UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

North American Electric Reliability Corporation	**)** **)**	**Docket No. _____**

JOINT PETITION OF THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION AND WESTERN ELECTRICITY COORDINATING COUNCIL FOR APPROVAL OF BAL-004-WECC-02 AND BAL-001-1

Gerald W. Cauley
President and Chief Executive Officer
North American Electric Reliability Corporation
3353 Peachtree Road, N.E.
Suite 600, North Tower
Atlanta, GA 30326
(404) 446-2560
(404) 446-2595 – facsimile

Charles A. Berardesco
Senior Vice President and General Counsel
Holly A. Hawkins
Assistant General Counsel
William H. Edwards
Counsel
North American Electric Reliability Corporation
1325 G Street, N.W., Suite 600
Washington, D.C. 20005
(202) 400-3000
(202) 644-8099 – facsimile
charlie.berardesco@nerc.net
holly.hawkins@nerc.net
william.edwards@nerc.net

Counsel for the North American Electric Reliability Corporation

Sandy Mooy
Associate General Counsel
Chris Albrecht
Legal Counsel
Western Electricity Coordinating Council
155 North 400 West, Suite 200
Salt Lake City, UT 84103
(801) 582-0353
calbrecht@wecc.biz
smooy@wecc.biz

Counsel for the Western Electricity Coordinating Council

August 20, 2013

TABLE OF CONTENTS

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

North American Electric Reliability Corporation	**)** **)**	**Docket No. _____**

JOINT PETITION OF THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION AND WESTERN ELECTRICITY COORDINATING COUNCIL FOR APPROVAL OF BAL-004-WECC-02 AND BAL-001-1

Pursuant to Section 215(d)(1) of the Federal Power Act ("FPA")[1] and Section 39.5[2] of the Federal Energy Regulatory Commission's ("FERC" or "Commission") regulations, the North American Electric Reliability Corporation ("NERC") hereby submits proposed regional Reliability Standard BAL-004-WECC-02 and proposed Reliability Standard BAL-001-1 for Commission approval (collectively, "Proposed Reliability Standards"), effective on the first day of the second quarter after regulatory approval. NERC requests that the Commission approve the Proposed Reliability Standards (**Exhibits A and B**) and find that the Proposed Reliability Standards are just, reasonable, not unduly discriminatory or preferential, and in the public interest.[3] The Western Electricity Coordinating Council ("WECC")[4] supports the filing of this

[1] 16 U.S.C. § 824o (2006).

[2] 18 C.F.R. § 39.5 (2012).

[3] Unless otherwise designated, all capitalized terms shall have the meaning set forth in the *Glossary of Terms Used in NERC Reliability Standards* ("*NERC Glossary*"), *available at* http://www.nerc.com/files/Glossary_of_Terms.pdf.

[4] On April 19, 2007, the Commission accepted delegation agreements between NERC and each of eight Regional Entities, including WECC. *N. Am. Elec. Reliability Corp.*, 119 FERC ¶ 61,060, at P 432 (2007). As a Regional Entity, WECC oversees transmission system reliability in the Western Interconnection. The WECC region encompasses nearly 1.8 million square miles, including all or parts of the fourteen western United States, two Canadian provinces, and the northern portion of Baja California, Mexico.

petition.[5] NERC also requests approval of the associated implementation plan (**Exhibit C**), Violation Risk Factors ("VRFs") and Violation Severity Levels ("VSLs") (**Exhibits A, B, and H**), and the approval of the following new or revised definitions in the NERC Glossary: "Area Control Error" ("ACE") and "Automatic Time Error Correction" ("ATEC"). ATEC is a newly proposed definition applicable within the Western Interconnection only. The proposed definition of ACE incorporates the use of ATEC and, once approved, will retire the current NERC Glossary definition of ACE. Finally, NERC requests the retirement of the following:

- Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (superseded by BAL-004-WECC-02);
- Reliability Standard BAL-001-0.1a– Real Power Balancing Control Performance and associated Appendix 2 interpretation (superseded by BAL-001-1); and
- Appendix 1 Interpretation of Requirement R3 in Reliability Standard BAL-003-0.1b – Frequency Response and Bias.

As required by Section 39.5(a)[6] of the Commission's regulations, this petition presents the technical basis and purpose of the Proposed Reliability Standards, a summary of the development proceedings of NERC and WECC (**Exhibit J**), and a demonstration that the proposed Reliability Standard meets the criteria identified by the Commission in Order No. 672[7] (**Exhibits D and E**). The Proposed Reliability Standards were approved by the NERC Board of Trustees on December 19, 2012.

---

[5] As the Regional Entity who developed proposed regional Reliability Standard BAL-004-WECC-02 and proposed changes to BAL-001-1, WECC joins and supports NERC's petition, thereby making WECC a party in this proceeding.

[6] 18 C.F.R. § 39.5(a) (2013).

[7] The Commission specified in Order No. 672 certain general factors it would consider when assessing whether a particular Reliability Standard is just and reasonable. *See Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards*, Order No. 672, FERC Stats. & Regs. ¶ 31,204, at P 262, 321-37, *order on reh'g*, Order No. 672-A, FERC Stats. & Regs. ¶ 31,212 (2006).

I. EXECUTIVE SUMMARY

The purpose of proposed regional Reliability Standard BAL-004-WECC-02 — Automatic Time Error Correction is to maintain Interconnection frequency and to ensure that Time Error Corrections and Primary Inadvertent Interchange payback are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection. The purpose of BAL-001-1 — Real Power Balancing Control Performance is to maintain interconnection steady-state frequency within defined limits by balancing power demand and supply in real-time.

In response to Commission directives in Order No. 723, WECC modified regional Reliability Standard BAL-004-WECC-01. To effectively address the Commission's directives and improve the regional Reliability Standard, the standard drafting team elected to move the WECC ACE, which incorporates the ATEC equations to a regional variance in the continent-wide Reliability Standard BAL-001-0.1a. For these reasons, these Proposed Reliability Standards – consisting of a regional Reliability Standard and a regional variance to a continent-wide Reliability Standard, are being submitted together for Commission approval.

The proposed Reliability Standards were approved by the NERC Board of Trustees on December 12, 2012. NERC requests an effective date of the first day of the second quarter after regulatory approval for the proposed changes.

II. NOTICES AND COMMUNICATIONS

Notices and communications with respect to this filing may be addressed to the following:[8]

[8] Persons to be included on the Commission's service list are identified by an asterisk. NERC respectfully requests a waiver of Rule 203 of the Commission's regulations, 18 C.F.R. § 385.203 (2013), to allow the inclusion of more than two persons on the service list in this proceeding.

Charles A. Berardesco*
Senior Vice President and General Counsel
Holly A. Hawkins*
Assistant General Counsel
William H. Edwards*
Counsel
North American Electric Reliability Corporation
1325 G Street, N.W., Suite 600
Washington, D.C. 20005
(202) 400-3000
(202) 644-8099 – facsimile
charlie.berardesco@nerc.net
holly.hawkins@nerc.net
william.edwards@nerc.net

Mark G. Lauby*
Vice President and Director of Standards
Howard Gugel*
Director of Standards Development
North American Electric Reliability Corporation
3353 Peachtree Road, N.E.
Suite 600, North Tower
Atlanta, GA 30326
(404) 446-2560
(404) 446-2595 – facsimile
mark.lauby@nerc.net
howard.gugel@nerc.net

Sandy Mooy*
Associate General Counsel
Chris Albrecht*
Legal Counsel
Western Electricity Coordinating Council
155 North 400 West, Suite 200
Salt Lake City, UT 84103
(801) 582-0353
calbrecht@wecc.biz
smooy@wecc.biz

III. BACKGROUND

A. Regulatory Framework

By enacting the Energy Policy Act of 2005,[9] Congress entrusted the Commission with the duties of approving and enforcing rules to ensure the reliability of the Nation's Bulk-Power System, and with the duties of certifying an ERO that would be charged with developing and enforcing mandatory Reliability Standards, subject to Commission approval. Section 215(b)(1)[10]

[9] 16 U.S.C. § 824o (2006).

[10] *Id.* § 824(b)(1).

of the FPA states that all users, owners, and operators of the Bulk-Power System in the United States will be subject to Commission-approved Reliability Standards. Section 215(d)(5)[11] of the FPA authorizes the Commission to order the ERO to submit a new or modified Reliability Standard. Section 39.5(a)[12] of the Commission's regulations requires the ERO to file with the Commission for its approval each Reliability Standard that the ERO proposes should become mandatory and enforceable in the United States, and each modification to a Reliability Standard that the ERO proposes should be made effective.

The Commission has the regulatory responsibility to approve standards that protect the reliability of the Bulk-Power System and to ensure that such standards are just, reasonable, not unduly discriminatory or preferential, and in the public interest. A Reliability Standard proposed by a Regional Entity must meet the same standard that NERC's Reliability Standards must meet, *i.e.*, the regional Reliability Standard must be shown to be just, reasonable, not unduly discriminatory or preferential, and in the public interest.[13] If the regional Reliability Standard is proposed by a Regional Entity organized on an Interconnection-wide basis, to be applicable on an Interconnection-wide basis, then NERC must rebuttably presume that the standard is just, reasonable, not unduly discriminatory or preferential, and in the public interest.[14]

Pursuant to Section 215(d)(2) of the FPA[15] and Section 39.5(c)(1)-(2)[16] of the Commission's regulations, the Commission will give due weight to the technical expertise of the ERO with respect to the content of a Reliability Standard and to the technical expertise of a Regional Entity organized on an Interconnection-wide basis with respect to a Reliability

---

11 *Id.* § 824o(d)(5).

12 18 C.F.R. § 39.5(a) (2013).

13 16 U.S.C. § 824o(d)(2); 18 C.F.R. §39.5(a).

14 16 U.S.C. § 824o(d)(3); 18 C.F.R. §39.5(b).

15 16 U.S.C. § 824o(d)(2).

16 18 C.F.R. § 39.5(c)(1)(2).

Standard to be applicable within that Interconnection. In Order No. 672, the Commission noted that:

> As a general matter, we will accept the following two types of regional differences, provided they are otherwise just, reasonable, not unduly discriminatory or preferential and in the public interest, as required under the statute: (1) a regional difference that is more stringent than the continent-wide Reliability Standard, including a regional difference that addresses matters that the continent-wide Reliability Standard does not; and (2) a regional Reliability Standard that is necessitated by a physical difference in the Bulk-Power System.[17]

A regional difference generally takes one of two forms: (1) a regional variance may be included in a continent-wide Reliability Standard, which achieves the reliability objective of the continent-wide standard's requirement(s) in an alternate way than specified in a given Requirement in the continent-wide standard or (2) a separate regional Reliability Standard may be developed, which adds one or more Requirements without altering any continent-wide Requirements that are applicable to entities in the region.[18]

B. History of WECC Development Project WECC-0068

1. Time Error Correction

As both NERC[19] and the Commission[20] have previously noted, Time Error[21] occurs when a synchronous Interconnection operates at a frequency that is different from the Interconnection's Scheduled Frequency. Interconnections control to 60 Hz (60 cycles per

---

[17] Order No. 672 at P 291.

[18] *See* NERC, *Whitepaper to Provide Guidance on Regional Standards and Variances*, May 17, 2012, *available at* http://www.nerc.com/docs/sac/rsg/Whitepaper%20on%20Regional%20Standards%20and%20Variances%20final.pdf

[19] NERC Oct. 24, 2012 Notice of Withdrawal of BAL-004-1, RM09-13-000 at 1-2.

[20] *Time Error Correction Reliability Standard*, 130 FERC ¶ 61,201 (2010).

[21] "Time Error" is defined as "[t]he difference between the Interconnection time measured at the Balancing Authority(ies) and the time specified by the National Institute of Standards and Technology. Time error is caused by the accumulation of Frequency Error over a given period." *NERC Glossary* at 64.

second); however, the control is imperfect and over time results in the average frequency being either above 60 Hz or below 60 Hz. This discrepancy between actual frequency and Scheduled Frequency results from an imbalance between generation and interchange and load and losses, which also results in Inadvertent Interchange.[22] Time Error Correction[23] is the procedure Reliability Coordinators and Balancing Authorities follow to reduce Time Error and regulate the average frequency closer to 60 Hz. The Time Error Correction Reliability Standard, BAL-004-0,[24] sets forth the process that Reliability Coordinators and Balancing Authorities follow to offset their Scheduled Frequency to reliably correct for the accumulated Time Error. The efficiency of Time Error Corrections is determined by the participation of all Balancing Authorities within the Interconnection. Coordination and oversight by all Balancing Authorities and Reliability Coordinators is necessary to ensure that Time Error Corrections are performed reliably.

2. Regional Reliability Standard BAL-004-WECC-01

On July 29, 2008, NERC submitted a petition for approval of regional Reliability Standard BAL-004-WECC-01. The primary purpose of BAL-004-WECC-01 is to reduce the number of Time Error Corrections imposed on the Western Interconnection by requiring Balancing Authorities that operate synchronously to the Western Interconnection to automatically correct for their contribution to Time Error. Balancing Authorities determine their contribution to the Time Error in the Western Interconnection using the ATEC procedure in BAL-004-WECC-01. The BAL-004-WECC-01 regional Reliability Standard requires that each

[22] Inadvertent Interchange occurs when unplanned energy transfers cross Balancing Authority boundaries, typically where a Balancing Authority experiences an operational problem that prevents its Net Actual Interchange of energy from matching its Net Scheduled Interchange with other Balancing Authorities within the Interconnection. "Inadvertent Interchange" is defined as the difference between the Balancing Authority's Net Actual Interchange and Net Scheduled Interchange. *NERC Glossary* at 35.

[23] "Time Error Correction" is defined as "[a]n offset to the Interconnection's scheduled frequency to return the Interconnection's Time Error to a predetermined value." *NERC Glossary* at 64.

[24] NERC withdrew the proposed BAL-004-1 Reliability Standard on October 24, 2012.

Balancing Authority calculate its Primary Inadvertent Interchange ("PII")[25] from its hourly Inadvertent Interchange and use the resulting PII in its ACE equation to continuously correct for its portion of the Time Error automatically, as opposed to manually, as specified in the continent-wide Reliability Standard BAL-004-0.

In Order No. 723,[26] the Commission approved BAL-004-WECC-01, finding that BAL-004-WECC-01 is more stringent than and covers matters not addressed by the related continent-wide NERC Reliability Standards BAL-004-0 and BAL-006-1. Specifically, the Commission stated that BAL-004-WECC-01 "provides for continuous capture of inadvertent interchange, and thereby (1) contributes to better operation of balancing authorities by operators, and (2) ensures that discrepancies between a balancing area's net scheduled interchange and its net actual interchange are adjusted more quickly and accurately."[27] In addition, pursuant to section 215(d)(5) of the FPA, the Commission directed WECC to develop modifications to BAL-004-WECC-01 as summarized below.

a) Requirement R1.2 of BAL-004-WECC-01

Requirement R1.2 of BAL-004-WECC-01 provides in part:

> Large accumulations of primary inadvertent point to an invalid implementation of ATEC, loose control, metering or accounting errors. A [Balancing Authority] in such a situation should identify the source of the error(s) and make the corrections, recalculate the primary inadvertent from the time of the error, adjust the accumulated primary inadvertent caused by the error(s), validate the implementation of ATEC, set L_{max} equal to L_{10} and continue to operate with ATEC reducing the accumulation as system parameters allow.

---

[25] "Primary Inadvertent Interchange" is a term approved for use in the Western Interconnection and is defined as "[t]he component of area (n) inadvertent interchange caused by the regulating deficiencies of the area (n)." *NERC Glossary* at 75.

[26] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC ¶ 61,176 (2008), *order on reh'g*, 129 FERC ¶ 61,023 (2009).

[27] Order No. 723 at P 25.

In its NOPR, the Commission noted that the phrases "large accumulation" and "in such a situation" are not defined and, while likely obvious in many circumstances, leaves to individual interpretation when a "large" amount of primary inadvertent has accumulated.[28] WECC suggested in its comments submitted in response to the NOPR to either define the terms within the regional Reliability Standard or clarify the language in the standard to better identify specific parameters that would trigger actions required under this standard. NERC agreed in its comments that further clarity of the identified phrases in Requirement R1.2 is appropriate. The Commission adopted its NOPR proposal and directed WECC to develop revisions to the provision so that a Balancing Authority will know with specificity the circumstances that trigger the actions required by Requirement R1.2.[29]

b) Requirement R2

Requirement R2 of BAL-004-WECC-01 provides that "[e]ach [Balancing Authority] while synchronously connected to the Western Interconnection will be allowed to have ATEC out of service for a maximum of 24 hours per calendar quarter, for reasons including maintenance and testing." In Order No. 723, the Commission directed WECC to develop a modification to the regional Reliability Standard consistent with WECC's and NERC's explanation in comments that the limit set forth in Requirement R2 of "24 hours per calendar quarter" is an accumulated total for the period, resulting from either a singular event or a cumulative time limit from a number of events.[30]

---

28 NOPR at P 36.

29 Order No. 723 at 30.

30 Order No. 723 at 34.

C. NERC and WECC Reliability Standards Development Procedures

The Proposed Reliability Standards were developed in an open and fair manner and in accordance with the Commission-approved NERC and WECC Reliability Standards development processes. NERC develops Reliability Standards in accordance with Section 300 (Reliability Standards Development) of its *Rules of Procedure* and the NERC Standard Processes Manual.[31] In Order No. 672, the Commission found that NERC's proposed rules provide for reasonable notice and opportunity for public comment, due process, openness, and a balance of interests in developing Reliability Standards and thus satisfies certain of the criteria for approving Reliability Standards.

As discussed in the Commission-approved *WECC Reliability Standards Development Procedure,*[32] WECC's standards must be developed according to the following characteristic attributes:

- Open Access to all aspects of the Standard Development process;
- Drafting by Subject Matter Experts that accept and respond to all public input; and
- Formal approval involving response to input and final vote by affected entities and WECC's Board of Directors.

Proposed WECC regional Reliability Standards are subject to approval by NERC and the Commission before becoming mandatory and enforceable under section 215 of the FPA.[33] As demonstrated herein, the proposed WECC regional Reliability Standard and the regional variance were developed in an open, transparent, and inclusive manner. The Proposed

---

[31] The NERC Rules of Procedure are available at http://www.nerc.com/AboutNERC/Pages/Rules-ofProcedure.aspx. The current NERC Standard Processes Manual is available at http://www.nerc.com/files/Appendix_3A_StandardsProcessesManual_20120131.pdf.

[32] The *WECC Reliability Standards Development Procedure* is available at http://www.wecc.biz/library/WECC%20Documents/Business%20and%20Governance%20Documents/WECC%20Reliability%20Standards%20Development%20Procedures.pdf.

[33] 16 U.S.C. § 824o (2006).

Reliability Standards were widely supported by the WECC ballot pool, approved by the WECC Standards Committee, and approved by both the WECC Board of Directors and NERC.

IV. JUSTIFICATION FOR APPROVAL

This section summarizes the proposed regional Reliability Standard BAL-004-WECC-02 and the regional variance in proposed Reliability Standard BAL-001-1. It also presents the technical basis and content of the Proposed Reliability Standards. As discussed below and in the discussion of the Order No. 672 criteria in **Exhibit D**, the Proposed Reliability Standards satisfy the Commission's criteria in Order No. 672 and are just, reasonable, not unduly discriminatory or preferential, and in the public interest.

In addition, the proposed WECC regional variance in BAL-001-1 achieves the reliability objective of Requirement R1 of the continent-wide BAL-001 Reliability Standard in an alternate way for the Western Interconnection than specified. Below are a Requirement-by-Requirement explanation of the Proposed Reliability Standards and a summary of the Commission directives addressed. A summary of the proposed retirements that accompany the approval of the proposed Reliability Standards is also provided.

A. Proposed Regional Reliability Standard BAL-004-WECC-02

WECC has revised BAL-004-WECC-01 to comply with directives from Order No. 723, make clarifications to BAL-004-WECC-01, and move the ATEC equations from Requirement R1 to a WECC regional variance in BAL-001-0.1. The purpose of proposed BAL-004-WECC-02 is to maintain Interconnection frequency and to ensure that Time Error Corrections and Primary Inadvertent Interchange payback are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection. Proposed BAL-004-WECC-02 applies to Balancing Authorities that operate synchronously in the Western Interconnection. It continues to

meet the purpose of the current BAL-004-WECC-01 regional Reliability Standard and remains more stringent than the continent-wide Reliability Standard BAL-004-0.[34] BAL-004-WECC-02 contains eight Requirements.

Requirement R1 requires each Balancing Authority that operates synchronously to the Western Interconnection to continuously operate utilizing ATEC in its Automatic Generation Control system. In response to the Commission directive in Order No. 723 to revise Requirement 1.2 of BAL-004-WECC-01, the term "large accumulation" is eliminated and replaced in **Requirement R1** with a quantifiable maximum limit for each Balancing Authority to meet by the end of each month. For load-serving Balancing Authorities, Primary Inadvertent Interchange is "limited to 150% of the previous calendar year's integrated hourly Peak Demand."[35] For generation only Balancing Authorities, Primary Inadvertent Interchange is limited to "150% of the previous calendar year's integrated hourly peak generation."[36] This will provide the specificity the Commission notes the Balancing Authority should have to trigger its responsibilities under the Requirement.

If a Balancing Authority discovers an error in the calculation of the hourly Primary Inadvertent Interchange, under **Requirement R2,** the Balancing Authority is required to recalculate the value of the hourly Primary Inadvertent Interchange and adjust the accumulated Primary Inadvertent Interchange from the time of the error within 90 days. The standard drafting team selected 90 days as a reasonable amount of time to correct an error and recalculate the hourly Primary Inadvertent Interchange and the accumulated Primary Inadvertent Interchange,

---

[34] BAL-004-WECC-02 continues to provide for "continuous capture of inadvertent interchange, and thereby (1) contributes to better operation of balancing authorities by operators, and (2) ensures that discrepancies between a balancing area's net scheduled interchange and its net actual interchange are adjusted more quickly and accurately." Order No. 723 at P 25 (finding that BAL-004-WECC-01 is more stringent than the continent-wide Reliability Standard).

[35] BAL-004-WECC-02, Requirement R1, Part 1.1. .

