance with the Reliability Standard. Provide additional information here**, as necessary that** demonstrates compliance with this Reliability Standard.

  **Entity** **Response: *(Registered Entity Response)***

# Compliance Findings Summary (to be filled out by auditor)

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| **Req.** | **NF** | **PV** | **OEA** | **NA** | **Statement** |
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| **2** | Retirement approved by FERC effective January 21, 2014. |
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**Excerpts From FERC Orders -- For Reference Purposes Only**

**Updated Through April 15, 2013**

**BAL-005-0b**

**Order No. 693**

P 387. The goal of this Reliability Standard is to maintain Interconnection frequency by requiring that all generation, transmission, and customer load be within the metered boundaries of a balancing authority area, and establishing the functional requirements for the balancing authority’s regulation service, including its calculation of ACE.

 P 397. As a general matter, the Commission believes that a single entity should establish the level of regulating reserve required based on the generation mix and ramping rates in the region. We disagree with commenters that minimum regulating reserve requirements are not necessary. … The Commission notes that Requirement R2 requires maintenance of a level of regulating reserves in order to prospectively meet the control performance standard but does not provide a calculation for the exact level which would be required. In particular, the Commission believes that, while the control performance standard metric is useful in identifying trends relating to poor regulating practices, specification of minimum reserve requirements to be maintained at all times would complement the control performance standard metrics by providing real-time requirements necessary for proper control.

 P 398. …the Commission agrees that the quality of reserves is relevant in determining if the resource is able to technically qualify as regulation.

 P 399. …The fundamental reason for regulating reserves is to balance load and generation in the short term due to the random variations in the balancing authorities’ loads and to accommodate ramping of transactions. …

 P 404. … this Reliability Standard applies to regulating reserves and not contingency reserves.

 P 405. We disagree that it is not possible to use DSM and direct control load management as a source of regulating reserves or any other type of operating reserves. The Commission notes that, while DSM and direct control load management may not be widely used today as a source of operating reserves, comments received and other evidence suggest that certain types of loads are technically capable of providing this service.

 P 406. Given that most of the commenters’ concerns over the inclusion of DSM as part of regulating reserves relate to the technical requirements, the Commission clarifies that to qualify as regulating reserves, these resources must be technically capable of providing the service. In particular, all resources providing regulation must be capable of automatically responding to real-time changes in load on an equivalent basis to the response of generation equipped with automatic generation control. … the Commission understands that it may be technically possible for DSM to meet equivalent requirements as conventional generators ….

 P 408. … the Commission notes that, if regulation is being provided over non-firm transmission service, the entity receiving the regulation should be responsible for having a back-up plan to include loss of the non-firm transmission service as referenced in Requirement R5. The Commission believes that a balancing authority may use non-firm transmission service for procuring regulation, so long as that balancing authority has a back-up plan that it can implement to include loss of non-firm transmission service.

 P 416. … By its terms, BAL-005-0 requires each generator operator with generating facilities operating within an Interconnection to ensure that those generating facilities are included within the metered boundaries of a balancing authority area. Therefore, any generator that is subject to the Reliability Standards, as discussed in the Applicability Issues section of this Final Rule,is subject to the metering requirements in this Reliability Standard. Our conclusion, however, does not determine the appropriate ratemaking treatment.

 P 417. … The Commission finds each Requirement of BAL-005-0 is clear and enforceable. The Requirements provide sufficient guidance for an entity to understand its obligations. When Measures are incorporated into the Reliability Standard, the Measures will provide guidance on assessing non-compliance with the Requirements. For these reasons and as previously addressed in the NOPR, the Commission disagrees that the enforceable obligations set forth in Requirements are unclear absent Measures.

 P 418. … The Commission adopts the NOPR proposal to require the ERO to modify the Reliability Standards to include a Measure that provides for a verification process over the minimum required automatic generation control or regulating reserves a balancing authority maintains….

P 420. The Commission approves Reliability Standard BAL-005-0 as mandatory and enforceable.

**Order No. 713**

P 23. Requirement R17 of Reliability Standard BAL-005-0 is intended to annually check and calibrate the time error and frequency devices under the control of the balancing authority that feed data into automatic generation control necessary to calculate ACE. Requirement R17 mandates that the balancing authority must adhere to an annual calibration program for time error and frequency devices. The requirement states that a balancing authority must adhere to minimum accuracies in terms of ranges specified in Hertz, volts, amps, etc., for various listed devices, such as digital frequency transducers, voltage transducers, remote terminal unit, potential transformers, and current transformers.