[36] BAL-004-WECC-02, Requirement R1, Part 1.2.

since recalculation of hourly Primary Inadvertent Interchange and the accumulated Primary Inadvertent Interchange is not a real-time operations reliability issue.

Requirement R3 requires each Balancing Authority to keep its Automatic Time Error Correction in service, with an allowable exception period of less than or equal to an accumulated twenty-four hours per calendar quarter for ATEC to be out of service. This carries forward the prior Requirement R2 of BAL-004-WECC-01 and deletes the portion of the requirement to notify all other Balancing Authorities of its operating mode if the operating mode differs from ATEC. Because use of ATEC is required under BAL-004-WECC-02, this notification aspect is no longer necessary. Requirement R3 also clarifies, in response to Order No. 723, that the exception period for having ATEC out of service is an *accumulated* total for the period of 24 hours per calendar quarter. The restated Requirement also recognizes that extremely short interruptions in ATEC need not be communicated to the Western Interconnection. For example, computer maintenance processes could result in momentary interruptions (*e.g.*, system upgrades) that do not require notifying neighboring Balancing Authorities.

Requirements R4 and R6 require the calculation and recalculation respectively of Primary Inadvertent Interchange (both hourly and accumulated) and Automatic Time Error Correction.[37] Requirement R4, parts 4.1, 4.2 and 4.3 specifically call for computation of hourly Primary Inadvertent Interchange, accumulated Primary Inadvertent Interchange, and Automatic Time Error Correction. Requirement R6 also calls for recalculation of hourly Primary Inadvertent Interchange and accumulated Primary Inadvertent Interchange "whenever adjustments are made to hourly Inadvertent Interchange or ΔTE."[38] These requirements provide added specificity and time constraint to the previous requirements in BAL-004-WECC-01.

[37] Requirement R4 from BAL-004-WECC-01 has been replaced by Requirement R4, parts 4.1, 4.2 and 4.3, and Requirement R6 in proposed BAL-004-WECC-02

[38] ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor.

Requirement R4.1 from BAL-004-WECC-01 has been replaced with the ΔTE term in BAL-001-1, Requirement E.B.1. Requirement R4.2 from BAL-004-WECC-01 has been replaced by **Requirements R2 and R6** in BAL-004-WECC-02.

Requirement R5 continues to allow each Balancing Authority to change its Automatic Generation Control operating mode to correspond to current operating conditions. This is currently permitted under Requirement R3 of BAL-004-WECC-01. Requirement R3 also required that the ACE used for NERC reports must be the same ACE as the AGC operating mode in use. Proposed Requirement R5 removes the reference to the NERC report because such a requirement is not necessary with the adoption of a WECC regional variance to BAL-001-0.1a.[39]

Requirement R7 replaces Requirement R4.3 from BAL-004-WECC-01. Requirement R7 requires the Balancing Authority to make the same adjustment to the accumulated Primary Inadvertent Interchange as it did for any month-end meter reading adjustments to Inadvertent Interchange. Requiring the same adjustment was chosen for simplicity to bilaterally assign Primary Inadvertent Interchange to both Balancing Authorities, since the effect of this metering error on system frequency is not easily determined over the course of a month.

Requirement R8 has been added to BAL-004-WECC-02 to prevent stranded Secondary Inadvertent Interchange. It requires payback of Inadvertent Interchange using ATEC rather than bilateral and unilateral payback.

Requirement R4.4 from BAL-004-WECC-01 has been deleted because Requirement R4.1 mandates the use of "change in Time Error distributed by the Interconnection Time Monitor." This eliminates the need for Balancing Authorities to maintain a separate Time Error

[39] There was some confusion in industry regarding which ACE should be used for NERC reports since the language in Requirement R3seemed to conflict with the NERC response in comments to the NOPR on BAL-004-WECC-01 that entities may use ATEC ACE for control but should use raw ACE for reporting.

which would require daily synchronizing with the Interconnection Time Monitor and renders Requirement R4.1 redundant.

B. Proposed Reliability Standard BAL-001-1

WECC has also developed a proposed alternative methodology for calculating ACE in the Western Interconnection. Specifically, WECC has moved the ATEC equations previously located in Requirement R1 of regional Reliability Standard BAL-004-WECC-01 to a WECC-specific regional variance in proposed Reliability Standard BAL-001-1.[40] This regional variance is included in proposed Reliability Standard BAL-001-1 in section E, part B. The proposed regional variance requires Balancing Authorities in WECC to use the ATEC ACE for control *and* Control Performance Standard reporting. This approach has the same reliability objective as BAL-001-0.1a with the enhanced benefit of ensuring that Time Error Corrections and Primary Inadvertent Interchange payback are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection. Using the ATEC ACE equation for Control Performance Standard reporting is appropriate in the Western Interconnection because it is a more accurate measure of how well a Balancing Authority is controlling to its control performance target. Balancing Authorities in the Western Interconnection believe that using the continent-wide ACE for Control Performance Standard reporting while using ATEC ACE for controlling is not a true measure of a Balancing Authority's control performance and is therefore not an accurate representation of their contribution to Interconnection reliability.

Under the current ACE equation, a Balancing Authority controls its frequency and Interchange to a target point of zero. By contrast, the proposed ATEC ACE allows the control to stay within a predefined range adjusted by the ATEC. WECC produced a technical justification

[40] The NERC Board of Trustees recently approved BAL-001-2 which will supersede the proposed BAL-001-1 Reliability Standard.

paper titled *Consolidation of NERC and Control ACEs – Using the Same ACE for Control and NERC Reporting*, included as **Exhibit G**, to detail the issues related to use of two different ACE equations. It provides background and a discussion of the key technical issues involved in developing the changes. The document also provides historical data showing the number of manual Time Error Corrections and shows comparative frequency error profiles.

Establishing a WECC regional variance in proposed BAL-001-1 provides the following enhancements within the BAL-001 Reliability Standard for the Western Interconnection:

- the definition of ATEC ACE will be re-located to BAL-001 from BAL-004-WECC-01, locating all of the definitions of ACE for all Interconnections in a single Reliability Standard;
- the equations for ATEC ACE will use terminology and variables that are common to the other Interconnections;
- definition of ACE and "control" ACE will be unified in the Western Interconnection; and
- consideration of exceptional circumstances governing multiple ACEs will be eliminated.

Proposed BAL-001-1 will retire the Appendix 2 interpretation to Reliability Standard BAL-001-0.1a if approved. The Appendix 2 interpretation request asked whether the WECC ATEC procedure violates Requirement R1 of BAL-001-0. The approved interpretation states that as long as Balancing Authorities use raw (unadjusted for WECC ATEC) ACE for Control Performance Standard reporting purposes under BAL-001, the use of ATEC for control is not in violation of BAL-001 Requirement R1. This interpretation is no longer necessary since the same ACE will be used in the Western Interconnection for control and Control Performance Standard reporting purposes.

Proposed BAL-001-1 will also permit the retirement of the Appendix 1 Interpretation of Requirement R3 in Reliability Standard BAL-003-0.1b – Frequency Response and Bias.[41] By creating a regional variance that replaces Requirement R1 in WECC, these interpretations are no longer needed.

C. Definitions

NERC and WECC also propose two definitions for approval. First, a revision to the definition for "Area Control Error" is proposed. The drafting team revised the definition for ACE to align with the NERC definition for ACE while at the same time recognizing the concept of ATEC used in the Western Interconnection. The revised definition includes a provision for ATEC if operating in the ATEC mode. The revised definition for ACE will replace the current continent-wide definition. To make clear that the ATEC portions of the definition only apply to WECC, the revised definition states that "ATEC is only applicable to Balancing Authorities in the Western Interconnection." The WECC regional definition of ACE will be retired. Second, "Automatic Time Error Correction" is a newly proposed definition applicable within the Western Interconnection intended to more accurately define the term. NERC and WECC request Commission approval of these defined terms.

D. Enforceability of Proposed Reliability Standards BAL-004-WECC-02 and BAL-001-1

The Proposed Reliability Standards contain Measures that support each Requirement. These Measures help provide clarity regarding how the Requirements will be enforced, and ensure that the Requirements will be enforced in a clear, consistent, and non-preferential manner

[41] On July 18, 2013, the Commission issued a NOPR proposing to approve Reliability Standard BAL-003-1. *See Frequency Response and Frequency Bias Setting Reliability Standard*, NOPR, 144 FERC ¶ 61,057 (2013). The proposed BAL-003-1 Reliability Standard would retire the Appendix 2 interpretation if approved by the Commission in a Final Rule. If the Commission rules on this petition and approves proposed BAL-001-1 prior to issuing a Final Rule approving proposed BAL-003-1, NERC and WECC request that the Commission retire the Appendix 2 interpretation.

and without prejudice to any party.[42] The Proposed Reliability Standards also contain both VRFs and VSLs assigned to each Requirement. The VRFs and VSLs were developed and reviewed for consistency with NERC and Commission guidelines.[43] Analysis of the assigned VRFs and VSLs for BAL-004-WECC-02 is included in **Exhibit H**.

For proposed BAL-001-1, the standard drafting team is proposing the same VSLs for Requirement E.B.1 of the regional variance as those in Requirement R1 of BAL-001-0.1a because both Requirements measure how well a Balancing Authority is meeting its control performance target. Requirements E.B.2 and E.B.3 are considered to be "Pass/Fail" Requirements and pursuant to the NERC Violation Severity Guidelines, these requirements were assigned a severity level of "severe." Using the definitions set forth in the *Sanction Guidelines of the North American Electricity Reliability Corporation*, the standard drafting team proposes the VRFs for Requirements E.B.1, E.B.2, and E.B.3 as "Medium". This reflects the determination by the standard drafting team, that if any one of the Requirements were violated, it could directly affect the electrical state or the capability of the Bulk Electric System, or the ability to effectively monitor and control the Bulk Electric System. However, if any one of the Requirements were violated, it is unlikely to lead to Bulk Electric System instability, separation, or cascading failures. No changes to the VRF's or VSL's were proposed for the existing portions of Reliability Standard BAL-001.

---

[42] Order No. 672 at P 327 ("There should be a clear criterion or measure of whether an entity is in compliance with a proposed Reliability Standard. It should contain or be accompanied by an objective measure of compliance so that it can be enforced and so that enforcement can be applied in a consistent and non-preferential manner.").

[43] See *Order on Violation Risk Factors*, 119 FERC ¶ 61,145 (2007) and *Order on Violation Severity Levels Proposed by the Electric Reliability Organization*, 123 FERC ¶ 61,284 (2008).

V. CONCLUSION

For the reasons set forth above, NERC respectfully requests Commission approval of:

- proposed regional Reliability Standard BAL-004-WECC-02 and proposed Reliability Standard BAL-001-1;
- the VRFs and VSLs for each of the Proposed Reliability Standards;
- the implementation plan for the Proposed Reliability Standards;
- the definitions for "Area Control Error" and "Automatic Time Error Correction;" and
- the retirement of the following:
    - regional Reliability Standard BAL-004-WECC-01 – Automatic Time Error Correction (superseded by BAL-004-WECC-02);
    - Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance and the associated Appendix 2 interpretation (superseded by BAL-001-1);
    - current definition of "Area Control Error" and the WECC regional definition of Area Control Error; and
    - Appendix 1 Interpretation of Requirement R3 in Reliability Standard BAL-003-0.1b – Frequency Response and Bias.

Respectfully submitted,

/s/ William H. Edwards

Charles A. Berardesco
Senior Vice President and General Counsel
Holly A. Hawkins
Assistant General Counsel
William H. Edwards
Counsel
North American Electric Reliability Corporation
1325 G Street, N.W., Suite 600
Washington, D.C. 20005
(202) 400-3000
(202) 644-8099 – facsimile
charlie.berardesco@nerc.net
holly.hawkins@nerc.net
william.edwards@nerc.net

Counsel for the North American Electric Reliability Corporation

Date: August 20, 2013

EXHIBIT A

Proposed Regional Reliability Standard BAL-004-WECC-02 – Automatic Time Error Correction

A. Introduction

1. **Title:** Automatic Time Error Correction

2. **Number:** BAL-004-WECC-02

3. **Purpose:** To maintain Interconnection frequency and to ensure that Time Error Corrections and Primary Inadvertent Interchange (PII) payback are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection.

4. **Applicability**

   4.1. Functional Entities

   4.1.1 Balancing Authorities that operate synchronously in the Western Interconnection.

5. **Effective Date:** On the first day of the second quarter, after applicable regulatory approval has been received (or the Reliability Standard otherwise becomes effective the first day of the fourth quarter following NERC Board adoption where regulatory approval is not required).

6. **Background:**

   In February 2003, the WECC Automatic Time Error Correction (ATEC) Procedure (Procedure) became effective for all Balancing Authorities in the Western Interconnection. The original intent of the Procedure was to minimize the number of Manual Time Error Corrections in the Western Interconnection. ATEC provides the added benefit of a superior approach over the current NERC Reliability Standard BAL-004-0 – Time Error Correction for assigning costs and providing for the equitable payback of Inadvertent Interchange. In October 2006, the Procedure became a WECC Criterion. In May 2009, FERC issued Order No.723 that approved Regional Reliability Standard BAL-004-WECC-1 - Automatic Time Error Correction, as submitted by NERC. In addition, the Commission directed WECC to develop several clarifying modifications to BAL-004-WECC-1 using the FERC-approved Process for Developing and Approving WECC Standards. The Effective Date of the BAL-004-WECC-1 standard was July 1, 2009. BAL-004-WECC-1 required Balancing Authorities within the Western Interconnection to maintain Interconnection frequency within a predefined frequency profile and to ensure that Time Error Corrections were effectively conducted in a manner that did not adversely affect the reliability of the Interconnection. In September 2009, WECC received WECC Standards/Regional Criterion Request Form (Request) WECC-0068, which was a request for modification of BAL-004-WECC-1. In July 2010, the chair of the WECC Operating Committee assigned the Request to the Performance Work Group (PWG) for development.

B. Requirements and Measures

R1. Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PII_{accum}) for both the monthly On-Peak period and the monthly Off-Peak period are each individually less than or equal to:

1.1. For load-serving Balancing Authorities, 150% of the previous calendar year's integrated hourly Peak Demand,

1.2. For generation-only Balancing Authorities, 150% of the previous calendar year's integrated hourly peak generation.

[Violation Risk Factor Medium:] [Time Horizon: Operations Assessment]

M1. Forms of acceptable evidence of compliance with Requirement R1include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool (WIT),
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R2. Each Balancing Authority shall, upon discovery of an error in the calculation of PII_{hourly}, recalculate within 90 days, the value of PII_{hourly} and adjust the PII_{accum} from the time of the error. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M2. Forms of acceptable evidence of compliance with Requirement R2 include but are not limited to any one of the following:

- Data, screen shots from the WIT,
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R3. Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service. *[Violation Risk Factor: Medium] [Time Horizon: Same-day Operations]*

M3. Forms of acceptable evidence of compliance with Requirement R3 may include, but are not limited to:

- Dated archived files,
- Historical data,

- Other data that demonstrates the ATEC was out of service for less than 24 hours per calendar quarter.

R4. Each Balancing Authority shall compute the following by 50 minutes after each hour:

4.1. $PII_{\mathbf{hourly}}$,

4.2. PII_{accum},

4.3. Automatic Time Error Correction term (I_{ATEC}).

[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]

M4. Forms of acceptable evidence of compliance with Requirement R4 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from internal Balancing Authority tool that demonstrate compliance, or
- Data from any other databases, spreadsheets, displays that demonstrate compliance.

R5. Each Balancing Authority shall be able to change its Automatic Generation Control operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error Control (used in ATEC mode), to correspond to current operating conditions. *[Violation Risk Factor: Medium] [Time Horizon: Real-Time Operations]*

M5. Forms of acceptable evidence of compliance with Requirement R5 include but are not limited to any one of the following:

- Screen shots from Energy Management System,
- Demonstration using an off-line system.

R6. Each Balancing Authority shall recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly Inadvertent Interchange or ΔTE. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M6. Forms of acceptable evidence of compliance with Requirement R6 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,

- Data, screen shots from an internal Balancing Authority tool that demonstrate compliance with, or
- Data from any other databases, spreadsheets, displays that demonstrate compliance.

R7. Each Balancing Authority shall make the same adjustment to the PII_{accum} as it did for any month-end meter reading adjustments to Inadvertent Interchange. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M7. Forms of acceptable evidence of compliance with Requirement R7 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from an internal Balancing Authority tool that demonstrate compliance,
- Production of data from any other databases, spreadsheets, displays that demonstrate compliance.

R8. Each Balancing Authority shall payback Inadvertent Interchange using ATEC rather than bilateral and unilateral payback. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M8. Forms of acceptable evidence of compliance with Requirement R8 include but are not limited to historical On-Peak and Off-Peak Inadvertent Interchange data, data from the WECC Interchange Tool, and ACE data.

C. Compliance

1. Compliance Monitoring Process

1.1 Compliance Enforcement Authority

The Regional Entity shall serve as the Compliance Enforcement Authority.

For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

For responsible entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

1.2 Compliance Monitoring and Assessment Processes:

Compliance Audits

Self-Certifications

Spot Checking

Compliance Investigations

Self-Reporting

Complaints

1.3 Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of PII_{hourly}, PII_{accum} (On-Peak and Off-Peak), ΔTE and any month-end adjustments for the preceding calendar year (January – December), as well as the current calendar year.

Each Balancing Authority in the Western Interconnection shall retain the amount of time the Balancing Authority operated without ATEC for the preceding calendar year (January – December), as well as the current calendar year.

1.4 Additional Compliance Information

None

Table of Compliance Elements

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	Operations Assessment	Medium	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 150%, but was less than or equal to 160% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 160%, but was less than or equal to 170% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 170%, but was less than or equal to 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.
R2	Operations Assessment	Medium	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 90 days of the discovery of the error; but made the required recalculations and adjustments within 120 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 120 days of the discovery of the error; but made the required recalculations and adjustments within 150 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 150 days of the discovery of the error; but made the required recalculations and adjustments within 180 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust PII_{accum} within 180 days of the discovery of the error.

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R3	Real-Time Operations	Medium	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 24 hours, but less than or equal to 72 hours.	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 72 hours, but less than or equal to 120 hours.	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 120 hours, but less than or equal to 168 hours	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 168 hours.
R4	Operations Assessment	Medium	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within 50 minutes, but made the required calculations in less than or equal to two hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within two hours, but made the required calculations in less than or equal to four hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within four hours, but made the required calculations in less than or equal to six hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within six hours.
R5	Real-Time Operations	Medium	N/A	N/A	N/A	The Balancing Authority is not able to change its AGC operating mode between Flat Frequency (for blackout restoration; Flat Tie Line (for loss of frequency

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						telemetry); Tie Line Bias; or Tie Line Bias plus Time Error control (used in ATEC mode).
R6	Operations Assessment	Medium	N/A	N/A	N/A	When making adjustments to hourly Inadvertent Interchange or ΔTE, the Balancing Authority did not recalculate the PII_{hourly} and the PII_{accum} for the On-Peak and Off-Peak periods.
R7	Operations Assessment	Medium	N/A	N/A	N/A	When making any month-end meter reading adjustments to Inadvertent Interchange, the Balancing Authority did not make the same adjustment to the PII_{accum}.
R8	Operations Assessment	Medium	N/A	N/A	N/A	The Balancing Authority paid back Inadvertent

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						Interchange using bilateral and unilateral payback rather than using ATEC.

Guidelines and Technical Basis

During development of this standard, text boxes were embedded within the standard to explain the rationale for various parts of the standard. Upon BOT approval, the text from the rationale text boxes was moved to this section.

Requirement R1:

Premise: Each Balancing Authority should ensure that the absolute value of its PII_{accum} for both the On-Peak period and the Off-Peak period each individually does not exceed 150% of the previous year's Peak Demand for load-serving Balancing Authorities and 150% of the previous year's peak generation for generation-only Balancing Authorities. The Balancing Authority is required to take action to keep each PII_{accum} period within the limit. For example, the Balancing Authorities actions may include:

- Identifying and correcting the source of any metering or accounting error(s) and recalculating the hourly Primary Inadvertent Interchange **(**PII_{hourly}) and the PII_{accum} from the time of the error;
- Validating the implementation of ATEC; or
- Setting L_{max} equal to $L_{10.}$until the PII_{accum} is below the limit in Requirement R1.

Justification: PII_{accum} may grow from month-end adjustments and metering errors, even with the inclusion of I_{ATEC} in the ACE equation.

Goal: To limit the amount of PII_{accum} that a Balancing Authority can have at the end of each month.

Requirement R2:

Premise: When a Balancing Authority finds an error in the calculation of its PII, the Balancing Authority needs time to correct the error and recalculate PII and PII_{accum}.

Justification: The drafting team selected 90 days as a reasonable amount of time to correct an error and recalculate PII and $PII_{accum,}$ since recalculation of PII and PII_{accum} is not a real-time operations reliability issue.

Goal: To promote the timely correction of errors in the calculation of PII and PII_{accum}.

Requirement R3:

Premise: When a Balancing Authority is not participating in ATEC, payback of PII_{accum} is delayed.

Justification: The limit of 24 hours per quarter discourages a Balancing Authority from withdrawing ATEC participation, for example, for economic gain during selected hours. If the limits were increased to 60 hours, a Balancing Authority could technically withdraw ATEC participation for one hour from Monday to Friday.

Goal: To promote fair and timely payback of PII_{accum} balances.

Requirement R4:

Premise: $PII_{\mathbf{hourly}}$, PII_{accum}, and I_{ATEC} should be determined before the next scheduling hour begins.

Justification: To promote timely calculations 50 minutes was selected because it is before the next hour ramp begins and permits time to collect the data and resolve interchange metering values.

Goal: To promote the timely calculation of $PII_{\mathbf{hourly}}$, PII_{accum}, and I_{ATEC}.

Requirement R5:

Premise: The ACE equation, and hence the AGC mode, will contain any number of parameters based on system operating conditions. Various AGC modes are identified corresponding to those operating conditions, as well as the specific sets of parameters included in the ACE equation.

Justification: Changing to the proper operating mode, corresponding to current operating conditions, affords proper movement of generating units in response to those conditions. The addition of the ATEC term results in an additional AGC mode and a different set of parameters. The inability to correctly calculate the ATEC term would dictate that AGC not be operated in the ATEC mode.

Goal: To set the AGC mode and calculate ACE in a manner that corresponds to the system operating conditions and to accommodate changes in those conditions.

Requirement R6:

Premise: Hourly adjustments to hourly Inadvertent Interchange (II) require a recalculation of the corresponding hourly PII value, the corresponding PII_{accum}, and all subsequent PII_{accum} for every hour up to the current hour.

Justification: As $PII_{\mathbf{hourly}}$ is corrected, then PII_{accum} should be recalculated.

Goal: To promote accurate, fair and timely payback of accumulated PII balances.

Requirement R7:

Premise: Month-end meter-reading adjustments are made, for example, when a Balancing Authority performs monthly comparisons of recorded month-end Net Actual Interchange (NI_A) values derived from hourly Actual Interchange Telemetered Values against month-end Actual Interchange Register Meter readings.

Justification: Month-end adjustments to II_{accum} are applied as 100% PII_{accum}. 100% was chosen for simplicity to bilaterally assign PII_{accum} to both Balancing Authorities, since the effect of this metering error on system frequency is not easily determined over the course of a month.

Goal: To provide a mechanism by which corresponding month-end II adjustments can be applied to PII_{accum}, when such adjustments cannot be attributed to any one particular hour or series of hours.

Requirement R8:

Premise: ATEC includes automatic unilateral payback of Primary Inadvertent Interchange and Secondary Inadvertent Interchange.

Justification: Additional unilateral and bilateral exchanges disturb the balance and distribution between Primary Inadvertent Interchange and Secondary Inadvertent Interchange throughout the Interconnection; thereby stranding Secondary Inadvertent Interchange.

Goal: To not strand Secondary Inadvertent Interchange.

Version History

Version	Date	Action	Change Tracking
1	February 4, 2003	Effective Date.	New
1	October 17, 2006	Created Standard from Procedure.	Errata
1	February 6, 2007	Changed the Standard Version from 0 to 1 in the Version History Table.	Errata
1	February 6, 2007	The upper limit bounds to the amount of Automatic Time Error Correction term was inadvertently omitted during the Standard Translation. The bound was added to the requirement R1.4.	Errata
1	February 6, 2007	The statement "The Time Monitor may declare offsets in 0.001-second increments" was moved from TEoffset to TDadj and offsets was corrected to adjustments.	Errata
1	February 6, 2007	The reference to seconds was deleted from the TE offset term.	Errata
1	June 19, 2007	The standard number BAL-STD-004-1 was changed to BAL-004-WECC-01 to be consistent with the NERC Regional Reliability Standard Numbering Convention.	Errata
2	December 19, 2012	Adopted by NERC Board of Trustees	

*** FOR INFORMATIONAL PURPOSES ONLY ***

Enforcement Dates: Standard BAL-004-WECC-02 — Automatic Time Error Correction

United States

Standard	Requirement	Enforcement Date	Inactive Date

This standard has not yet been approved by the applicable regulatory authority.

Printed On: August 16, 2013, 09:29 AM

EXHIBIT B

Proposed Reliability Standard BAL-001-1 – Real Power Balancing Control Performance

A. Introduction

1. **Title**: **Real Power Balancing Control Performance**

2. **Number**: BAL-001-1

3. **Purpose**: To maintain Interconnection steady-state frequency within defined limits by balancing real power demand and supply in real-time.

4. **Applicability**:

   4.1. Balancing Authorities

5. **Effective Date:** The WECC Regional Variance to NERC Reliability Standard BAL-001-1 is to be effective on the first day of the second quarter, after regulatory approval.

B. Requirements

R1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit ε_1^2 is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \epsilon_1^2 \; or \; \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\epsilon_1^2} \le 1$$

The equation for ACE is:

$ACE = (NI_A - NI_S) - 10B\,(F_A - F_S) - I_{ME}$

where:

- NI_A is the algebraic sum of actual flows on all tie lines.
- NI_S is the algebraic sum of scheduled flows on all tie lines.
- B is the Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.
- F_A is the actual frequency.
- F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.
- I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

R2. Each Balancing Authority shall operate such that its average ACE for at least 90% of clock-ten-minute periods (6 non-overlapping periods per hour) during a calendar month is within a specific limit, referred to as L_{10}.

$$AVG_{10-minute}(ACE_i) \le L_{10}$$

where:

$L_{10}=1.65 \in_{10} \sqrt{(-10B_i)(-10B_s)}$

ε_{10} is a constant derived from the targeted frequency bound. It is the targeted root-mean-square (RMS) value of ten-minute average Frequency Error based on frequency performance over a given year. The bound, ε_{10}, is the same for every Balancing Authority Area within an Interconnection, and B_s is the sum of the Frequency Bias Settings of the Balancing Authority Areas in the respective Interconnection. For Balancing Authority Areas with variable bias, this is equal to the sum of the minimum Frequency Bias Settings.

R3. Each Balancing Authority providing Overlap Regulation Service shall evaluate Requirement R1 (i.e., Control Performance Standard 1 or CPS1) and Requirement R2 (i.e., Control Performance Standard 2 or CPS2) using the characteristics of the combined ACE and combined Frequency Bias Settings.

R4. Any Balancing Authority receiving Overlap Regulation Service shall not have its control performance evaluated (i.e. from a control performance perspective, the Balancing Authority has shifted all control requirements to the Balancing Authority providing Overlap Regulation Service).

C. Measures

M1. Each Balancing Authority shall achieve, as a minimum, Requirement 1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-\text{month}}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement R1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{sampling cycles in clock-minute}}}{n_{\text{sampling cycles in clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{sampling cycles in clock-minute}}}{n_{\text{sampling cycles in clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B} \right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}} \right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error will be used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minute samples in hour}}}$$

The reporting Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-hour average-month}} = \frac{\sum_{\text{days-in-month}} [(\text{CF}_{\text{clock-hour}})(n_{\text{one-minute samples in clock-hour}})]}{\sum_{\text{days-in month}} [n_{\text{one-minute samples in clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}} [(\text{CF}_{\text{clock-hour average-month}})(n_{\text{one-minute samples in clock-hour averages}})]}{\sum_{\text{hours-in day}} [n_{\text{one-minute samples in clock-hour averages}}]}$$

The 12-month compliance factor becomes:

$$\text{CF}_{\text{12-month}} = \frac{\sum_{\text{i=1}}^{12} (CF_{\text{month-i}})(n_{(\text{one-minute samples in month})-\text{i}})]}{\sum_{\text{i=1}}^{12} [n_{(\text{one-minute samples in month})\text{-i}}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

M2. Each Balancing Authority shall achieve, as a minimum, Requirement R2 (CPS2) compliance of 90%. CPS2 relates to a bound on the ten-minute average of ACE. A compliance percentage is calculated as follows:

$$CPS2 = \left[1 - \frac{\text{Violations}_{\text{month}}}{(\text{Total Periods}_{\text{month}} - \text{Unavailable Periods}_{\text{month}})} \right] * 100$$

The violations per month are a count of the number of periods that ACE clock-ten-minutes exceeded L_{10}. ACE clock-ten-minutes is the sum of valid ACE samples within a clock-ten-minute period divided by the number of valid samples.

Violation clock-ten-minutes

= 0 if

$$\left| \frac{\sum ACE}{n_{\text{samples in 10-minutes}}} \right| \leq L_{10}$$

= 1 if

$$\left| \frac{\sum ACE}{n_{\text{samples in 10-minutes}}} \right| > L_{10}$$

Each Balancing Authority shall report the total number of violations and unavailable periods for the month. L_{10} is defined in Requirement R2.

Since CPS2 requires that ACE be averaged over a discrete time period, the same factors that limit total periods per month will limit violations per month. The calculation of total periods per month and violations per month, therefore, must be discussed jointly.

A condition may arise which may impact the normal calculation of total periods per month and violations per month. This condition is a sustained interruption in the recording of ACE.

In order to ensure that the average ACE calculated for any ten-minute interval is representative of that ten-minute interval, it is necessary that at least half the ACE data samples are present for that interval. Should half or more of the ACE data be unavailable due to loss of telemetering or computer unavailability, that ten-minute interval shall be omitted from the calculation of CPS2.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Regional Reliability Organization.

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar month.

1.3. Data Retention

The data that supports the calculation of CPS1 and CPS2 (Appendix 1-BAL-001-0) are to be retained in electronic form for at least a one-year period. If the CPS1 and CPS2 data for a Balancing Authority Area are undergoing a review to address a question that has been raised regarding the data, the data are to be saved beyond the normal retention period until the question is formally resolved. Each Balancing Authority shall retain for a rolling 12-month period the values of: one-minute average ACE (ACE_i), one-minute average Frequency Error, and, if using variable bias, one-minute average Frequency Bias.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance – CPS1

2.1. Level 1: The Balancing Authority Area's value of CPS1 is less than 100% but greater than or equal to 95%.

2.2. Level 2: The Balancing Authority Area's value of CPS1 is less than 95% but greater than or equal to 90%.

2.3. Level 3: The Balancing Authority Area's value of CPS1 is less than 90% but greater than or equal to 85%.

2.4. Level 4: The Balancing Authority Area's value of CPS1 is less than 85%.

3. Levels of Non-Compliance – CPS2

3.1. Level 1: The Balancing Authority Area's value of CPS2 is less than 90% but greater than or equal to 85%.

3.2. Level 2: The Balancing Authority Area's value of CPS2 is less than 85% but greater than or equal to 80%.

3.3. Level 3: The Balancing Authority Area's value of CPS2 is less than 80% but greater than or equal to 75%.

3.4. Level 4: The Balancing Authority Area's value of CPS2 is less than 75%.

E. Regional Differences

E.A. The ERCOT Control Performance Standard 2 Waiver approved November 21, 2002.

E.B. Regional Variance for the Western Electricity Coordinating Council

The following Interconnection-wide variance shall be applicable in the Western Interconnection and replaces, in their entirety, Requirement R1 and Section D.2. (i.e., under Compliance replace Levels of Non-Compliance – CPS1). Please note that the ACE equation is replaced in its entirety with the following equation identified in Requirement E.B.1.

Requirements and Measures

E.B.1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit ε_1^2 is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \epsilon_1^2 \; or \; \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\epsilon_1^2} \le 1$$

The equation for ACE in the Western Interconnection is:

$$ACE = \left(NI_A - NI_S\right) - 10B\left(F_A - F_S\right) - I_{ME} + I_{ATEC}$$

where:

- NI_A is the algebraic sum of actual flows on all tie lines.
- NI_S is the algebraic sum of scheduled flows on all tie lines.

- B is the Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.
- F_A is the actual frequency.
- F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.
- I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

$I_{ATEC} = \frac{PII_{accum}^{on/off\ peak}}{(1-Y)*H}$ when operating in Automatic Time Error Correction control mode.

I_{ATEC} shall be zero when operating in any other AGC mode.

- $Y = B / B_S$.
- H =Number of Hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3.
- B_S = Frequency Bias for the Interconnection (MW / 0.1 Hz).
- Primary Inadvertent Interchange (PII_{hourly}) is **(1-Y) * (II_{actual} - B * ΔTE/6)**
- II_{actual} is the hourly Inadvertent Interchange for the last hour.
- ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where:

  $\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE_{offset})$
- TD_{adj} is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks.
- t is the number of minutes of Manual Time Error Correction that occurred during the hour.
- TE_{offset} is 0.000 or +0.020 or -0.020.
- PII_{accum} is the Balancing Authority's accumulated PII_{hourly} in MWh. An On-Peak and Off-Peak accumulation accounting is required.

Where:

$$PII_{accum}^{on/off\ peak} = \text{last period's } PII_{accum}^{on/off\ peak} + PII_{hourly}$$

[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]

M.E.B.1. Each Balancing Authority shall achieve, as a minimum, Requirement E.B.1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-\text{month}}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement E.B.1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{sampling cycles in clock-minute}}}{n_{\text{sampling cycles in clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{sampling cycles in clock-minute}}}{n_{\text{sampling cycles in clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}}\right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error will be used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minute samples in hour}}}$$

The reporting Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-hour average-month}} = \frac{\sum_{\text{days-in-month}} [(\text{CF}_{\text{clock-hour}})(n_{\text{one-minute samples in clock-hour}})]}{\sum_{\text{days-in month}} [n_{\text{one-minute samples in clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}} [(\text{CF}_{\text{clock-hour average-month}})(n_{\text{one-minute samples in clock-hour averages}})]}{\sum_{\text{hours-in day}} [n_{\text{one-minute samples in clock-hour averages}}]}$$

The 12-month compliance factor becomes:

$$CF_{12\text{-month}} = \frac{\sum_{i=1}^{12}(CF_{\text{month-i}})(n_{(\text{one-minute samples in month})-i})]}{\sum_{i=1}^{12}[n_{(\text{one-minute samples in month})\text{-i}}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

E.B.2. Each Balancing Authority shall limit the absolute value of I_{ATEC}, the Automatic Time Error Correction term as follows: *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*

$|I_{ATEC}| \leq L_{max}$.

M.E.B.2. Forms of acceptable evidence for Requirement E.B.2 may include, but are not limited to:

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or
- Other archived data that demonstrates compliance.

E.B.3. Each Balancing Authority shall set L_{max} within the limits as follows:

$0.20 * |B| \leq L_{max} \leq L_{10}$.

[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]

M.E.B.3. Forms of acceptable evidence for Requirement E.B.3 may include, but is not limited to:

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or
- Other archived data that demonstrates compliance.

E.B Compliance

1. Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of I_{ATEC} and L_{max} for the preceding calendar year (January – December), as well as the current calendar year.

Table of Compliance Elements

E #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
E.B.1	Real-time Operations	Medium	The Balancing Authority Area's value of CPS1 was less than 100% but greater than or equal to 95%.	The Balancing Authority Area's value of CPS1 was less than 95% but greater than or equal to 90%.	The Balancing Authority Area's value of CPS1 was less than 90% but greater than or equal to 85%.	The Balancing Authority Area's value of CPS1 was less than 85%.
E.B.2	Real-time Operations	Medium	N/A	N/A	N/A	The Balancing Authority Area's absolute value for I_{ATEC} was greater than L_{max}.
E.B.3	Operations Planning	Medium	N/A	N/A	N/A	The Balancing Authority did not set L_{max} to within the limits in E.B.3 (i.e., $0.20 * \|B\| \leq L_{max} \leq L_{10}$).

F. Associated Documents

Version History

Version	Date	Action	Change Tracking
0	February 8, 2005	BOT Approval	New
0	April 1, 2005	Effective Implementation Date	New
0	August 8, 2005	Removed "Proposed" from Effective Date	Errata
0	July 24, 2007	Corrected R3 to reference M1 and M2 instead of R1 and R2	Errata
0a	December 19, 2007	Added Appendix 2 – Interpretation of R1 approved by BOT on October 23, 2007	Revised
0a	January 16, 2008	In Section A.2., Added "a" to end of standard number In Section F, corrected automatic numbering from "2" to "1" and removed "approved" and added parenthesis to "(October 23, 2007)"	Errata
0	January 23, 2008	Reversed errata change from July 24, 2007	Errata
0.1a	October 29, 2008	Board approved errata changes; updated version number to "0.1a"	Errata
0.1a	May 13, 2009	Approved by FERC	
1	December 19, 2012	Adopted by NERC Board of Trustees	

Appendix 1-BAL-001-1
CPS1 and CPS2 Data

CPS1 DATA	Description	Retention Requirements
ε_1	A constant derived from the targeted frequency bound. This number is the same for each Balancing Authority Area in the Interconnection.	Retain the value of ε_1 used in CPS1 calculation.
ACE_i	The clock-minute average of ACE.	Retain the 1-minute average values of ACE (525,600 values).
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value(s) of B_i used in the CPS1 calculation.
F_A	The actual measured frequency.	Retain the 1-minute average frequency values (525,600 values).
F_S	Scheduled frequency for the Interconnection.	Retain the 1-minute average frequency values (525,600 values).

CPS2 DATA	Description	Retention Requirements
V	Number of incidents per hour in which the absolute value of ACE clock-ten-minutes is greater than L_{10}.	Retain the values of V used in CPS2 calculation.
ε_{10}	A constant derived from the frequency bound. It is the same for each Balancing Authority Area within an Interconnection.	Retain the value of ε_{10} used in CPS2 calculation.
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value of B_i used in the CPS2 calculation.
B_s	The sum of Frequency Bias of the Balancing Authority Areas in the respective Interconnection. For systems with variable bias, this is equal to the sum of the minimum Frequency Bias Setting.	Retain the value of B_s used in the CPS2 calculation. Retain the 1-minute minimum bias value (525,600 values).
U	Number of unavailable ten-minute periods per hour used in calculating CPS2.	Retain the number of 10-minute unavailable periods used in calculating CPS2 for the reporting period.

Guidance and Rationale

Rationale for E.B.1

Premise: When a Balancing Authority Area uses the ACE equation with an ATEC correction component for both control and assessing performance, it provides a more accurate measurement of the Control Performance methodology while at the same time achieving the same reliability objective as the existing BAL-001-0.1a standard.

Justification: Adding the $\boldsymbol{I_{ATEC}}$ term to the ACE equation reduces the number of manual time error corrections and PII_{accum}.

Goal: To establish an ACE equation that permits the implementation of Automatic Time Error Correction.

Rationale for E.B.2

Premise: $\boldsymbol{I_{ATEC}}$ greater than L_{max} may result in a risk to reliability caused by large ATEC payback.

Justification: Balancing Authorities should not control their Balancing Authority Areas using an approach that puts system reliability at risk.

Goal: The goal of Requirement E.B.2 is to limit $\boldsymbol{I_{ATEC}}$ to $\boldsymbol{L_{max}}$ in order to reduce potential reliability risks to the interconnection caused by a large ATEC payback term.

Rationale for E.B.3

Premise: Operating within an L_{max} less than 0.20 * |B| may not provide sufficient correction for PII and operating with an L_{max} greater than L_{10} may result in potential reliability risks caused by a large ATEC payback term.

Justification: L_{max} should be limited to prevent Balancing Authorities from creating potential reliability risks caused by a large ATEC payback term.

Goal: The goal of Requirement E.B.3 is to develop a range for L_{max} where Balancing Authorities reduce potential reliability risks by limiting I_{ATEC} to L_{max}.

*** FOR INFORMATIONAL PURPOSES ONLY ***

Enforcement Dates: Standard BAL-001-1 — Real Power Balancing Control Performance

United States

Standard	Requirement	Enforcement Date	Inactive Date

This standard has not yet been approved by the applicable regulatory authority.

Printed On: August 16, 2013, 08:46 AM

EXHIBIT C

Implementation Plan

Implementation Plan
WECC-0068 Modification of BAL-004-WECC-01
Automatic Time Error Correction (ATEC)

The following information details the implementation plans for changes to BAL-004-WECC-02, BAL-001-0.1a, and BAL-003-0.1b.

Date of Implementation

The Implementation Plan is to make BAL-001-0.1a with the WECC Regional Variance and Regional Standard BAL-004-WECC-02 effective on the first day of the second quarter, after regulatory approval in areas where applicable. Since entities in the Western Interconnection are already controlling their Balancing Authority Areas with the Automatic Time Error Correction (ATEC) Area Control Error (ACE) equation – but are reporting Control Performance Standard (CPS) 1 using the North America Electricity Corporation (NERC) raw ACE equation, the impact of transition to controlling and reporting using the ATEC ACE is expected to be minimal. Additionally, it is anticipated that it will take a very small amount of time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

The small time delay after approval is deemed sufficient to allow Balancing Authorities time to implement any software and procedural changes for reporting.

Change in reporting quantities

Beginning on the date of implementation, there will be a step-change in quantities reported by WECC entities for CPS. The new reported CPS will be generally smaller and will reflect the actual control performance error. Based on evaluated data, the expected value of reported CPS will decrease from corresponding reported data from previous periods.

Conforming Changes to Other Standards

BAL-001-0.1a and BAL-004-WECC-02 have been evaluated together because of their close relationship and the affect that a change to the ACE equation will have on required reports. With the approval of these changes to the documents, the Appendix 1 Interpretation of Requirement R3 of the BAL-003-0.1b standard can also be removed. It is not anticipated that these changes will require conforming changes in any other documents.

WESTERN ELECTRICITY COORDINATING COUNCIL • WWW.WECC.BIZ
155 NORTH 400 WEST • SUITE 200 • SALT LAKE CITY • UTAH • 84103-1114 • PH 801.582.0353 • FX 801.582.3918

Retirements

At the date of implementation of these standards, BAL-004-WECC-01 and the existing version of BAL-001-0.1a will be retired and replaced by these new standards. The drafting team for Project WECC-0068 also requests withdrawal of the BAL-001-0.1a Appendix 2 Interpretation of Requirement R1and the BAL-003-0.1b Appendix 1 Interpretation of Requirement R3. By creating a Regional Variance that replaces Requirement R1, these interpretations are no longer needed. The drafting team revised the definition for ACE in the WECC Regional Definitions to closely align with the NERC definition for ACE while at the same time recognizing the concept of ATEC.

Costs, Efforts, and Discontinuities due to change/Benefits

Costs to implement the change have not been calculated, but are estimated to be relatively low due to the fact that ATEC ACE is already being calculated and used in operation control, and that CPS reporting is already being done. The only difference will be to collect and report the differing CPS quantities.

WESTERN ELECTRICITY COORDINATING COUNCIL • WWW.WECC.BIZ
155 NORTH 400 WEST • SUITE 200 • SALT LAKE CITY • UTAH • 84103-1114 • PH 801.582.0353 • FX 801.582.3918

EXHIBIT D

Order No. 672 Criteria

EXHIBIT D

Order No. 672 Criteria

In Order No. 672,[1] the Commission identified a number of criteria it will use to analyze Reliability Standards proposed for approval to ensure they are just, reasonable, not unduly discriminatory or preferential, and in the public interest. The discussion below identifies these factors and explains how the Proposed Reliability Standards have met or exceeded the criteria:

1. **Proposed Reliability Standards must be designed to achieve a specified reliability goal and must contain a technically sound means to achieve that goal.**[2]

The purpose of proposed Reliability Standard BAL-004-WECC-02 — Automatic Time Error Correction is to maintain Interconnection frequency and to ensure that Time Error Corrections and Primary Inadvertent Interchange payback are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection. The purpose of the proposed regional variance in Reliability Standard BAL-001-1 — Real Power Balancing Control Performance is to maintain interconnection steady-state

---

[1] *Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards*, Order No. 672, FERC Stats. & Regs. ¶ 31,204, *order on reh'g*, Order No. 672-A, FERC Stats. & Regs. ¶ 31,212 (2006).