P32. The Commission approves the ERO’s formal interpretation of Requirement R17 of BAL-005-0 as set forth in the ERO’s April 2008 filing. Based on the comments, we find that this interpretation will not decrease the accuracy of frequency and time error measurements by not requiring calibration of tie-line megawatt metering devices. In addition, we are persuaded by the commenters that the need to calibrate tie-line megawatt metering devices is addressed by other requirements such as Requirement R13 that require hourly checks to ensure continuous accuracy. The Commission notes that the applicable requirement for the accuracy of calibration of tie-line megawatt metering devices is identified in Requirement R17….

P 33. … We note that the interpretation provides that “[s]ome 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.”…

P 34. The Era’s interpretation of BAL-005-0, Requirement R17 provides that “frequency inputs from other sources that are for reference only are excluded.” The Commission notes that this Reliability Standard establishes requirements concerning the inputs to the ACE equation to correctly operate automatic generation control. Frequency inputs used for other purposes are not covered by this Reliability Standard. Therefore, we understand the ERO’s interpretation to exclude frequency devices that do not provide input into the reporting or compliance with the ACE equation or provide real-time time error or frequency information to the system operator. Any devices that provide reference input from which a balancing authority calibrates other time error and frequency devices, however, do provide real-time time error and frequency information to the system operator and therefore must be calibrated under this requirement.

**Appendix 1**

**Effective Date: August 27, 2008 (U.S.)**

**Interpretation of BAL-005-0 Automatic Generation Control, R17**

**Request for Clarification received from PGE on July 31, 2007**

*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*

**BAL-005-0**

**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 ≤ 0.25% of full scale

Remote terminal unit ≤ 0.25% of full scale

Potential transformer ≤ 0.30% of full scale

Current transformer ≤ 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 provided by NERC Frequency Task Force on September 7, 2007 and Revised on**

**November 16, 2007**

As noted in the existing interpretation, BAL-005-0 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.

**North American Electric Reliability Corporation, Docket No. RD09-2-000, Letter Order (May 13, 2009)**

On February 6, 2009, NERC submitted a filing requesting approval of revised versions of Commission-approved Reliability Standards provided by NERC. These revised versions incorporate changes that were reviewed through an errata approval process developed by its Standards Committee, rather than the Standards Development Procedure. The revised Reliability Standards update the versions approved in Order No. 693 to include all revisions which were approved by the NERC board of trustees and industry stakeholders using the NERC Reliability Standards development process. Specifically, BAL-005-0a, Sections A and F errata as follows: In Section A.2., added “a” to end of standard number. The “a” was mistakenly omitted when the BAL-005-0a was filed with FERC. In Section F, added “1.” Date revised: 1/16/08.

NERC’s uncontested filing is approved pursuant to the relevant authority delegated to the Director, Office of Electric Reliability, under 18 C.F.R. § 375.314.

**North American Electric Reliability Corporation, 140 FERC ¶ 61,191 (September 13, 2012)**

On June 5, 2012, NERC submitted a filing that requested approval of errata changes to seven Reliability Standards including:

• BAL-005-0.1b Automatic Generation Control - replace Appendix 1 with a correct version of a Commission-approved interpretation, changing “BAL-005-1” to “BAL-005-0”and make an internal reference correction in the interpretation. NERC has also updated the version history table to reflect these revisions and to incorporate additional information regarding the adoption of Version 0 of this standard.

NERC’s uncontested filing is approved pursuant to the relevant authority delegated to the Director, Office of Electric Reliability, under 18 C.F.R. § 375.303, as of the date of this order [September 13, 2012].

**Revision History**

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| **Version** | **Date** | **Reviewers** | **Revision Description** |
| 1 | 5/5/10 | Craig Struck | Added Revision History. |
| 1.1 | 11/04/10 | QRSAW WG | Revised Findings Table and modified Supporting Evidence tables |
| 1.1 | January 2011 | Craig Struck | Reviewed for format consistency and content. |
| 1.2 | February 2013 | Jacki Power | Errata adopted by Standards Committee; (replaced Appendix 1 with the FERC-approved revised interpretation of R17 and corrected standard version referenced in Interpretation by changing from “BAL-005-1” to “BAL-005-0). Interpretation added to RSAW and referenced in related requirement.  |
| 1.2 | April 15, 2013 | NERC Legal | Updated excerpts from FERC orders from March 31, 2009 through and including April 15, 2013. |
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