[2] Order No. 672 at P 321. The proposed Reliability Standard must address a reliability concern that falls within the requirements of section 215 of the FPA. That is, it must provide for the reliable operation of Bulk-Power System facilities. It may not extend beyond reliable operation of such facilities or apply to other facilities. Such facilities include all those necessary for operating an interconnected electric energy transmission network, or any portion of that network, including control systems. The proposed Reliability Standard may apply to any design of planned additions or modifications of such facilities that is necessary to provide for reliable operation. It may also apply to Cybersecurity protection.

Order No. 672 at P 324. The proposed Reliability Standard must be designed to achieve a specified reliability goal and must contain a technically sound means to achieve this goal. Although any person may propose a topic for a Reliability Standard to the ERO, in the ERO's process, the specific proposed Reliability Standard should be developed initially by persons within the electric power industry and community with a high level of technical expertise and be based on sound technical and engineering criteria. It should be based on actual data and lessons learned from past operating incidents, where appropriate. The process for ERO approval of a proposed Reliability Standard should be fair and open to all interested persons.

frequency within defined limits by balancing power demand and supply in real-time. Implementation of the Proposed Reliability Standards will achieve a number of reliability goals: (1) consolidating two ACE equations improves reliability by enhancing control; (2) implementation creates a maximum (absolute value) ceiling for Accumulated Primary Inadvertent Interchange; (3) implementation maintains or improves the interconnection frequency error profile; and (4) implementation reduces the number and duration of manual time error corrections.

The proposed regional variance in BAL-001-1 is an alternative methodology for calculating ACE; specifically, it would replace the NERC raw ACE equation with the ATEC ACE thereby requiring WECC Balancing Authorities to use the ATEC ACE for both control and Control Performance Standard reporting. This approach has the same reliability objective as BAL-001-0.1a with the enhanced benefit of ensuring that Time Error Corrections and Primary Inadvertent Interchange payback are effectively conducted in a manner that does not adversely affect the reliability of the Western Interconnection.

Use of the ATEC component in the ACE equation has been effective in mitigating two main issues in the Western Interconnection. First, it has been used to reduce the number of hours of manual Time Error Corrections, or the amount of manual adjustments of timing errors that accumulate on clocks, which make certain interconnection scheduled frequency deviations. Second, since Time Error is directly related to Inadvertent Interchange, the procedure has been used to reduce accumulated Inadvertent Interchange, or the difference between the actual and scheduled interchange.

The ATEC procedure requires Balancing Authorities in the Western Interconnection to determine their contribution to the Interconnection Time Error. The

Balancing Authority does this by calculating its Primary Inadvertent Interchange. BAL-001-1 Requirement E.B.1 requires that each Balancing Authority calculate its PII_{accum} and I_{ATEC} from its hourly Inadvertent Interchange. When the resulting I_{ATEC} is entered into Balancing Authority's ACE equation, I_{ATEC} continuously corrects for its portion of the time error automatically, as opposed to manually. Although the maximum payback is bounded between limits, the continuous correction enables equitable payback of Primary Inadvertent Interchange.

2. Proposed Reliability Standards must be applicable only to users, owners and operators of the bulk power system, and must be clear and unambiguous as to what is required and who is required to comply.[3]

Proposed BAL-004-WECC-02 and BAL-001-1 are clear and unambiguous as to what is required and who is required to comply. The proposed regional Reliability Standard and the variance to the continent-wide standard are only applicable to Balancing Authorities in the Western Interconnection. These entities are users, owners, or operators of the Bulk-Power System. The assigned tasks are detailed and largely follow a numeric equation thereby limiting ambiguity.

3. A proposed Reliability Standard must include clear and understandable consequences and a range of penalties (monetary and/or non-monetary) for a violation.[4]

Both proposed BAL-001-1 and BAL-004-WECC-02 include a Table of Compliance Elements specific to the proposed additions and changes. These tables include applicable Time Horizons, Violation Risk Factors, and Violation Severity Levels

[3] Order No. 672 at P 322. The proposed Reliability Standard may impose a requirement on any user, owner, or operator of such facilities, but not on others.

Order No. 672 at P 325. The proposed Reliability Standard should be clear and unambiguous regarding what is required and who is required to comply. Users, owners, and operators of the Bulk-Power System must know what they are required to do to maintain reliability.

[4] Order No. 672 at P 326. The possible consequences, including range of possible penalties, for violating a proposed Reliability Standard should be clear and understandable by those who must comply.

for each Requirement, varying from lower to severe, based on the magnitude of each specified violation. The VRFs and VSLs for proposed BAL-004-WECC-02 and BAL-001-1 comport with NERC and Commission guidelines related to their assignment. The assignment of the severity level for each VSL is consistent with the corresponding Requirement and the VSLs should ensure uniformity and consistency in the determination of penalties. The VSLs do not use any ambiguous terminology, thereby supporting uniformity and consistency in the determination of similar penalties for similar violations. For these reasons, the proposed Reliability Standard includes clear and understandable consequences in accordance with Order No. 672.

Proposed BAL-004-WECC-02 and BAL-001-1 also include clear and understandable consequences and a range of penalties (monetary and/or non-monetary) for a violation. Upon approval by the Commission, the ranges of penalties for violations will be based on the applicable VRF and VSL in accordance with the sanctions table and the supporting penalty determination process described in the Commission-approved NERC Sanction Guidelines, Appendix 4B to the NERC *Rules of Procedure*. An explanation of the VRFs and VSLs for proposed BAL-004-WECC-02 is provided in **Exhibit I**. An explanation of the VRFs and VSLs for proposed BAL-001-1 is included in section IV.D of the petition.

4. A proposed Reliability Standard must identify clear and objective criterion or measure for compliance, so that it can be enforced in a consistent and non-preferential manner.[5]

[5] Order No. 672 at P 327. There should be a clear criterion or measure of whether an entity is in compliance with a proposed Reliability Standard. It should contain or be accompanied by an objective measure of compliance so that it can be enforced and so that enforcement can be applied in a consistent and non-preferential manner.

Proposed BAL-001-1 and BAL-004-WECC-02 identify clear and objective criterion or measures for compliance, so that it can be enforced in a consistent non-preferential manner. For each Requirement specified in proposed BAL-001-1 and BAL-004-WECC-02 proposed for addition or alteration, there is a corresponding objective Measure. These Measures require, but are not limited to, possession of specified documentation containing specified content evidencing the achievement of the task assigned in the corresponding Requirement.

5. Proposed Reliability Standards should achieve a reliability goal effectively and efficiently — but do not necessarily have to reflect "best practices" without regard to implementation cost or historical regional infrastructure design.[6]

The proposed regional Reliability Standard and the regional variance achieve its reliability goal effectively and efficiently. The standard drafting team made clarifying changes to respond to the Commission's directives, made general improvements to the language in the BAL-004-WECC-01 regional Reliability Standard, and the proposed BAL-001-1 and BAL-004-WECC-02 Reliability Standards continue to utilize the same ATEC ACE procedures used in the Western Interconnection under BAL-004-WECC-01.

6. Proposed Reliability Standards cannot be "lowest common denominator," *i.e.,* cannot reflect a compromise that does not adequately protect Bulk-Power System reliability. Proposed Reliability Standards can consider costs to implement for smaller entities, but not at consequences of less than excellence in operating system reliability.[7]

---

[6] Order No. 672 at P 328. The proposed Reliability Standard does not necessarily have to reflect the optimal method, or "best practice," for achieving its reliability goal without regard to implementation cost or historical regional infrastructure design. It should however achieve its reliability goal effectively and efficiently.

[7] Order No. 672 at P 329. The proposed Reliability Standard must not simply reflect a compromise in the ERO's Reliability Standard development process based on the least effective North American practice — the so-called "lowest common denominator" — if such practice does not adequately protect Bulk-Power System reliability. Although FERC will give due weight to the technical expertise of the ERO, we will not hesitate to remand a proposed Reliability Standard if we are convinced it is not adequate to protect reliability.

Proposed BAL-001-1 and BAL-004-WECC-02 do not reflect a compromise that does not adequately protect Bulk-Power System reliability. As noted above, the alternative approach continues to meet the reliability goal in BAL-001-0.1a and maintains the current practice in WECC of using ATEC. The proposed regional variance in BAL-001-1 requires an alternative methodology that has been shown to result in reduced frequency error profiles and in reduced inadvertent interchange when compared with the results of the methodology required by BAL-001-0.1a in the continent-wide portion of the Reliability Standard.

The standard drafting team determined that the regional variance should result in relatively the same aggregate costs to applicable entities. While exact costs to implement the changes have not been calculated, the standard drafting team estimated the costs to be relatively low due to the fact that ATEC ACE is already being calculated and used in operation control, and that Control Performance Standard reporting is already done. The only difference will be to collect and report the differing Control Performance Standard quantities.

7. Proposed Reliability Standards must be designed to apply throughout North America to the maximum extent achievable with a single Reliability Standard while not favoring one geographic area or regional model. It should take into account regional variations in the organization and corporate structures of transmission owners and operators, variations in generation fuel type and ownership patterns, and regional variations in market design if these affect the proposed Reliability

---

Order No. 672 at P 330. A proposed Reliability Standard may take into account the size of the entity that must comply with the Reliability Standard and the cost to those entities of implementing the proposed Reliability Standard. However, the ERO should not propose a "lowest common denominator" Reliability Standard that would achieve less than excellence in operating system reliability solely to protect against reasonable expenses for supporting this vital national infrastructure. For example, a small owner or operator of the Bulk-Power System must bear the cost of complying with each Reliability Standard that applies to it.

Standard.[8]

Proposed BAL-001-1 and BAL-004-WECC-02 are designed on a regional basis and will only apply to the Western Interconnection.

8. Proposed Reliability Standards should cause no undue negative effect on competition or restriction of the grid beyond any restriction necessary for reliability.[9]

The proposed Reliability Standards will not cause undue negative effects on competition or restriction of the grid. Because the proposed Reliability Standards will be applied equally across the Western Interconnection, BAL-004-WECC-02 and the regional variance added to BAL-001-1 will not negatively affect competition.

Some entities submitted comments that setting the control limits too broadly may entice some entities to take advantage of economic and system conditions and push control obligations onto neighboring Balancing Authorities in the Interconnection. The standard drafting team considered the position concluding that the operating limits proposed were reasonable taking into consideration the size and the current operating practices of Balancing Authorities. As noted in the technical documents in **Exhibit G**, controlling with an ACE equation containing the ATEC term reduces the average

---

[8] Order No. 672 at P 331. A proposed Reliability Standard should be designed to apply throughout the interconnected North American Bulk-Power System, to the maximum extent this is achievable with a single Reliability Standard. The proposed Reliability Standard should not be based on a single geographic or regional model but should take into account geographic variations in grid characteristics, terrain, weather, and other such factors; it should also take into account regional variations in the organizational and corporate structures of transmission owners and operators, variations in generation fuel type and ownership patterns, and regional variations in market design if these affect the proposed Reliability Standard.

[9] Order No. 672 at P 332. As directed by section 215 of the FPA, FERC itself will give special attention to the effect of a proposed Reliability Standard on competition. The ERO should attempt to develop a proposed Reliability Standard that has no undue negative effect on competition. Among other possible considerations, a proposed Reliability Standard should not unreasonably restrict available transmission capability on the Bulk-Power System beyond any restriction necessary for reliability and should not limit use of the Bulk-Power System in an unduly preferential manner. It should not create an undue advantage for one competitor over another.

frequency deviation error. The proposed ATEC and Primary Inadvertent Interchange limits are within the design parameters for control.

9. The implementation time for the proposed Reliability Standard is reasonable.[10]

The implementation time for the Proposed Reliability Standards is reasonable. The proposed effective dates are explained in the proposed implementation plan, attached as **Exhibit C**. The Proposed Reliability Standards will become effective on the first day of the second quarter after regulatory approval. Since entities in the Western Interconnection are already controlling their Balancing Authority Areas with the ATEC ACE equation the impact of transition to controlling and reporting using the ATEC ACE is expected to be minimal. Additionally, it is anticipated that it will take a very small amount of time to implement the limits to a Balancing Authority's accumulated Primary Inadvertent Interchange.

10. The Reliability Standard was developed in an open and fair manner and in accordance with the Commission-approved Reliability Standard development process.[11]

The Proposed Reliability Standards were developed in accordance with NERC's and WECC's Commission-approved, ANSI- accredited processes for developing and approving Reliability Standards. A summary of the Reliability Standard Development proceedings is included in **Exhibit I** along with the complete record of development.

---

[10] Order No. 672 at P 333. In considering whether a proposed Reliability Standard is just and reasonable, FERC will consider also the timetable for implementation of the new requirements, including how the proposal balances any urgency in the need to implement it against the reasonableness of the time allowed for those who must comply to develop the necessary procedures, software, facilities, staffing or other relevant capability.

[11] Order No. 672 at P 334. Further, in considering whether a proposed Reliability Standard meets the legal standard of review, we will entertain comments about whether the ERO implemented its Commission-approved Reliability Standard development process for the development of the particular proposed Reliability Standard in a proper manner, especially whether the process was open and fair. However, we caution that we will not be sympathetic to arguments by interested parties that choose, for whatever reason, not to participate in the ERO's Reliability Standard development process if it is conducted in good faith in accordance with the procedures approved by FERC.

These processes included, among other things, multiple comment periods, pre-ballot review periods, and balloting periods. Additionally, all drafting team meetings were properly noticed and open to the public. The initial and recirculation ballots both achieved a quorum and exceeded the required ballot pool approval levels.

11. NERC must explain any balancing of vital public interests in the development of proposed Reliability Standards.[12]

NERC and WECC have not identified competing vital public interests with respect to the request for approval of the proposed Reliability Standards. In addition, no comments were received during the standard development process that indicated the proposed Reliability Standards conflict with other vital public interests.

12. Proposed Reliability Standards must consider any other appropriate factors.[13]

No other factors relevant to whether the proposed Reliability Standards are just and reasonable were identified.

[12] Order No. 672 at P 335. Finally, we understand that at times development of a proposed Reliability Standard may require that a particular reliability goal must be balanced against other vital public interests, such as environmental, social and other goals. We expect the ERO to explain any such balancing in its application for approval of a proposed Reliability Standard.

[13] Order No. 672 at P 323. In considering whether a proposed Reliability Standard is just and reasonable, we will consider the following general factors, as well as other factors that are appropriate for the particular Reliability Standard proposed.

EXHIBIT E

Mapping Document

The Project WECC-0068 (BAL-004-WECC-2 and Regional Variance to BAL-001-0.1a)
Drafting Team Completed Actions
January 18, 2012

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
R1. Each BA that operates synchronously to the Western Interconnection shall continuously operate utilizing Automatic Time Error Correction (ATEC) in its Automatic Generation Control (AGC) system. [Risk Factor: Lower] $ACE_{ATEC} = (NI_A - NI'_S) - 10B_i(F_A - F_S) - T_{0b} + I_{ME}$ **Where:** **NI_A =** Net Interchange Actual (MW). **F_A =** Frequency Actual (Hz). **F_S =** Frequency Scheduled (Normally 60 Hz). **B_i =** Frequency Bias for the Balancing Authority's Area (MW / 0.1 Hz). **T_{0b} =** Remaining Bilateral Payback for Inadvertent Interchange created prior to implementing automatic payback (MW). **I_{ME} =** Meter Error Correction (MW).	**E.B.1.** Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit $\in_1^2$ is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee. $AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \in_1^2 \; or \; \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\in_1^2} \le 1$ The equation for ACE in the Western Interconnection is: $ACE = (NI_A - NI_S) - 10B(F_A - F_S) - I_{ME} + I_{ATEC}$	Establishing a Regional Variance in BAL-001-01.1a in which an ACE equation for WECC is specified provides the following benefits from a Standards perspective: a) Locates in a single standard the definition of ACE for all Interconnections; b) Identifies a single ACE formula for all Interconnections with common terminology and uncommon differences (i.e., there is no	Reducing the NERC ACE and "control" ACE to a single ACE, allows Operations to "control to the target." This means that control actions will directly affect the monitored, measured objective function. Since the amount of the adjustment during any one hour is limited by L_{10}, Balancing Authorities automatically limit the risk and the amount of the transaction.

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
$$NI'_S = NI_S - \frac{II_{Primary}^{on/off\ peak}}{(1-Y)*H}$$ **NI_S =** Net Interchange Scheduled (MW). **Y =** B_i / B_S. **H =** Number of Hours used to payback Inadvertent Interchange Energy. The WECC Performance Work Group has set the value of H to 3. **B_S =** Frequency Bias for the Interconnection (MW / 0.1 Hz). $II_{primary}^{on/off peak}$ **=** is the Balancing Authority's accumulated primary inadvertent interchange in MWh. An On-Peak and Off-Peak accumulation accounting is required. Where: $II_{primary}^{on/off peak}$ **= last period's** $II_{primary}^{on/off peak}$ **+ (1-Y) * (II_{actual} - B_i * ΔTE/6)** **II_{actual}** is the hourly Inadvertent Interchange for the last hour.	**Where:** **NI_A** is the algebraic sum of actual flows on all tie lines. **F_A** is the actual frequency. **F_S** is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections. **B =** Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz. I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero. $I_{ATEC} = \frac{PII_{accum}^{on/off\ peak}}{(1-Y)*H}$ when operating in Automatic Time Error Correction control mode. I_{ATEC} shall be zero when operating in any other AGC mode. **NI_S** is the algebraic sum of scheduled flows on all tie lines. **Y =** B / B_S. **H =** Number of Hours used to payback Primary Inadvertent Interchange energy. The	longer a NERC ACE and a "control" ACE); and c) Eliminates consideration of exceptional circumstances governing multiple ACEs.	

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where: **$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE\ offset)$** **$TD_{adj}$** is any operator adjustment to the control center Time Error to correct for differences with the time monitor. **t** is the number of minutes of Manual Time Error Correction that occurred during the hour. **TE offset** is 0.000 or +0.020 or -0.020.	value of H is set to 3. **B_S =** Frequency Bias for the Interconnection (MW / 0.1 Hz). **P**rimary **I**nadvertent **I**nterchange **(PII_{hourly})** is **$(1-Y) * (II_{actual} - B * \Delta TE/6)$** **$II_{actual}$** is the hourly Inadvertent Interchange for the last hour. **ΔTE** is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where: **$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE_{offset})$** **$TD_{adj}$** is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks. **t** is the number of minutes of Manual Time Error Correction that occurred during the hour. **TE_{offset}** is 0.000 or +0.020 or -0.020. **PII_{accum}** is the Balancing Authority's accumulated **PII_{hourly}** in MWh. An On-Peak and Off-Peak accumulation accounting is required. Where: $PII_{accum}^{on/off\ peak}$ **= last period's** $PII_{accum}^{on/off\ peak}$ **+** PII_{hourly}		
R1.1. The absolute value of the WECC	**E.B.2.** Each Balancing Authority shall limit the	Provides clarity in	Eliminates

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
Automatic Time Error Correction term is limited as follows: $\left\| \frac{II_{primary}^{on/off\ peak}}{(1\text{-}Y)\cdot H} \right\| \leq L_{max}$ Where L_{max} is chosen by the BA and is bounded as follows: $0.20 * \|B_i\| \leq L_{max} \leq L_{10}$ L_{10} is the Balancing Authority CPS2 limit in MW. If the WECC Automatic Time Error Correction term is less than the upper limit, use the calculated WECC Automatic Time Error Correction term.	absolute value of I_{ATEC}, the Automatic Time Error Correction term as follows: $\left\| I_{ATEC} \right\| \leq L_{max}$. **E.B.3.** Each Balancing Authority shall set L_{max} within the limits as follows: $0.20 * \|B\| \leq L_{max} \leq L_{10}$.	requirements and actions to be taken by the Balancing Authorities. Relocating this requirement to BAL-001-0.1a consolidates all requirements affecting calculation of terms in the ACE equation.	potential confusion regarding limitation of the ATEC term, which could affect the final ACE value, subsequent control of units, and associated impact on system frequency.

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
R1.2 Large accumulations of primary inadvertent point to an invalid implementation of ATEC, loose control, metering or accounting errors. A BA [Balancing Authority] in such a situation should identify the source of the error(s) and make the corrections, recalculate the primary inadvertent from the time of the error, adjust the accumulated primary inadvertent caused by the error(s), validate the implementation of ATEC, set L_{max} equal to $L_{10,}$ and continue to operate with ATEC reducing the accumulation as system parameters allow.	**R1.** Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PII_{accum}) for both the On-Peak period and the Off-Peak period are each individually less than or equal to: **1.1** For load-serving Balancing Authorities, 150% of the previous calendar year's integrated hourly Peak Demand, **1.2** For generation-only Balancing Authorities, 150% of the previous calendar year's integrated hourly peak generation.	FERC directed WECC to define large accumulations for PII_{accum}. As a result in Requirement R1 the large accumulation limit was set to 150% of previous year's peak demand or peak generation for generation only Balancing Authorities. The action required is that the Balancing Authority shall not permit the PII_{accum} to exceed the defined value, which is demonstrated at the end of each month. Requirement R2 contains the provision to recalculate. Since	The drafting team reviewed historical data to identify an appropriate amount to limit PII_{accum} and accommodate month end adjustments.

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
		an upper limit is now defined, the list of possible actions to be taken was moved to the premise for Requirement R1.	
R2. Each BA [Balancing Authority] that is synchronously connected to the Western Interconnection, and operates in any AGC operating mode other than ATEC, shall notify all other BAs of its operating mode through the designated Interconnection communication system. Each BA, while synchronously connected to the Western Interconnection, will be allowed to have ATEC out of service for a maximum of 24 hours per calendar quarter, for reasons including maintenance and testing. [Risk Factor: Lower]	**R3.** Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service.	Resolve that the "out of service" duration is an accumulation over the specified period. Also recognizes that extremely short interruptions in ATEC need not be communicated to the Interconnection. For example, computer maintenance processes could result in momentary interruptions (e.g., system upgrades)	

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
		that do not require notifying neighboring Balancing Authorities.	
R3. BAs in the Western Interconnection shall be able to change their AGC operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error control (used in ATEC mode). The ACE used for NERC reports shall be the same ACE as the AGC operating mode in use. [Risk Factor: Lower]	**R5.** Each Balancing Authority shall be able to change its Automatic Generation Control operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error Control (used in ATEC mode), to correspond to current operating conditions.	Removed reference to NERC report because with the adoption of a WECC regional variance to BAL-001-0.1a such a requirement is not necessary.	Changing to the proper operating mode, corresponding to current operating conditions, affords proper movement of generating units in response to those conditions. The addition of the ATEC term results in an additional AGC mode and a different set of parameters. The inability to correctly calculate the ATEC term would dictate that AGC not be operated in the

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
			ATEC mode.
R4. Regardless of the AGC operating mode, each BA in the Western Interconnection shall compute its hourly Primary Inadvertent Interchange when hourly checkout is complete. If hourly checkout is not complete by 50 minutes after the hour, compute Primary Inadvertent Interchange with best available data. This hourly value shall be added to the appropriate accumulated Primary Inadvertent Interchange balance for either On-Peak or Off-Peak periods. [Risk Factor: Lower]	**R4.** Each Balancing Authority shall compute the following by 50 minutes after each hour: **4.1.** PII_{hourly}, **4.2.** PII_{accum}, **4.3.** Automatic Time Error Correction term (I_{ATEC}). **R6.** Each Balancing Authority shall recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly Inadvertent Interchange or ΔTE.	The drafting team clarified the previous requirement and adopted the NERC requirement format.	To promote timely calculations, 50 minutes was selected because it is before the next hour ramp begins, and permits time to collect the data and resolve interchange metering values. As hourly PII is corrected, then PII_{accum} should be recalculated.
R4.1 Each BA in the Western Interconnection shall use the change in Time Error distributed by the Interconnection Time Monitor.		This adjustment is included as part of equation in Requirement E.B.1. as ΔTE.	
R4.2 All corrections to any previous hour Primary Inadvertent Interchange shall be added to the appropriate On-	**R2**. Each Balancing Authority shall, upon discovery of an error in the calculation of PII_{hourly}, recalculate within 90 days, the value of PII_{hourly} and adjust the	The drafting team clarified the previous	The drafting team selected 90 days as a

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
Peak or Off-Peak accumulated Primary Inadvertent Interchange.	PII_{accum} from the time of the error. **R6.** Each Balancing Authority shall recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly Inadvertent Interchange or ΔTE.	requirement and adopted the NERC requirement format.	reasonable amount of time to correct an error and recalculate PII_{hourly} and $PII_{accum,}$ since recalculation of PII_{hourly} and PII_{accum} is not a real-time operations reliability issue.
R4.3 Month-end Inadvertent Adjustments are 100% Primary Inadvertent Interchange and shall be added to the appropriate On-Peak or Off-Peak accumulated Primary Inadvertent Interchange, unless such adjustments can be pinpointed to specific hours in which case R4.2 applies.	**R7.** Each Balancing Authority shall make the same adjustment to the PII_{accum} as it did for any month-end meter reading adjustments to Inadvertent Interchange.	The drafting team clarified the previous requirement and adopted the NERC requirement format.	Month-end adjustments to II are applied as 100% PII_{accum}. 100% was chosen for simplicity to bilaterally assign PII to both Balancing Authorities, since the effect of this metering error on system frequency is not easily determined over

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
			the course of a month.
R4.4 Each BA in the Western Interconnection shall synchronize its Time Error to the nearest 0.001 seconds of the system Time Error by comparing its reading at the designated time each day to the reading broadcast by the Interconnection Time Monitor. Any difference shall be applied as an adjustment to its current Time Error.		The requirement was deleted because the Interconnection Time Monitor is responsible for monitoring and calculating Time Error. Balancing Authorities are no longer responsible for Time Error monitoring, so the requirement was removed.	
	R8. Each Balancing Authority shall payback Inadvertent Interchange using ATEC rather than bilateral and unilateral payback.	Added new requirement to prevent stranded Secondary Inadvertent Interchange.	
Definitions of Terms Used in Regional Standard **Area Control Error:** Means the instantaneous difference between net actual and scheduled interchange,	**Revised Definitions of Terms Used in Standard** **Area Control Error**: The instantaneous difference between a Balancing Authority's net actual and scheduled interchange, taking into account the effects	The Automatic Time Error Correction definition was modified to more	

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
taking into account the effects of Frequency Bias including correction for meter error. **Automatic Time Error Correction:** A frequency control automatic action that a Balancing Authority uses to offset its frequency contribution, to support the Interconnection's scheduled frequency. **Primary Inadvertent Interchange:** The component of area (n) inadvertent interchange caused by the regulating deficiencies of the area (n). **Secondary Inadvertent Interchange:** The component of area (n) inadvertent interchange caused by the regulating deficiencies of area (i).	of Frequency Bias, correction for meter error, and Automatic Time Error Correction (ATEC), if operating in the ATEC mode. ATEC is only applicable to Balancing Authorities in the Western Interconnection. **Automatic Time Error Correction:** The addition of a component to the ACE equation that modifies the control point for the purpose of continuously paying back Primary Inadvertent Interchange to correct accumulated time error.	accurately define Automatic Time Error Correction. The current definitions for Primary Inadvertent Interchange and Secondary Inadvertent Interchange were retained.	

EXHIBIT F

Issues and Directives – Order No. 723

Mapping Document FERC Order 723 Directives
WECC-0068 Modification of BAL-004-WECC-1
Automatic Time Error Correction

Received From	FERC Order 723[1] Snapshot WECC-0068 Mod. To BAL-004-WECC-1	The BAL-004-WECC-2 and Variance to BAL-001-0.1a Completed Actions
FERC	P 30. As explained in the NOPR, the Commission is concerned that the phrases "large accumulation" and "in such a situation," as used in Requirement R1.2, leaves to individual interpretation when a "large" amount of primary inadvertent has accumulated. The ERO and WECC agree that the provision should be clarified. Accordingly, the Commission adopts its NOPR proposal and directs WECC to develop revisions to the provision so that a Balancing Authority will know specifically which circumstances trigger the actions required by Requirement R1.2.	See BAL-004-WECC-2 in Requirement R1 where the term "large accumulation is eliminated and replaced with a quantifiable maximum limit for each Balancing Authority to be within by the end of each month.
FERC	P 34. Consistent with the NOPR, pursuant to Section 215(d) (5) of the FPA, the Commission directs WECC to develop a modification to the Regional Reliability Standard consistent with WECC's and NERC's explanation that the limit set forth in Requirement 2 of "24 hours per calendar quarter" is	See BAL-004-WECC-2 Requirement R3, which has been revised to specify an accumulation over the period.

[1] 127 FERC ¶ 61,176 UNITED STATES OF AMERICA FEDERAL ENERGY REGULATORY COMMISSION, 18 CFR Part 40, Docket No. RM08-12-000; Order No.723, Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction (Issued May 21, 2009)

Received From	FERC Order 723[1] Snapshot WECC-0068 Mod. To BAL-004-WECC-1	The BAL-004-WECC-2 and Variance to BAL-001-0.1a Completed Actions
	an accumulated total for the period – resulting from either a singular event or a cumulative time limit from a number of events.	
FERC	P 44. FERC requires that Balancing Authorities use Raw ACE for CPS reporting and WATEC ACE for control. The Interconnect prefers to use the WATEC ACE for control and CPS reporting. Develop a Regional Variance to BAL-001-0.1a to resolve the issue.	See BAL-001-0.1a. Section E.B is a Regional Variance for WECC that replaces Requirement R1 and Section D Compliance 2. This Regional Variance establishes a single ACE equation for use in WECC for all NERC standards referencing ACE. Furthermore, the Drafting Team for WECC-0068 requests withdrawal of BAL-001-0.1a Appendix 2 Interpretation of Requirement 1 and BAL-003-0.1b Appendix 1 Interpretation of Requirement R3.
FERC	P 51. FERC adopts its NOPR proposal and directs that the violation risk factors assigned to BAL-004-WECC-01, Requirements R1, R2, R3, and R4, be modified from "lower" to "medium." The ERO and WECC must submit a filing that includes the directed modifications within 60 days of the effective date of this Final Rule.	NERC and WECC, in their compliance filing of August 28, 2009,[2] adjusted the Violation Risk Factors to medium as directed. Likewise, the corresponding requirements in BAL-001-0.1a E.B.1, BAL-004-WECC-2 Requirements R3, R4, and R5 have been assigned Violation Risk Factors of Medium.

[2] *Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 51 of Order No. 723 – Directed Modification of Violation Risk Factors for Regional Reliability Standard BAL-004-WECC-1, Automatic Time Error Correction*, Docket No. RM08-12-000, filed August 28, 2009.

Received From	FERC Order 723[1] Snapshot WECC-0068 Mod. To BAL-004-WECC-1	The BAL-004-WECC-2 and Variance to BAL-001-0.1a Completed Actions
FERC	P 54. The Commission adopts its NOPR proposal and directs the ERO and WECC to submit violation severity levels for each Requirement and sub-Requirement that has been assigned a violation risk factor. To allow adequate time for the development of the violation severity levels, the ERO and WECC must submit a filing that includes the directed violation severity levels within 120 days of the effective date of this Final Rule.	NERC and WECC in its compliance filing of October 23, 2009[3] adjusted the violation severity levels as directed. The drafting team has established similar violation severity levels for each requirement in both BAL-001-01.1a E.B and BAL-004-WECC-2.

[3] *Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 54 of Order No. 723*, Docket No. RM08-12-000, filed October 23, 2009.

EXHIBIT G

Technical Documents

Technical Justification Overview
WECC-0068 Modification of BAL-004-WECC-01
Automatic Time Error Correction

This filing is designed to meet the specific requirements of Order 723[1], clarify certain ambiguities, and meet the specific criteria for a Regional Variance as established by the Federal Energy Regulatory Commission (FERC).

This filing was developed in accordance with the Process for Developing and Approving WECC Standards, as superseded by the Reliability Standards Development Procedures.

In order to obtain a Regional Variance to a NERC Reliability Standard, the proposed documents must: 1) be an alternative methodology with the same reliability objective, 2) not be inconsistent with or less stringent than the NERC reliability standard, or 3) be necessitated by a physical difference.

Alternative Methodology with the Same Reliability Objective

This filing represents a proposed alternative methodology for calculating Area Control Error (ACE); specifically, it would replace the NERC raw ACE equation with the Automated Time Error Correction (ATEC) ACE thereby requiring WECC Balancing Authorities to use the ATEC ACE for control and Control Performance Standard (CPS) reporting. This approach has the same reliability objective as BAL-001-0.1a with the enhanced benefit of ensuring that Time Error Corrections and Primary Inadvertent Interchange (PII) payback are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection.

Using the ATEC ACE equation for CPS reporting is more appropriate because it is a more accurate measure of how well a Balancing Authority is controlling to its control performance target.

Under the current NERC ACE equation a Balancing Authority controls its frequency and Interchange to a target point of zero. By contrast, the proposed ATEC ACE allows the control to stay within a predefined range called L_{max} (which is between 0.20 * |B| and $\pm L_{10}$) adjusted by the ATEC.

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).

WESTERN ELECTRICITY COORDINATING COUNCIL • WWW.WECC.BIZ
155 NORTH 400 WEST • SUITE 200 • SALT LAKE CITY • UTAH • 84103-1114 • PH 801.582.0353 • FX 801.582.3918

The ATEC component defines a new control point and is equivalent to making an interchange schedule that would automatically payback PII – a feature not present when only the ACE equation is used. This modification to the ACE equation is equivalent to making an adjustment because of a metering error. Since the amount of the adjustment during any one hour is limited by L_{max}, Balancing Authorities automatically limit the risk to the interconnection and the amount of the transaction.

Consistent with or more Stringent

The proposed WECC Variance to BAL-001-0.1a is consistent with — or more stringent than — the NERC BAL-001-0.1a Reliability Standard because:

1. The addition of $\boldsymbol{I_{ATEC}}$ to the ACE equation and adjustment to the control performance target used for controlling frequency and interchange does not place any additional risk to reliability because limits are set in the magnitude of the $\boldsymbol{I_{ATEC}}$ adjustment.
2. The Regional Variance allows the use of the same control performance target for control and reporting providing a better methodology for measuring performance.

BAL-004-WECC-01 requires Balancing Authorities in the Western Interconnection to use ATEC ACE for control. As proposed in the WECC Variance, Balancing Authorities in the Western Interconnection that are operating synchronously to the Interconnection would use the ATEC ACE resulting in automatically correcting time error.

Use of the ATEC component in the ACE equation has been effective in mitigating two main issues in the Western Interconnection:

1. It has been used to reduce the number of hours of Manual Time Error Corrections, or the amount of manual adjustments of timing errors that accumulate on clocks, which make certain interconnection scheduled frequency deviations.
2. Since time error is directly related to Inadvertent Interchange, the procedure has been used to reduce accumulated Inadvertent Interchange, or the difference between the actual and scheduled interchange.

The ATEC procedure requires Balancing Authorities in the Western Interconnection to determine their contribution to the Interconnection time error. The Balancing Authority does this by calculating its PII. BAL-001-0.1a Requirement E.B.1 requires that each Balancing Authority calculate its PII_{accum} and I_{ATEC} from its hourly Inadvertent Interchange. When the resulting I_{ATEC} is entered into Balancing Authority's ACE equation, I_{ATEC} continuously corrects for its portion of the time error automatically, as opposed to manually, as specified in the continent-wide standard on Time Error

WESTERN ELECTRICITY COORDINATING COUNCIL • WWW.WECC.BIZ
155 NORTH 400 WEST • SUITE 200 • SALT LAKE CITY • UTAH • 84103-1114 • PH 801.582.0353 • FX 801.582.3918

Correction BAL-004-1 Requirement R2. Although the maximum payback is bounded between limits, the continuous correction enables equitable payback of Primary Inadvertent Interchange.

Supporting Documentation

Attachment I Mod to BAL-004-WECC-01 Technical Justification Consolidation of ACE Equations

The aforementioned document is provided to detail the issues related to use of two different Area Control Error (ACE) equations. It provides background and a discussion of the key technical issues involved in developing the requested changes. The document also provides historical data showing the historical number of manual time error corrections and it shows comparative frequency error profiles.

Attachment J Mod to BAL-004-WECC-01 Technical Justification Frequency Bias Posting

The aforementioned document is provided to calculate values for ACE limits to the value L10 as a function of each area's Frequency Bias. The spreadsheet illustrates the frequencies that would be necessary for an area to exceed its L10, as well as providing a tool to illustrate for each area their Frequency Component of ACE as a function of system frequency.

WESTERN ELECTRICITY COORDINATING COUNCIL • WWW.WECC.BIZ
155 NORTH 400 WEST • SUITE 200 • SALT LAKE CITY • UTAH • 84103-1114 • PH 801.582.0353 • FX 801.582.3918

Consolidation of NERC and Control ACEs –
Using the Same ACE for Control and NERC Reporting
April 18, 2012
Attachment I

The use of two Area Control Error (ACE) equations came as a result of North American Electric Reliability Corporation's (NERC) comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a)[1] wherein NERC stated that entities:

1. May use an Automatic Time Error Correction (ATEC) term in the ACE equation for control (Control ACE), but
2. Should use NERC Area Control Error (NERC ACE[2]) for Control Performance Standard (CPS) reporting.[3]

The industry desires to use the same ACE equation for control and reporting because it provides a better measurement of control performance. In Project WECC-0068, WECC proposes to create a WECC Regional Variance to BAL-001-0.1a — modifying the ACE equation to include the ATEC term for both control and reporting.

The purpose of the NERC CPS is to evaluate how well a Balancing Authority operates to its intended control performance target, taking into account interconnection frequency deviations. The NERC evaluation of control performance requires Balancing Authorities in the Western Interconnection to use the NERC ACE to measure how well a Balancing Authority controls to the control performance target rather than using the ATEC ACE typically used in the Western Interconnection. Since the CPS measurement is an assessment of the control performance within the bounds indentified for CPS1 and CPS2, it is essential to include the ATEC term in the ACE equation used in the calculation of CPS in order to evaluate the true control performance that was accomplished for each hour. To exclude ATEC by using NERC ACE to calculate CPS distorts the evaluation results and complicates operations. It also requires having to retain NERC ACE as well as ATEC ACE.

---

[1] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).

[2] NERC ACE is also called "raw ACE."

[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

The primary reliability objectives of Project WECC-0068, which contains the WECC Variance to BAL-001-0.1a and the WECC BAL-004-WECC-2 Standard, are to:

1. Provide a more accurate measure of how well a Balancing Authority is actually controlling to its control performance target, and
2. Manage Inadvertent Interchange through a timely and equitable process.

These objectives are achieved through managing the Primary portion of Inadvertent Interchange. In the Western Interconnection, the Primary Inadvertent Interchange (PII) is defined as: "The component of area (n) inadvertent interchange caused by the regulating deficiencies of the area (n)." This is opposed to Secondary Inadvertent Interchange which is: "The component of area (n) inadvertent interchange caused by the regulating deficiencies of area (i)."[4]

Balancing Authorities in the Western Interconnection developed a process for controlling frequency that includes payback of PII. When a Balancing Authority includes the ATEC term in its ACE equation, it provides for automatic payback of its PII. The automatic payback of PII affects automatic payback of the corresponding Secondary Inadvertent Interchange of other Balancing Authorities through the frequency component of their ACE. This process allows inadvertent payback to occur equitably to all Balancing Authorities that are owed energy. The energy repayment also occurs during like hours (i.e., On-Peak energy is returned during On-Peak hours and Off-Peak Energy is returned during Off-Peak hours). The payback of energy occurs over a three-hour period reducing the likelihood of aggravating or causing a frequency excursion following a large accumulation of Inadvertent Interchange. If the PII unexpectedly increases significantly, there are additional processes in place where a Balancing Authority can take actions to reduce the amount of payback to avoid these conditions.

The computation of the amount of PII payback, also known as the ATEC term (I_{ATEC}), is as follows:

$I_{ATEC} = \frac{\mathrm{PII}_{\mathrm{accum}}^{\text{on/off peak}}}{(1-Y)*H}$ when operating in ATEC control mode. I_{ATEC} shall be zero when operating in any other Automatic Generation Control (AGC) mode.

H is the number of hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3.

$\mathrm{PII}_{\mathrm{accum}}$ is the Balancing Authority's accumulated $\mathrm{PII}_{\mathrm{hourly}}$ in MWh. An On-Peak and Off-Peak accumulation accounting is required.

Where:

[4] Definitions from WECC Regional Definitions in Glossary of Terms Used in NERC Reliability Standards, May 24, 2011.

$$PII_{accum}^{on/off\ peak} = \text{last period's } PII_{accum}^{on/off\ peak} + PII_{hourly}$$

In the equation above, Primary Inadvertent Interchange (PII_{hourly}) is (1-Y) * (II_{actual} - B * ΔTE/6) where Y = B / B_S and ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where:

$$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE_{offset})$$

$II_{\mathbf{actual}}$ is the hourly Inadvertent Interchange for the last hour.

$B_{\mathbf{S}}$ = Frequency Bias for the Interconnection (MW / 0.1 Hz).

B = Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority.

t is the number of minutes of Manual Time Error Correction that occurred during the hour.

$TE_{\mathbf{offset}}$ is 0.000 or +0.020 or -0.020.

TD_{adj} is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks.

Balancing Authorities in the Western Interconnection believe that using NERC ACE for CPS reporting while using Control ACE for controlling is not a true measure of a Balancing Authority's control performance and is therefore not an accurate representation of their contribution to Interconnection reliability.

The numbered list that follows presents reasons for:

a) incorporating the ATEC term in the ACE equation and utilizing that ACE equation for CPS reporting;

b) creating a regional variance to NERC BAL-001-0.1a to define ACE in the Western Interconnection to include the ATEC term;

c) creating BAL-004-WECC-02, the WECC Regional Reliability Standard which establishes a maximum value for Accumulated Primary Inadvertent Interchange; and

d) using the CPS measurement metrics.

1. Consolidation of two ACE equations improves reliability by enhancing control.

   The current NERC ACE equation in NERC BAL-001-0.1a – Real Power Balancing Control Performance requires that each Balancing Authority controls frequency and Interchange within the bounds indentified for CPS1 and CPS2 for its Balancing Authority Area. In other words the Balancing Authority controls its ACE close to zero in support of Interconnection scheduled frequency, over a 12-month period, such that the interconnection frequency error profile for epsilon 1 ($\in_1$) and epsilon 10 ($\in_{10}$) are maintained in a manner that approaches the WECC frequency error profile design (see Attachment 1). The proposed ATEC ACE equation, with an Automatic

Time Error adjustment, works similarly to the NERC equation. The addition of the ATEC component is equivalent to making an Interchange Transaction that would automatically pay back PII (as described below), or is similar to making an adjustment because of a metering error. The payback amount is managed by requiring that the ATEC component stay within a predefined range of L_{max} where L_{max} is between 0.20*|B| and L_{10}. Since the amount of the payback during any one hour is limited by L_{max}, Balancing Authorities automatically limit any burden caused by ATEC on the transmission system. L_{10} is also the range for the CPS2 measurement. By limiting L_{max} to L_{10} the impact of ATEC alone will not cause a Balancing Authority's ACE to go beyond the CPS2 bounds.

2. In the ACE equation there is a frequency component (i.e., $-10B(F_A - F_S)$ where F_A is the actual frequency and F_S is the scheduled frequency; F_S is normally 60 Hz but may be offset during manual time error corrections). During steady state conditions when a Balancing Authority's ATEC term results in an increase in generation to pay back its PII, it raises Interconnection frequency to a value larger than 60 Hz.

   The ATEC component causes an otherwise balanced Balancing Authority to push or pull energy from the grid, which may cause frequency to shift away from 60 Hz. Through the frequency bias term of their ACE equation, every other Balancing Authority reacts to this frequency shift in the opposite direction, moving to keep frequency at or near 60 Hz. This exchange has an effect similar to the first Balancing Authority exchanging multiple Interchange Transactions with all other Balancing Authorities. The collection of equitably-allocated ATEC adjustments or offsets for all Balancing Authorities, in aggregate, correct for Interconnection-accumulated energy imbalance manifested as accumulated Time Error.

3. To place a maximum (absolute value) ceiling for Accumulated Primary Inadvertent Interchange.

   During its review of Accumulated Primary Inadvertent Interchange (PII_{accum}), the Project WECC-0068 Drafting Team found that some Balancing Authorities may have large adjustments to PII_{accum} as a result of month-end meter-reading adjustments. In addition, it was discovered that small Balancing Authorities could have large PII_{accum} relative to their size even though they are following good utility operating practices.

   As a result of this review, for each On-Peak and Off-Peak period it is reasonable to establish the following limits:

   - the magnitude of PII_{accum} to 150 percent of the previous calendar year's integrated hourly Peak Demand; or
   - for generation-only Balancing Authorities, 150 percent of the previous calendar year's integrated hourly peak generation.

   This maximum value for PII_{accum} sets a requirement for Balancing Authorities to take action to reduce PII_{accum} while allowing flexibility in a Balancing Authority's operation and control. The magnitude is not so limiting that it becomes onerous to comply with

Requirement R1 of BAL-004-WECC-02. By instituting accepted industry practices, each Balancing Authority should be able to stay within the limit.

4. Using the Control ACE rather than NERC ACE will not reduce Interconnection reliability during frequency events.

   The design of the PII payback process permits the proper governor response when the system experiences large frequency excursions. The ATEC component in the ACE equation is implemented as part of a Balancing Authority's secondary control (i.e., AGC control). When a frequency event occurs (e.g., frequency dips below 59.9 Hz) the frequency component in the ACE equation for medium and large Balancing Authorities becomes large in magnitude compared to the maximum allowed ATEC component. The frequency component then remains the primary driving force behind both primary (i.e., governor response) and secondary (i.e., AGC) control for arresting the frequency decline and restoring frequency to 60 Hz. This is shown in the Frequency vs. Frequency Component of ACE Plots (see Attachment 2) because the range for L_{max} in the plots becomes relatively small when compared to the Frequency Component of ACE. The graph of L_{10}, bias, and frequency deviation shows that the ATEC influence is minimal during a disturbance.

   For small Balancing Authorities the response to a frequency event depends on the sign and magnitude of the ATEC component at the time of the event compared to L_{10}. The graphs in Attachment 2 containing each Balancing Authority's L_{10}, bias, and (0.20*|B|) against the frequency component in the ACE equation suggest that ATEC influence is minimal for small Balancing Authorities during disturbances.

5. Maintain or improve the interconnection frequency error profile.

   The WECC frequency error profile contained in Attachment 1 improved with the implementation of the ATEC term in the ACE equation. The ATEC term was added to the ACE equation in February of 2003. As shown in the three figures in Attachment 1, the frequency error profile before 2003 was higher than in the years after 2003 until the Reliability-based Control (RBC) field trial began in 2010.

6. Maintain the $\in_1$ and $\in_{10}$ bands near historical performance.

   The targeted frequency bounds, epsilon 1 ($\in_1$) and epsilon 10 ($\in_{10}$), are based on historic measured frequency error. These bounds, typically in millihertz (mHz), are the targeted frequency ranges used when developing the CPS contained in BAL-001-0.1a. The Western Interconnection was assigned its own frequency bounds of 22.8 mHz for $\in_1$ and 7.3 mHz for $\in_{10}$. Prior to the introduction of the ATEC term into the ACE equation the annual valuations of frequency errors were drifting upward, away from the targeted frequency bound.

   When the ATEC term was implemented as part of the ACE equation, these annual valuations came back down and were closer to the targeted frequency bound. Each frequency bound is a constraint developed and placed into the control performance measurement.

The control performance target for an ACE equation with an ATEC term measures the average ACE error range from zero. CPS1 and CPS2 are measuring performance against the control performance target. Therefore, the frequency bounds and acceptable error ranges measured by CPS1 and CPS2 are still valid. As a result, WECC intends to continue measuring how close the Balancing Authority performs to the control performance target (i.e., average control error against an ACE equals zero including the ATEC component), and proposes to use the same measure for control as are used for the control performance target in BAL-001-0.1a (see Attachment 1 – Figure 1-3 – for frequency error profile against $\in_1$ and $\in_{10}$).

It should be noted that the change in the ACE equation does not have an impact on the Disturbance Control Standard (BAL-002-0). Balancing Authorities and Reserve Sharing Groups will still need to return their ACE to zero or its pre-disturbance value within 15 minutes.

7. Reduce the number and duration of manual time error corrections.

   The number of manual time error corrections performed in the Western Interconnection was 538 in 2000 prior to adopting ATEC as a procedure. After implementing ATEC in 2003 the number of manual time error corrections performed in WECC was significantly reduced. In 2010, the number of time error corrections performed by WECC was 106 (see History of Manual Time Error Corrections: Table 1).

History of Manual Time Error Corrections

The table below contains the number of manual time error corrections conducted each year in the Western Interconnection.

Table 1

Year	Number of Manual Time Corrections
1998	315
1999	530
2000	538
2001	453
2002	427
2003	216
2004	79
2005	80
2006	100
2007	106
2008	113
2009	74
2010	106
2011	160

ATTACHMENT 1

Frequency Error Profiles

Figure 1

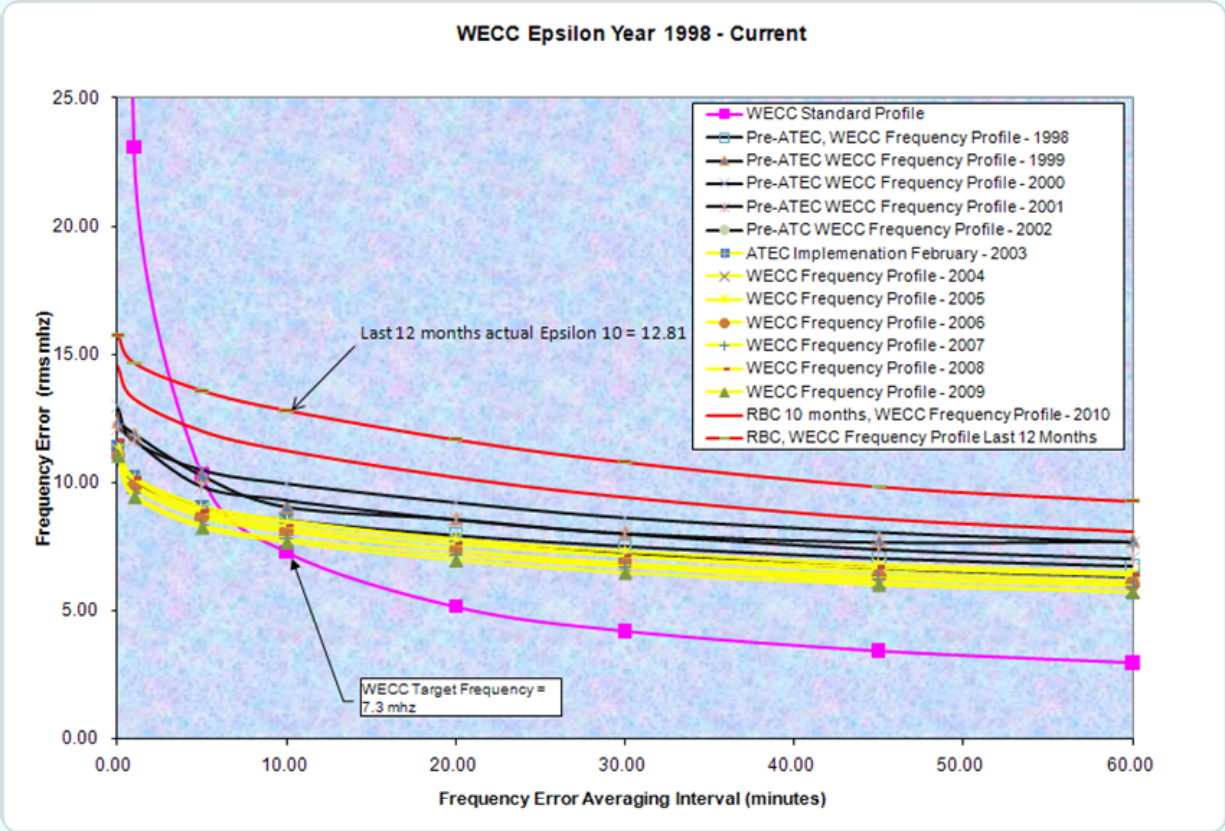


Figure 2

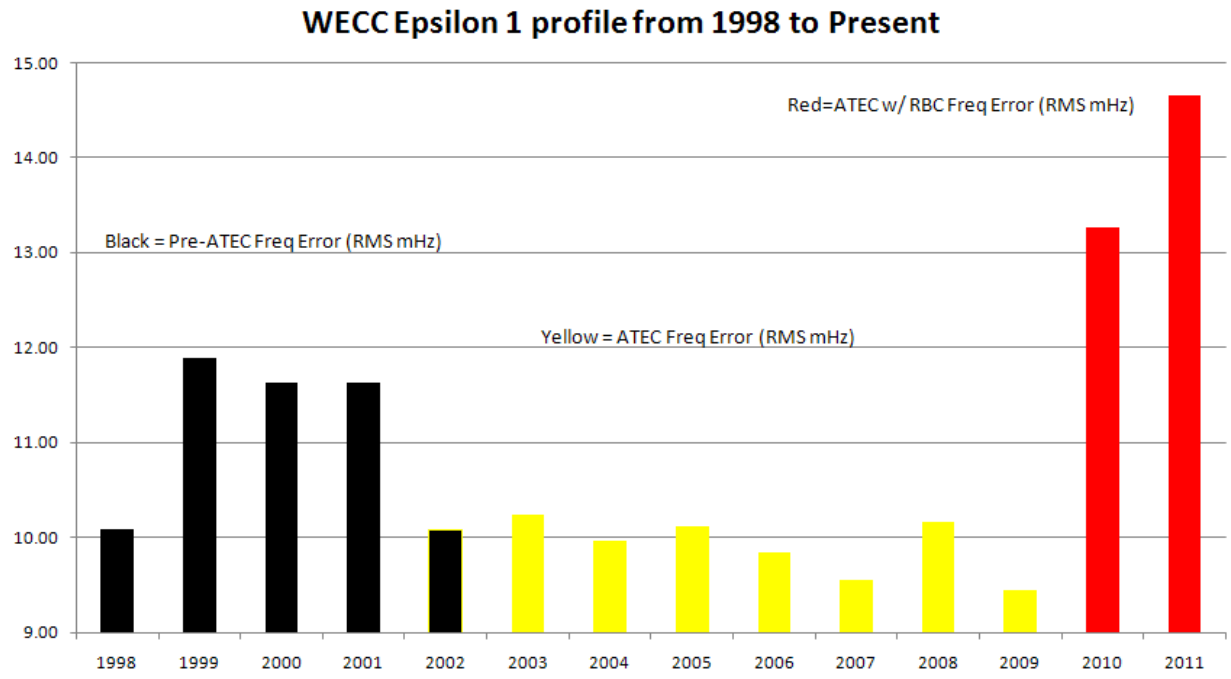


Figure 3

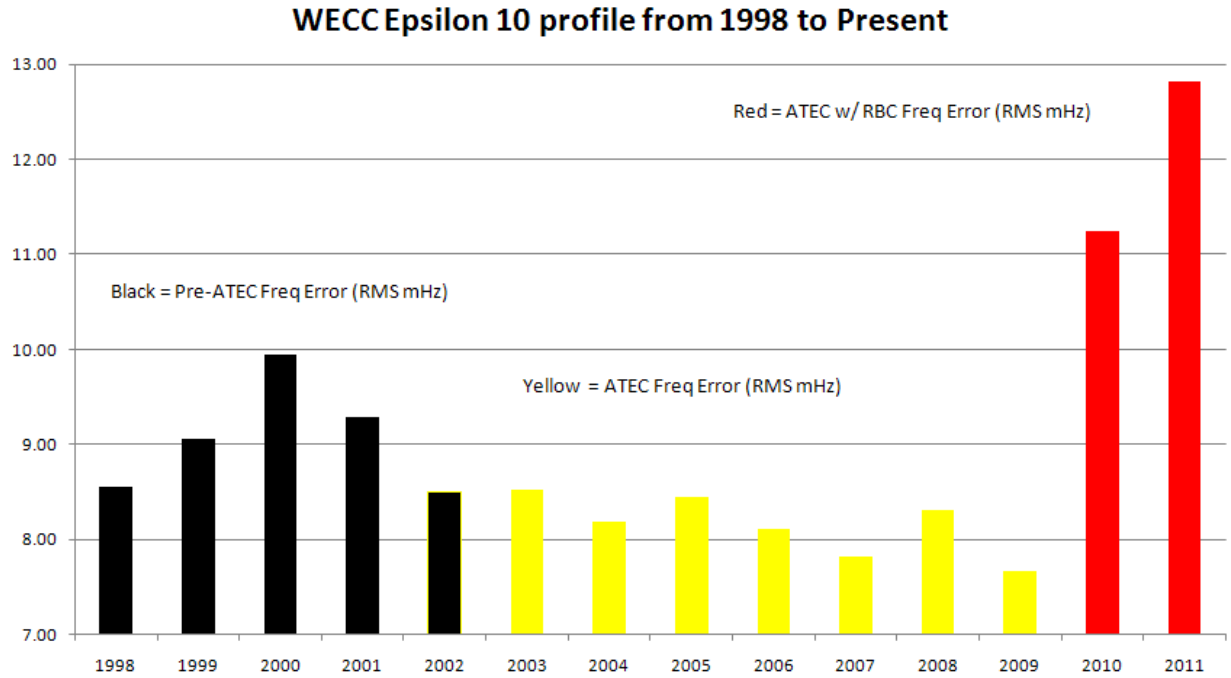


EXHIBIT H

Violation Severity Level and Violation Risk Factor Guideline Analysis

VRF and VSL Justification
WECC-0068 Modification of BAL-004-WECC-01
Automatic Time Error Correction

Table of Compliance Elements

The Table of Compliance Elements is appended to this document.

Violation Risk Factor (VRF)

The WECC-0068 Modification to BAL-004-WECC-01 Drafting Team used the definitions for VRFs found in the "Sanction Guidelines of the North American Electric Reliability Corporation"[1] to determine the VRF for each requirement. In further coupling those definitions with the specific mandates of FERC in Order 723, at P. 51, the drafting team modified the VRF for Requirements R1, R2, R3 and R4 from "lower" to "medium." All VRFs are now medium.

Based upon the definitions, the drafting team assigned a "Medium" VRF for Requirements R1, R2, R3 and R4 because, if any one of the requirements were violated, that violation could directly affect the electrical state or the capability of the bulk electric system, or the ability to effectively monitor and control the bulk electric system. However, the team noted that violation of any of these requirements is unlikely to lead to bulk electric system instability, separation, or cascading failures.

Violation Severity Level (VSL)

The WECC-0068 Modification to BAL-004-WECC-01 Drafting Team used the Violation Severity Level Guidelines[2] to determine the VSL for each requirement and sub-requirement. In further coupling those guidelines with the specific mandates of FERC in Order 723, at P. 54, the drafting team modified the VSL for Requirements R1, R2, R3 and R4 and any sub-requirements there under.

[1] http://www.nerc.com/files/Violation_Risk_Factors.pdf

[2] http://www.nerc.com/files/VSL_Guidelines_20090817.pdf

Developed as: **WECC-0068**

Table of Compliance Elements

R #	Time Horizon	VRF	Violation Severity Levels			
			1. Lower VSL	2. Moderate VSL	3. High VSL	4. Severe VSL
R1	Operations Assessment	Medium	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 150%, but was less than or equal to 160% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 160%, but was less than or equal to 170% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 170%, but was less than or equal to 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.
R2	Operations Assessment	Medium	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 90 days of the discovery of the error; but made the required recalculations and adjustments within 120 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 120 days of the discovery of the error; but made the required recalculations and adjustments within 150 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 150 days of the discovery of the error; but made the required recalculations and adjustments within 180 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust PII_{accum} within 180 days of the discovery of the error.
R3	Real-Time	Medium	The Balancing	The Balancing	The Balancing	The Balancing

Developed as: **WECC-0068**

R #	Time Horizon	VRF	Violation Severity Levels			
			1. Lower VSL	2. Moderate VSL	3. High VSL	4. Severe VSL
	Operations		Authority operated during a calendar quarter without ATEC in service for more than an accumulated 24 hours, but less than or equal to 72 hours.	Authority operated during a calendar quarter without ATEC in service for more than an accumulated 72 hours, but less than or equal to 120 hours.	Authority operated during a calendar quarter without ATEC in service for more than an accumulated 120 hours, but less than or equal to 168 hours	Authority operated during a calendar quarter without ATEC in service for more than an accumulated 168 hours.
R4	Operations Assessment	Medium	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within 50 minutes, but made the required calculations in less than or equal to two hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within two hours, but made the required calculations in less than or equal to four hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within four hours, but made the required calculations in less than or equal to six hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within six hours.
R5	Real-Time Operations	Medium	N/A	N/A	N/A	The Balancing Authority is not able to change its AGC operating mode between Flat Frequency (for blackout restoration; Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; or Tie Line Bias plus Time Error control (used in ATEC mode).

Developed as: **WECC-0068**

R #	Time Horizon	VRF	Violation Severity Levels			
			1. Lower VSL	2. Moderate VSL	3. High VSL	4. Severe VSL
R6	Operations Assessment	Medium	N/A	N/A	N/A	When making adjustments to hourly Inadvertent Interchange or ΔTE, the Balancing Authority did not recalculate the PII_{hourly} and the PII_{accum} for the On-Peak and Off-Peak periods.
R7	Operations Assessment	Medium	N/A	N/A	N/A	When making any month-end meter reading adjustments to Inadvertent Interchange, the Balancing Authority did not make the same adjustment to the PII_{accum}.
R8	Operations Assessment	Medium	N/A	N/A	N/A	The Balancing Authority paid back Inadvertent Interchange using bilateral and unilateral payback rather than using ATEC.

Developed as: **WECC-0068**

EXHIBIT I

Summary of Development History and Record of Development

EXHIBIT I -- Summary of Development History

A. WECC First Posting – 45-day Formal Comment Period

The Project WECC-0068 (Regional Variance to BAL-001-0.1a — Real Power Balancing Control Performance and refinements to BAL-004-WECC-2 — Automatic Time Error Correction) standards were posted for a 45-day public comment period from April 15, 2011 through June 1, 2011. WECC distributed the notice for the posting on April 15, 2011. The consideration of comments was posted on June 29, 2011.

B. WECC Second Posting – 30-day Formal Comment Period

The Regional Variance to BAL-001-0.1a — Real Power Balancing Control Performance and refinements to BAL-004-WECC-2 — Automatic Time Error Correction were posted for a 30-day public comment period from November 4, 2011 through December 5, 2011. WECC distributed the notice for the posting on November 4, 2011. The consideration of comments was posted on December 13, 2011.

C. WECC Third Posting – 30-day Formal Comment Period

The Regional Variance to BAL-001-0.1a — Real Power Balancing Control Performance and refinements to BAL-004-WECC-2 — Automatic Time Error Correction were posted for a 30-day public comment period from December 15, 2011 through January 16, 2011. WECC distributed the notice for the posting on December 14, 2011. WECC received comments from two companies representing four of the ten Industry Segments. The consideration of comments was posted on February 3, 2012. The Project was then presented to the WECC Operating Committee for discussion.

D. WECC Fourth Posting – 30-day Formal Comment Period

The Regional Variance to BAL-001-0.1a — Real Power Balancing Control Performance and refinements to BAL-004-WECC-2 — Automatic Time Error Correction were posted for a

30-day public comment period from February 23, 2012 through March 25, 2012. WECC distributed the notice for the posting on February 23, 2012. WECC received a comment from one company representing two of the ten Industry Segments; it was a supporting comment only and therefore no consideration of comments document was necessary. On May 18, 2012, the Proposed Reliability Standards were approved by the WECC Ballot Pool.

E. WECC Board Adoption

On June 26, 2012, the Proposed Reliability Standards were approved by the WECC Board of Directors.

F. NERC Posting – 45-day Formal Comment Period

The proposed regional variance to NERC Reliability Standard BAL-001-0.1a was posted for a 45-day public comment period from January 23, 2012 through March 9, 2012. There were six sets of comments, including comments from eight different people from six entities representing five of the ten Industry Segments. The proposed regional Reliability Standard BAL-004-WCC-02 was also posted for a 45-day public comment period from January 23, 2012 through March 9, 2012. There were five sets of comments, including comments from seven different people from five entities representing four of the ten Industry Segments.

G. NERC Board of Trustees Adoption

The Proposed Reliability Standards were approved by the NERC Board of Trustees on December 19, 2012.

Regional Reliability Standards Under Development

Regional Reliability Standards - Under Development				
Standard No.	**Title**	**Regional Status**	**Dates**	**NERC Status**
	MRO Regional Reliability Standards Process Manual	MRO Board Approved - June 28, 2012	8/28/2012 - 10/11/2012	Info Submit Comments Comment Form MRO Regional Reliability Standards Process Manual (Clean) MRO Regional Reliability Standards Process Manual (Redlined) Comments Received Consideration of Comments MRO Regional Reliability Standards Process Manual (Redlined in response to comments)
Northeast Power Coordinating Council (NPCC)				
BAL-002-NPCC-01	Regional Reserve Sharing Groups	Standard Under Development	10/12/2011 10/12/2011-11/10/2011	Monitoring Regional Progress Solicitation for Drafting Team Members NPCCDT Self-Nomination Form
	NPCC Regional Standards Process Manual		06/06/13 - 07/22/13	Info Submit Comments Comment Form NPCC Regional Standards Process Manual (Clean) NPCC Regional Standards Process Manual (Redlined)
PRC-002-NPCC-02 RSAR	Disturbance and Monitoring	RSAR Approved	2/20/13	Standard to be Reviewed Information in a Regional Standard Authorization Request (RSAR)

PRC-012-NPCC-01	Special Protection Systems	Standard Development on Hold	8/2/2011	Monitoring Regional Progress
Reliability First Corporation (RFC)				
SERC Reliability Corporation (SERC)				
Southwest Power Pool, Inc. (SPP)				
	SPP RE Regional Standards Development Process Manual		06/26/13 - 08/09/13	Info Submit Comments Unofficial Comment Form (Word) SPP RE Regional Standards Process Manual (Clean) SPP RE Regional Standards Process Manual (Redlined)
PRC-006-SPP-01	Automatic Underfrequency Load Shedding	NERC Board Adopted November 7, 2012	8/15/2012 - 9/28/2012	Info Submit Comments Comment Form PRC-006-SPP-01 Implementation Plan Consideration of Comments
			9/24/2009	Monitoring Regional Progress
Texas Reliability Entity (TRE)				
BAL-001-TRE-01	Primary Frequency Response in the ERCOT Region	TRE Board Approved April 23, 2013	5/31/2013 - 7/15/2013	Info Submit Comments Unofficial Comment Form (Word Version) BAL-001-TRE-1 Implementation Plan Reference Document Initial Primary Frequency Response Methodology (Att A) Sustained Primary Frequency Response Methodology (Att B) Comments Received Consideration of Comments
Western Electricity Coordinating Council (WECC)				
BAL-001-0.1a WECC Variance	Real Power Balancing Control Performance	Standard Under Development	1/23/2012 - 3/9/2012	Info Submit Comments

				Comment Form Comments Received Consideration of Comments
BAL-002-WECC-2	Contingency Reserves (Order 740 Remand)	NERC Board Adopted November 7, 2012	1/6/2012 - 2/20/2012	Info Submit Comments Comment Form BAL-002-WECC-2 (clean) BAL-002-WECC-2 (redlined) Implementation Plan Comments Received Consideration of Comments
BAL-004-WECC-02	Automatic Time Error Correction	NERC Board Approved December 19, 2012	1/23/2012 - 3/9/2012	Info Submit Comments Comment Form BAL-004-WECC-02 (clean) BAL-004-WECC-02 (redlined) Comments Received Consideration of Comments
IRO-006-WECC-02	Qualified Transfer Path Unscheduled Flow (USF) Relief	Standard Under Development	10/3/2012 - 11/16/2012	Info Submit Comments Comment Form IRO-006-WECC-2 (Clean) IRO-006-WECC-2 (redlined to last approved) Comments Received Consideration of Comments

To download a file click on the file using your right mouse button, then save it to your computer in a directory of your choice.

Atlanta Office | 3353 Peachtree Road, NE Suite 600 North Tower, Atlanta, GA 30326 | 404-446-2560
Washington Office | 1325 G Street, NW Suite 600, Washington, DC 20005-3801 | 202-400-3000

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standards Announcement

Comment Period Open for BAL-004-WECC-02
January 23 – March 9, 2012

Regional Project: Now available

Proposed Standard for the Western Electricity Coordinating Council (WECC)
WECC has requested NERC to post regional reliability standard BAL-004-WECC-02 Automatic Time Error Correction for a 45-day industry review as permitted by the NERC Rules of Procedure.

Instructions
Please use this electronic form to submit comments. If you experience any difficulties in using the electronic form, please contact Monica Benson at monica.benson@nerc.net. An off-line, unofficial copy of the comment form is posted on the regional standards development page.

Background
BAL-004-WECC-02 retains the requirement for Balancing Authorities to compute the Automatic Time Error Correction and Primary Inadvertent Interchange by 50 minutes after the hour and requires that Balancing Authorities have the ability to operate their Automatic Generation Control in other modes. In addition, Balancing Authorities are required to recalculate Primary Inadvertent Interchange when hourly and month-end adjustments are made.

In Version 3 in order to prevent the stranding of Secondary Inadvertent Interchange the drafting team added a Requirement R8 that restrictions the payback of Inadvertent Interchange to using ATEC rather than through bilateral and unilateral payback methods.

The proposed BAL-004-WECC-02 will replace the Automatic Time Error Correction definition in the NERC Glossary of Terms in the WECC Regional Definitions section. The WECC definitions for Primary Inadvertent Interchange and Secondary Inadvertent Interchange will be retained under the WECC Regional Definitions in the Glossary of Terms Used in NERC Reliability Standards. A new definition "Automatic Timer Error Correction – ATEC" is included in this standard.

Regional Reliability Standards Development Process
Section 300 of the *Rules of Procedure for the Electric Reliability Organization* governs the regional reliability standards development process. The success of the NERC standards development process depends on stakeholder participation. We extend our thanks to all those who participate.

For more information or assistance, please contact Monica Benson, Standards Process Administrator, at monica.benson@nerc.net or at 404-446-2560.

North American Electric Reliability Corporation
116-390 Village Blvd.
Princeton, NJ 08540
609.452.8060 | www.nerc.com

Unofficial Comment Form for Regional Reliability Standard BAL-004-WECC-02 Automatic Time Error Correction

Please **DO NOT** use this form. Please use the electronic form located at the link below to submit comments on the Regional Reliability Standard **BAL-004-WECC-02.** Comments must be submitted by **March 9, 2012**. If you have questions please contact Howard Gugel at howard.gugel@nerc.net or Barb Nutter at barbara.nutter@nerc.net.

http://www.nerc.com/filez/regional_standards/regional_reliability_standards_under_development.html

Background Information

A regional reliability standard shall be: (1) a regional reliability standard that is more stringent than the continent-wide reliability standard, including a regional standard that addresses matters that the continent-wide reliability standard does not; or (2) a regional reliability standard that is necessitated by a physical difference in the bulk power system. Regional reliability standards shall provide for as much uniformity as possible with reliability standards across the interconnected bulk power system of the North American continent. Regional reliability standards, when approved by FERC and applicable authorities in Mexico and Canada shall be made part of the body of NERC reliability standards and shall be enforced upon all applicable bulk power system owners, operators, and users within the applicable area, regardless of membership in the region.

BAL-004-WECC-02 retains the requirement for Balancing Authorities to compute the Automatic Time Error Correction and Primary Inadvertent Interchange by 50 minutes after the hour and requires that Balancing Authorities have the ability to operate their Automatic Generation Control in other modes. In addition, Balancing Authorities are required to recalculate Primary Inadvertent Interchange when hourly and month-end adjustments are made.

In Version 3 in order to prevent the stranding of Secondary Inadvertent Interchange the drafting team added a Requirement R8 that restrictions the payback of Inadvertent Interchange to using ATEC rather than through bilateral and unilateral payback methods.

The proposed BAL-004-WECC-02 will replace the Automatic Time Error Correction definition in the NERC Glossary of Terms in the WECC Regional Definitions section. The WECC definitions for Primary Inadvertent Interchange and Secondary Inadvertent Interchange will be retained under the WECC Regional Definitions in the Glossary of Terms Used in NERC Reliability Standards. A new definition "Automatic Timer Error Correction – ATEC" is included in this standard.

Each **Western Electricity Coordinating Council (WECC)** Regional Reliability Standard shall enable or support one or more of the NERC reliability principles, thereby ensuring that each standard serves a purpose in support of the reliability of the regional bulk electric system. Each of those standards shall also be consistent with all of the NERC reliability principles, thereby ensuring that no standard

undermines reliability through an unintended consequence. The NERC reliability principles supported by this standard are the following:

- **Reliability Principle 1 -** Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
- **Reliability Principle 3 -** Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.

The proposed **WECC** Regional Reliability Standard is not inconsistent with, or less stringent than established NERC Reliability Standards. Once approved by the appropriate authorities, the **WECC** Regional Reliability Standard obligates the **WECC** to monitor and enforce compliance, apply sanctions, if any, consistent with any regional agreements and the NERC rules.

R1. Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PII_{accum}) for both the monthly On-Peak period and the monthly Off-Peak period are each individually less than or equal to:

R2. Each Balancing Authority shall, upon discovery of an error in the calculation of PII_{hourly}, recalculate within 90 days, the value of PII_{hourly} and adjust the PII_{accum} from the time of the error.

R3. Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service.

R4. Each Balancing Authority shall compute the following by 50 minutes after each hour:

R5. Each Balancing Authority shall be able to change its Automatic Generation Control operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error Control (used in ATEC mode), to correspond to current operating conditions.

R6. Each Balancing Authority shall recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly Inadvertent Interchange or ΔTE.

R7. Each Balancing Authority shall make the same adjustment to the PII_{accum} as it did for any month-end meter reading adjustments to Inadvertent Interchange.

R8. Each Balancing Authority shall payback Inadvertent Interchange using ATEC rather than bilateral and unilateral payback.

The approval process for a regional reliability standard requires NERC to publicly notice and request comment on the proposed standard. Comments shall be permitted only on the following criteria (technical aspects of the standard are vetted through the regional standards development process):

> **Unfair or Closed Process —** The regional reliability standard was not developed in a fair and open process that provided an opportunity for all interested parties to participate. Although a NERC-approved regional reliability standards development procedure shall be presumed to be fair and open, objections could be raised regarding the implementation of the procedure.
>
> **Adverse Reliability or Commercial Impact on Other Interconnections —** The regional reliability standard would have a significant adverse impact on reliability or commerce in other interconnections.
>
> **Deficient Standard —** The regional reliability standard fails to provide a level of reliability of the bulk power system such that the regional reliability standard would be likely to cause a serious and substantial threat to public health, safety, welfare, or national security.
>
> **Adverse Impact on Competitive Markets within the Interconnection —** The regional reliability standard would create a serious and substantial burden on competitive markets within the interconnection that is not necessary for reliability.

1. **Do you agree the proposed standard is being developed in a fair and open process, using the associated Regional Reliability Standards Development Procedure?**

   ☐ Yes
   ☐ No

   Comments:

2. **Does the proposed standard pose an adverse impact to reliability or commerce in a neighboring region or interconnection?**

   ☐ Yes
   ☐ No

   Comments:

3. **Does the proposed standard pose a serious and substantial threat to public health, safety, welfare, or national security?**

   ☐ Yes
   ☐ No

   Comments:

4. **Does the proposed standard pose a serious and substantial burden on competitive markets within the interconnection that is not necessary for reliability?**

   ☐ Yes

   ☐ No

   Comments:

5. **Does the proposed regional reliability standard meet at least one of the following criteria?**

   - **The proposed standard has more specific criteria for the same requirements covered in a continent-wide standard**
   - **The proposed standard has requirements that are not included in the corresponding continent-wide reliability standard**
   - **The proposed regional difference is necessitated by a physical difference in the bulk power system.**

   ☐ Yes

   ☐ No

   Comments:

Document Title	WECC Standard BAL-004-WECC-02
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1	4/15/2011	Version 1 Posted	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Version 3 Posted 12/15/11	Addressed comments from Version 2 posting
4		Standing Committee Approval	
5		WECC Board Approval	

WECC 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.

.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	07/16/2010
9. Notice of development / first 30-day notice	09/2/2010
10. New committee chair orientation meeting	08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 01/18/11 02/10/11 03/11–12/11 03/24/11 04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
16. Post first draft for 45-day comment period	04/15/2011
17. Meet to answer to comments, address impact statement and draft responses	06/2-3/2011 06/14/2011 06/23/2011 06/29/2011
18. Post responses to comments received during 45-day comment period	06/29/2011
19. Meet to answer to comments, address impact statement and	08/8/2011 08/15/2011

Completed Actions	Completion Date
draft responses	08/30/2011 11/01/2011
20. Post the Version 2 for a 30-day comment period	11/04/2011
21. Post consideration of comments of Version 2	12/15/2011
22. Post the third dart for 30-day comment period	12/15/2011
23. Project WECC-0068 Version 3 Comments were due	01/16/2012
24. Meeting to answer comments, address impact statement, draft responses	01/18/2012
25. Post responses to comments	02/13/2012
26. Post for Operating Committee approval	02/24/2012

Description of Current Draft:

On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC Standards.[1] In addition, WECC staff identified additional modifications to BAL-004-WECC-1 that would clarify the intent without changing the requirements. Finally, the industry has commented that there is confusion concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as that used during Automatic Generation Control (AGC) mode. This seems to conflict with NERC's comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a) [2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation for control but should use raw ACE for CPS reporting.[3] As part of this filing WECC has submitted a proposed regional variance to BAL-001-0.1a to address this conflict.

The purpose of the refinements to BAL-004-WECC-1 as proposed in WECC Regional Reliability Standard BAL-004-WECC-2 – Automatic Time Error Correction (BAL-004-WECC-2) is to implement the directives in FERC Order 723 and to make other clarifications to BAL-004-WECC-1 as the industry deems necessary, while maintaining the Western Interconnection's

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).

[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).

[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

reliability. The FERC Order 723 directives are as follows:

1. "The Commission is concerned that the phrases 'large accumulation' and 'in such a situation' as used in Requirement R1.2 leaves to individual interpretation when a 'large' amount of primary inadvertent has accumulated. The ERO and WECC agree that the provision could benefit from further clarity. Accordingly, the Commission adopts its NOPR proposal and directs WECC to develop revisions to the provision so that a balancing authority will know with specificity the circumstances that trigger the actions required by Requirement R1.2."[4]
2. "Consistent with the NOPR, pursuant to section 215(d) (5) of the FPA, the Commission directs WECC to develop a modification to the regional Reliability Standard consistent with WECC's and NERC's explanation that the limit set forth in Requirement 2 of '24 hours per calendar quarter' is an accumulated total for the period, resulting from either a singular event or a cumulative time limit from a number of events."[5]
3. "[The Commission] direct[s] that the violation risk factors assigned to BAL-004-WECC-01, Requirements R1, R2, R3, and R4 be modified from 'lower' to 'medium.' The ERO and WECC must submit a filing within 60 days of the effective date of this Final Rule that includes the directed modifications."[6] These modifications were addressed in a compliance filing dated August 28, 2009. [7]
4. "The Commission adopts its NOPR proposal and directs the ERO and WECC to submit violation severity levels for each Requirement and sub-Requirement that has been assigned a violation risk factor. To allow adequate time for the development of the violation severity levels, the ERO and WECC must submit a filing within 120 days of the effective date of this Final Rule that includes the directed violation severity levels."[8] These modifications were addressed in a compliance filing date October 23, 2009.[9]
5. In response to Xcel comments, FERC referenced their approval, in Order No. 713, of an ERO interpretation stating that as long as Balancing Authorities use raw ACE for Control Performance Standard (CPS) reporting purposes and WECC ATEC (ATEC) ACE for control, it is not a violation of BAL-001-0.1a, Requirement 1.[10]. WECC Stakeholders believe it is more appropriate to use the ATEC ACE for control and CPS reporting. To clarify this difference, WECC has developed a regional variance BAL-001-0.1a.

The implementation of an ATEC ACE is part of a regional variance to BAL-001-0.1a associated with this posting. The purpose of this filing is to meet the directives of FERC Order 723 while refining for clarity the existing requirements of BAL-004-WECC-1. Refinements to BAL-004-WECC-1 include:

---

[4] Order 723 at ¶ 30.

[5] *Id* at ¶ 34.

[6] *Id* at ¶ 51.

[7] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 51 of Order No. 723 – Directed Modification of Violation Risk Factors for Regional Reliability Standard BAL-004-WECC-1, Automatic Time Error Correction, Docket No. RM08-12-000, filed August 28, 2009

[8] Order 723 at ¶ 54.

[9] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 54 of Order No. 723, Docket No. RM08-12-000, filed October 23, 2009

[10] Order 723 at ¶ 44-45.

1. A requirement that defines the large accumulation at 150% of previous year's peak demand or peak generation for generation-only Balancing Authorities. The action required is that the Balancing Authority shall not permit the PII_{accum} to exceed the defined value, which is demonstrated at the end of each month.
2. A clarification in response to the FERC order that the accumulated time for ATEC out of service shall not exceed 24 hours during a calendar quarter.

BAL-004-WECC-2 retains the requirement for Balancing Authorities to compute the Automatic Time Error Correction and Primary Inadvertent Interchange by 50 minutes after the hour and requires that Balancing Authorities have the ability to operate their Automatic Generation Control in other modes. In addition, Balancing Authorities are required to recalculate Primary Inadvertent Interchange when hourly and month-end adjustments are made.

In Version 3 in order to prevent the stranding of Secondary Inadvertent Interchange the drafting team added a Requirement R8 that restrictions the payback of Inadvertent Interchange to using ATEC rather than through bilateral and unilateral payback methods.

The proposed BAL-004-WECC-2 will replace the Automatic Time Error Correction definition in the NERC Glossary of Terms in the WECC Regional Definitions section. The WECC definitions for Primary Inadvertent Interchange and Secondary Inadvertent Interchange will be retained under the WECC Regional Definitions in the *Glossary of Terms Used in NERC Reliability Standards*.

Development Plan:

Anticipated Actions	Anticipated Date
1. Post draft standard for 45-day NERC comment period	02/01/2012
2. NERC comment period ends	03/27/2012
3. Operating Committee approves proposed standard	03/27/2012
4. DT completes review and consideration of industry comments to NERC posting	04/27/2012
5. Post draft standard for WECC Board approval	05/01/2012
6. WECC Board approval	06/21/2012
7. Post draft standard for 15-day NERC comment period	06/25/2012
8. NERC 15-day comment period ends	07/2012
9. DT completes review and consideration of industry comments to NERC posting	07/2012
10. Submit NERC Board of Trustees approval request	08/2012
11. Receive NERC Board approval	08/2012

.

Implementation Plan

The Implementation Plan is to make the WECC Regional Variance to BAL-001-0.1a and BAL-004-WECC-2 effective on the first day of the second quarter, after regulatory approval in areas where applicable. Since entities are already controlling their Balancing Authority Area with the ATEC ACE equation – but are reporting using the NERC raw ACE equation for reporting CPS1 – the transition to controlling and reporting using the ATEC ACE should be minimal. Additionally, it should not take much time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

Definitions of Terms Used in Regional 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 definitions will be removed from the standard and added to the NERC Glossary under WECC Regional Definitions. In addition the current definitions for "**Primary Inadvertent Interchange**" and "**Secondary Inadvertent Interchange"** will be retained in the Glossary of Terms Used in NERC Reliability Standards under WECC Regional Definitions.*

Automatic Time Error Correction: The addition of a component to the ACE equation that modifies the control point for the purpose of continuously paying back Primary Inadvertent Interchange to correct accumulated time error.

A. Introduction

1. Title: **Automatic Time Error Correction**

2. Number: BAL-004-WECC-02

3. Purpose: To maintain Interconnection frequency and to ensure that Time Error Corrections and Primary Inadvertent Interchange (PII) payback are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection.

4. Applicability

4.1. Functional Entities

4.1.1 Balancing Authorities that operate synchronously in the Western Interconnection.

5. Effective Date: On the first day of the second quarter, after applicable regulatory approval has been received (or the Reliability Standard otherwise becomes effective the first day of the fourth quarter following NERC Board adoption where regulatory approval is not required).

6. Background:

In February 2003, the WECC Automatic Time Error Correction (ATEC) Procedure (Procedure) became effective for all Balancing Authorities in the Western Interconnection. The original intent of the Procedure was to minimize the number of Manual Time Error Corrections in the Western Interconnection. ATEC provides the added benefit of a superior approach over the current NERC Reliability Standard BAL-004-0 – Time Error Correction for assigning costs and providing for the equitable payback of Inadvertent Interchange. In October 2006, the Procedure became a WECC Criterion. In May 2009, FERC issued Order No.723 that approved Regional Reliability Standard BAL-004-WECC-1 - Automatic Time Error Correction, as submitted by NERC. In addition, the Commission directed WECC to develop several clarifying modifications to BAL-004-WECC-1 using the FERC-approved Process for Developing and Approving WECC Standards. The Effective Date of the BAL-004-WECC-1 standard was July 1, 2009. BAL-004-WECC-1 required Balancing Authorities within the Western Interconnection to maintain Interconnection frequency within a predefined frequency profile and to ensure that Time Error Corrections were effectively conducted in a manner that did not adversely affect the reliability of the Interconnection. In September 2009, WECC received WECC Standards/Regional Criterion Request Form (Request) WECC-0068, which was a request for modification of BAL-004-WECC-1. In July 2010, the chair of the WECC Operating Committee assigned the Request to the Performance Work Group (PWG) for development.

B. Requirements and Measures

R1. Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PII_{accum}) for both the monthly On-Peak period and the monthly Off-Peak period are each individually less than or equal to:

1.1. For load-serving Balancing Authorities, 150% of the previous calendar year's integrated hourly Peak Demand,

1.2. For generation-only Balancing Authorities, 150% of the previous calendar year's integrated hourly peak generation.

[Violation Risk Factor Medium:] [Time Horizon: Operations Assessment]

M1. Forms of acceptable evidence of compliance with Requirement R1include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool (WIT),
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R2. Each Balancing Authority shall, upon discovery of an error in the calculation of PII_{hourly}, recalculate within 90 days, the value of PII_{hourly} and adjust the PII_{accum} from the time of the error. *[Violation Risk*

Rationale for R1:

Premise: Each Balancing Authority should ensure that the absolute value of its PII_{accum} for both the On-Peak period and the Off-Peak period each individually does not exceed 150% of the previous year's Peak Demand for load-serving Balancing Authorities and 150% of the previous year's peak generation for generation-only Balancing Authorities. The Balancing Authority is required to take action to keep each PII_{accum} period within the limit. For example, the Balancing Authorities actions may include:

- Identifying and correcting the source of any metering or accounting error(s) and recalculating the hourly Primary Inadvertent Interchange **(**PII_{hourly}) and the PII_{accum} from the time of the error;
- Validating the implementation of ATEC; or
- Setting L_{max} equal to $L_{10.}$until the PII_{accum} is below the limit in Requirement R1.

Justification: PII_{accum} may grow from month-end adjustments and metering errors, even with the inclusion of I_{ATEC} in the ACE equation.

Goal: To limit the amount of PII_{accum} that a Balancing Authority can have at the end of each month.

Rationale for R2:

Premise: When a Balancing Authority finds an error in the calculation of its PII, the Balancing Authority needs time to correct the error and recalculate PII and PII_{accum}.

Justification: The drafting team selected 90 days as a reasonable amount of time to correct an error and recalculate PII and $PII_{accum,}$ since recalculation of PII and PII_{accum} is not a real-time operations reliability issue.

Goal: To promote the timely correction of errors in the calculation of PII and PII_{accum}.

Factor: Medium] [Time Horizon: Operations Assessment]

M2. Forms of acceptable evidence of compliance with Requirement R2 include but are not limited to any one of the following:

- Data, screen shots from the WIT,
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R3. Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service. *[Violation Risk Factor: Medium] [Time Horizon: Same-day Operations]*

M3. Forms of acceptable evidence of compliance with Requirement R3 may include, but are not limited to:

- Dated archived files,
- Historical data,
- Other data that demonstrates the ATEC was out of service for less than 24 hours per calendar quarter.

Rationale for R3:

Premise: When a Balancing Authority is not participating in ATEC, payback of PII_{accum} is delayed.

Justification: The limit of 24 hours per quarter discourages a Balancing Authority from withdrawing ATEC participation, for example, for economic gain during selected hours. If the limits were increased to 60 hours, a Balancing Authority could technically withdraw ATEC participation for one hour from Monday to Friday.

Goal: To promote fair and timely payback of PII_{accum} balances.

R4. Each Balancing Authority shall compute the following by 50 minutes after each hour:

- **4.1.** $PII_{\mathbf{hourly}}$,
- **4.2.** PII_{accum},
- **4.3.** Automatic Time Error Correction term (I_{ATEC}).

Rationale for R4:

Premise: $PII_{\mathbf{hourly}}$, PII_{accum}, and I_{ATEC} should be determined before the next scheduling hour begins.

Justification: To promote timely calculations 50 minutes was selected because it is before the next hour ramp begins and permits time to collect the data and resolve interchange metering values.

Goal: To promote the timely calculation of $PII_{\mathbf{hourly}}$, PII_{accum}, and I_{ATEC}.

[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]

M4. Forms of acceptable evidence of compliance with Requirement R4 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from internal Balancing Authority tool that demonstrate compliance, or
- Data from any other databases, spreadsheets, displays that demonstrate compliance.

R5. Each Balancing Authority shall be able to change its Automatic Generation Control operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error Control (used in ATEC mode), to correspond to current operating conditions. *[Violation Risk Factor: Medium] [Time Horizon: Real-Time Operations]*

M5. Forms of acceptable evidence of compliance with Requirement R5 include but are not limited to any one of the following:

- Screen shots from Energy Management System,
- Demonstration using an off-line system.

Rationale for R5:

Premise: The ACE equation, and hence the AGC mode, will contain any number of parameters based on system operating conditions. Various AGC modes are identified corresponding to those operating conditions, as well as the specific sets of parameters included in the ACE equation.

Justification: Changing to the proper operating mode, corresponding to current operating conditions, affords proper movement of generating units in response to those conditions. The addition of the ATEC term results in an additional AGC mode and a different set of parameters. The inability to correctly calculate the ATEC term would dictate that AGC not be operated in the ATEC mode.

Goal: To set the AGC mode and calculate ACE in a manner that corresponds to the system operating conditions and to accommodate changes in those conditions.

R6. Each Balancing Authority shall recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly Inadvertent Interchange or ΔTE. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M6. Forms of acceptable evidence of compliance with Requirement R6 include but are not limited to any one of the following:

Rationale for R6:

Premise: Hourly adjustments to hourly Inadvertent Interchange (II) require a recalculation of the corresponding hourly PII value, the corresponding PII_{accum}, and all subsequent PII_{accum} for every hour up to the current hour.

Justification: As $PII_{\mathbf{hourly}}$ is corrected, then PII_{accum} should be recalculated.

Goal: To promote accurate, fair and timely payback of accumulated PII balances.

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from an internal Balancing Authority tool that demonstrate compliance with, or
- Data from any other databases, spreadsheets, displays that demonstrate compliance.

R7. Each Balancing Authority shall make the same adjustment to the PII_{accum} as it did for any month-end meter reading adjustments to Inadvertent Interchange. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M7. Forms of acceptable evidence of compliance with Requirement R7 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from an internal Balancing Authority tool that demonstrate compliance,
- Production of data from any other databases, spreadsheets, displays that demonstrate compliance.

Rationale R7:

Premise: Month-end meter-reading adjustments are made, for example, when a Balancing Authority performs monthly comparisons of recorded month-end Net Actual Interchange (NI_A) values derived from hourly Actual Interchange Telemetered Values against month-end Actual Interchange Register Meter readings.

Justification: Month-end adjustments to II_{accum} are applied as 100% PII_{accum}. 100% was chosen for simplicity to bilaterally assign PII_{accum} to both Balancing Authorities, since the effect of this metering error on system frequency is not easily determined over the course of a month.

Goal: To provide a mechanism by which corresponding month-end II adjustments can be applied to PII_{accum}, when such adjustments cannot be attributed to any one particular hour or series of hours.

R8. Each Balancing Authority shall payback Inadvertent Interchange using ATEC rather than bilateral and unilateral payback. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M8. Forms of acceptable evidence of compliance with Requirement R8 include but are not limited to historical On-Peak and Off-Peak Inadvertent Interchange data, data from

Rationale R8:

Premise: ATEC includes automatic unilateral payback of Primary Inadvertent Interchange and Secondary Inadvertent Interchange.

Justification: Additional unilateral and bilateral exchanges disturb the balance and distribution between Primary Inadvertent Interchange and Secondary Inadvertent Interchange throughout the Interconnection; thereby stranding Secondary Inadvertent Interchange.

Goal: To not strand Secondary Inadvertent Interchange.

the WECC Interchange Tool, and ACE data.

C. Compliance

1. Compliance Monitoring Process

1.1 Compliance Enforcement Authority

The Regional Entity shall serve as the Compliance Enforcement Authority.

For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

For responsible entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

1.2 Compliance Monitoring and Assessment Processes:

Compliance Audits

Self-Certifications

Spot Checking

Compliance Investigations

Self-Reporting

Complaints

1.3 Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of PII_{hourly}, PII_{accum} (On-Peak and Off-Peak), ΔTE and any month-end adjustments for the preceding calendar year (January – December), as well as the current calendar year.

Each Balancing Authority in the Western Interconnection shall retain the amount of time the Balancing Authority operated without ATEC for the preceding calendar year (January – December), as well as the current calendar year.

1.4 Additional Compliance Information

None

Table of Compliance Elements

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	Operations Assessment	Medium	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 150%, but was less than or equal to 160% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 160%, but was less than or equal to 170% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 170%, but was less than or equal to 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.
R2	Operations Assessment	Medium	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 90 days of the discovery of the error; but made the required recalculations and adjustments within 120 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 120 days of the discovery of the error; but made the required recalculations and adjustments within 150 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 150 days of the discovery of the error; but made the required recalculations and adjustments within 180 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust PII_{accum} within 180 days of the discovery of the error.

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R3	Real-Time Operations	Medium	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 24 hours, but less than or equal to 72 hours.	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 72 hours, but less than or equal to 120 hours.	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 120 hours, but less than or equal to 168 hours	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 168 hours.
R4	Operations Assessment	Medium	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within 50 minutes, but made the required calculations in less than or equal to two hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within two hours, but made the required calculations in less than or equal to four hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within four hours, but made the required calculations in less than or equal to six hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within six hours.
R5	Real-Time Operations	Medium	N/A	N/A	N/A	The Balancing Authority is not able to change its AGC operating mode between Flat Frequency (for blackout restoration; Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; or Tie Line Bias

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						plus Time Error control (used in ATEC mode).
R6	Operations Assessment	Medium	N/A	N/A	N/A	When making adjustments to hourly Inadvertent Interchange or ΔTE, the Balancing Authority did not recalculate the PII_{hourly} and the PII_{accum} for the On-Peak and Off-Peak periods.
R7	Operations Assessment	Medium	N/A	N/A	N/A	When making any month-end meter reading adjustments to Inadvertent Interchange, the Balancing Authority did not make the same adjustment to the PII_{accum}.
R8	Operations Assessment	Medium	N/A	N/A	N/A	The Balancing Authority paid back Inadvertent Interchange using bilateral and unilateral payback rather than

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						using ATEC.

Guidelines and Technical Basis

Requirement R1:

Requirement R2:

Requirement R3:

Requirement R4:

Requirement R5:

Requirement R6:

Requirement R7:

Requirement R8:

~~Standard BAL-004-WECC-01 — Automatic Time Error Correction~~

~~A. Introduction~~

~~Title: Automatic Time Error Correction~~

Document Title	WECC Standard BAL-004-WECC-02
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1	4/15/2011	Version 1 Posted	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Version 3 Posted 12/15/11	Addressed comments from Version 2 posting
4		Standing Committee Approval	
5		WECC Board Approval	

WECC 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.

.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	07/16/2010
9. Notice of development / first 30-day notice	09/2/2010
10. New committee chair orientation meeting	08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 01/18/11 02/10/11 03/11–12/11 03/24/11 04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
16. Post first draft for 45-day comment period	04/15/2011
17. Meet to answer to comments, address impact statement and draft responses	06/2-3/2011 06/14/2011 06/23/2011 06/29/2011
18. Post responses to comments received during 45-day comment period	06/29/2011
19. Meet to answer to comments, address impact statement and draft responses	08/8/2011 08/15/2011 08/30/2011 11/01/2011
20. Post the Version 2 for a 30-day comment period	11/04/2011
21. Post consideration of comments of Version 2	12/15/2011
22. Post the third dart for 30-day comment period	12/15/2011
23. Project WECC-0068 Version 3 Comments were due	01/16/2012
24. Meeting to answer comments, address impact statement, draft	01/18/2012

Completed Actions	Completion Date
responses	
25. Post responses to comments	02/13/2012
26. Post for Operating Committee approval	02/24/2012

Description of Current Draft:

On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC Standards.[1] In addition, WECC staff identified additional modifications to BAL-004-WECC-1 that would clarify the intent without changing the requirements. Finally, the industry has commented that there is confusion concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as that used during Automatic Generation Control (AGC) mode. This seems to conflict with NERC's comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a)[2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation for control but should use raw ACE for CPS reporting.[3] As part of this filing WECC has submitted a proposed regional variance to BAL-001-0.1a to address this conflict.

The purpose of the refinements to BAL-004-WECC-1 as proposed in WECC Regional Reliability Standard BAL-004-WECC-2 – Automatic Time Error Correction (BAL-004-WECC-2) is to implement the directives in FERC Order 723 and to make other clarifications to BAL-004-WECC-1 as the industry deems necessary, while maintaining the Western Interconnection's reliability. The FERC Order 723 directives are as follows:

1. "The Commission is concerned that the phrases 'large accumulation' and 'in such a situation' as used in Requirement R1.2 leaves to individual interpretation when a 'large' amount of primary inadvertent has accumulated. The ERO and WECC agree that the provision could benefit from further clarity. Accordingly, the Commission adopts its NOPR proposal and directs WECC to develop revisions to the provision so that a balancing authority will know with specificity the circumstances that trigger the actions required by Requirement R1.2."[4]
2. "Consistent with the NOPR, pursuant to section 215(d) (5) of the FPA, the Commission directs WECC to develop a modification to the regional Reliability Standard consistent with WECC's and NERC's explanation that the limit set forth in Requirement 2 of '24 hours per calendar quarter' is an accumulated total for the period, resulting from either a singular event or a cumulative time limit from a number of events."[5]
3. "[The Commission] direct[s] that the violation risk factors assigned to BAL-004-WECC-01, Requirements R1, R2, R3, and R4 be modified from 'lower' to 'medium.' The ERO and WECC must submit a filing within 60 days of the effective date of this Final Rule that

---

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).

[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).

[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

[4] Order 723 at ¶ 30.

[5] *Id* at ¶ 34.

includes the directed modifications."[6] These modifications were addressed in a compliance filing dated August 28, 2009. [7]

4. "The Commission adopts its NOPR proposal and directs the ERO and WECC to submit violation severity levels for each Requirement and sub-Requirement that has been assigned a violation risk factor. To allow adequate time for the development of the violation severity levels, the ERO and WECC must submit a filing within 120 days of the effective date of this Final Rule that includes the directed violation severity levels."[8] These modifications were addressed in a compliance filing date October 23, 2009.[9]
5. In response to Xcel comments, FERC referenced their approval, in Order No. 713, of an ERO interpretation stating that as long as Balancing Authorities use raw ACE for Control Performance Standard (CPS) reporting purposes and WECC ATEC (ATEC) ACE for control, it is not a violation of BAL-001-0.1a, Requirement 1.[10]. WECC Stakeholders believe it is more appropriate to use the ATEC ACE for control and CPS reporting. To clarify this difference, WECC has developed a regional variance BAL-001-0.1a.

The implementation of an ATEC ACE is part of a regional variance to BAL-001-0.1a associated with this posting. The purpose of this filing is to meet the directives of FERC Order 723 while refining for clarity the existing requirements of BAL-004-WECC-1. Refinements to BAL-004-WECC-1 include:

1. A requirement that defines the large accumulation at 150% of previous year's peak demand or peak generation for generation-only Balancing Authorities. The action required is that the Balancing Authority shall not permit the PII_{accum} to exceed the defined value, which is demonstrated at the end of each month.
2. A clarification in response to the FERC order that the accumulated time for ATEC out of service shall not exceed 24 hours during a calendar quarter.

BAL-004-WECC-2 retains the requirement for Balancing Authorities to compute the Automatic Time Error Correction and Primary Inadvertent Interchange by 50 minutes after the hour and requires that Balancing Authorities have the ability to operate their Automatic Generation Control in other modes. In addition, Balancing Authorities are required to recalculate Primary Inadvertent Interchange when hourly and month-end adjustments are made.

In Version 3 in order to prevent the stranding of Secondary Inadvertent Interchange the drafting team added a Requirement R8 that restrictions the payback of Inadvertent Interchange to using ATEC rather than through bilateral and unilateral payback methods.

The proposed BAL-004-WECC-2 will replace the Automatic Time Error Correction definition in the NERC Glossary of Terms in the WECC Regional Definitions section. The WECC definitions for Primary Inadvertent Interchange and Secondary Inadvertent Interchange will be retained under the WECC Regional Definitions in the *Glossary of Terms Used in NERC Reliability Standards*.

Development Plan:

Anticipated Actions	Anticipated Date
1. Post draft standard for 45-day NERC comment period	02/01/2012
2. NERC comment period ends	03/27/2012

[6] *Id* at ¶ 51.

[7] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 51 of Order No. 723 – Directed Modification of Violation Risk Factors for Regional Reliability Standard BAL-004-WECC-1, Automatic Time Error Correction, Docket No. RM08-12-000, filed August 28, 2009

[8] Order 723 at ¶ 54.

[9] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 54 of Order No. 723, Docket No. RM08-12-000, filed October 23, 2009

[10] Order 723 at ¶ 44-45.

3. Operating Committee approves proposed standard	03/27/2012
4. DT completes review and consideration of industry comments to NERC posting	04/27/2012
5. Post draft standard for WECC Board approval	05/01/2012
6. WECC Board approval	06/21/2012
7. Post draft standard for 15-day NERC comment period	06/25/2012
8. NERC 15-day comment period ends	07/2012
9. DT completes review and consideration of industry comments to NERC posting	07/2012
10. Submit NERC Board of Trustees approval request	08/2012
11. Receive NERC Board approval	08/2012

.

Implementation Plan

The Implementation Plan is to make the WECC Regional Variance to BAL-001-0.1a and BAL-004-WECC-2 effective on the first day of the second quarter, after regulatory approval in areas where applicable. Since entities are already controlling their Balancing Authority Area with the ATEC ACE equation – but are reporting using the NERC raw ACE equation for reporting CPS1 – the transition to controlling and reporting using the ATEC ACE should be minimal. Additionally, it should not take much time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

Definitions of Terms Used in Regional 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 definitions will be removed from the standard and added to the NERC Glossary under WECC Regional Definitions. In addition the current definitions for "**Primary Inadvertent Interchange**" and "**Secondary Inadvertent Interchange"** will be retained in the Glossary of Terms Used in NERC Reliability Standards under WECC Regional Definitions.*

Automatic Time Error Correction: The addition of a component to the ACE equation that modifies the control point for the purpose of continuously paying back Primary Inadvertent Interchange to correct accumulated time error.

A. Introduction

1. Title: Automatic Time Error Correction

2. Number: BAL-004-WECC-~~01~~02

3. Purpose: To maintain Interconnection frequency ~~**within a predefined frequency profile under all conditions (i.e. normal and abnormal), and**~~ and to ensure that Time Error Corrections and Primary Inadvertent Interchange (PII) payback are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection.

4. Applicability~~:~~

4.1. Functional Entities

4.1. ~~1~~ Balancing Authorities ~~**(BA)**~~ that operate synchronously ~~**to**~~in the Western Interconnection.

5. Effective Date: On the first day of the ~~**first**~~second quarter, after applicable regulatory approval~~.~~ has been received (or the Reliability Standard otherwise becomes effective the first day of the fourth quarter following NERC Board adoption where regulatory approval is not required).

~~B. Requirements~~

~~**R1.** Each BA that operates synchronously to the Western Interconnection shall continuously operate utilizing Automatic Time Error Correction (ATEC) in its Automatic Generation Control (AGC) system. [Risk Factor: Lower]~~

$$ACE_{ATEC} = (NI_A - NI'_S) - 10B_i(F_A - F_S) - T_{0b} + I_{ME}$$

Where:

NI_A = Net Interchange Actual (MW).

F_A = Frequency Actual (Hz).

F_S = Frequency Scheduled (Normally 60 Hz).

B_i = Frequency Bias for the Balancing Authority's Area (MW / 0.1 Hz).

T_{0b} = Remaining Bilateral Payback for Inadvertent Interchange created prior to implementing automatic payback (MW).

I_{ME} = Meter Error Correction (MW).

$$NI'_S = NI_S - \frac{H^{on/off\ peak}_{Primary}}{(1 - Y) * H}$$

NI_S = Net Interchange Scheduled (MW).

$Y = B_i / B_S$.

H = Number of Hours used to payback Inadvertent Interchange Energy. The WECC Performance Work Group has set the value of H to 3.

B_S = Frequency Bias for the Interconnection (MW / 0.1 Hz).

$H^{on/off\ peak}_{primary}$ = is the Balancing Authority's accumulated primary inadvertent interchange in MWh. An On-Peak and Off-Peak accumulation accounting is required.

Where:

$$\Pi^{\text{on/off peak}}_{\text{primary}} = \text{last period's } \Pi^{\text{on/off peak}}_{\text{primary}} + (1-Y) * (H_{\text{actual}} - B_i * \Delta TE/6)$$

H_{actual} is the hourly Inadvertent Interchange for the last hour.

ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor.

Where:

$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE\ offset)$

TD_{adj} is any operator adjustment to the control center Time Error to correct for differences with the time monitor.

t is the number of minutes of Manual Time Error Correction that occurred during the hour.

TE offset is 0.000 or +0.020 or -0.020.

R1.1. The absolute value of the WECC Automatic Time Error Correction term is limited as follows:

$$\left| \frac{H_{primary}^{on/off\ peak}}{(1-Y)\cdot H} \right| \leq L_{max}$$

Where L_{max} is chosen by the Balancing Authority and is bounded as follows:

$0.20 * |B_i| \leq L_{max} \leq L_{10}$

L_{10} is the Balancing Authority CPS2 limit in MW. If the WECC Automatic Time Error Correction term is less than the upper limit, use the calculated WECC Automatic Time Error Correction term.

R1.2. Large accumulations of primary inadvertent point to an invalid implementation of ATEC, loose control, metering or accounting errors. A BA in such a situation should identify the source of the error(s) and make the corrections, recalculate the primary inadvertent from the time of the error, adjust the accumulated primary inadvertent caused by the error(s), validate the implementation of ATEC, set L_{max} equal to L_{10} and continue to operate with ATEC reducing the accumulation as system parameters allow.

R2. Each BA that is synchronously connected to the Western Interconnection and operates in any AGC operating mode other than ATEC shall notify all other BAs of its operating mode through the designated Interconnection communication system. Each BA while synchronously connected to the Western Interconnection will be allowed to have ATEC out of service for a maximum of 24 hours per calendar quarter, for reasons including maintenance and testing. [Risk Factor: Lower]

6. Background:

In February 2003, the WECC Automatic Time Error Correction (ATEC) Procedure (Procedure) became effective for all Balancing Authorities in the Western Interconnection. The original intent of the Procedure was to minimize the number of Manual Time Error Corrections in the Western Interconnection. ATEC provides the added benefit of a superior approach over the current NERC Reliability Standard BAL-004-0 – Time Error Correction for assigning costs and providing for the equitable payback of Inadvertent Interchange. In October 2006, the Procedure became a WECC Criterion. In May 2009, FERC issued Order No.723 that approved Regional Reliability Standard BAL-004-WECC-1 - Automatic Time Error Correction, as submitted by NERC. In addition, the Commission directed WECC to develop several clarifying modifications to BAL-004-WECC-1 using the FERC-approved Process for Developing and Approving WECC Standards. The Effective Date of the BAL-004-WECC-1 standard was July 1, 2009. BAL-004-WECC-1 required Balancing

Authorities within the Western Interconnection to maintain Interconnection frequency within a predefined frequency profile and to ensure that Time Error Corrections were effectively conducted in a manner that did not adversely affect the reliability of the Interconnection. In September 2009, WECC received WECC Standards/Regional Criterion Request Form (Request) WECC-0068, which was a request for modification of BAL-004-WECC-1. In July 2010, the chair of the WECC Operating Committee assigned the Request to the Performance Work Group (PWG) for development.

B. Requirements and Measures

R1. Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PII_{accum}) for both the monthly On-Peak period and the monthly Off-Peak period are each individually less than or equal to:

1.1. For load-serving Balancing Authorities, 150% of the previous calendar year's integrated hourly Peak Demand,

1.2. For generation-only Balancing Authorities, 150% of the previous calendar year's integrated hourly peak generation.

[Violation Risk Factor Medium:] [Time Horizon: Operations Assessment]

M1. Forms of acceptable evidence of compliance with Requirement R1include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool (WIT),
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R2. Each Balancing Authority shall, upon discovery of an error in the calculation of PII_{hourly}, recalculate within 90 days, the value of PII_{hourly} and adjust the PII_{accum} from the time of the error. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M2. Forms of acceptable evidence of compliance with Requirement R2 include but are not limited to any one of the following:

- Data, screen shots from the WIT,

Rationale for R1:

Premise: Each Balancing Authority should ensure that the absolute value of its PII_{accum} for both the On-Peak period and the Off-Peak period each individually does not exceed 150% of the previous year's Peak Demand for load-serving Balancing Authorities and 150% of the previous year's peak generation for generation-only Balancing Authorities. The Balancing Authority is required to take action to keep each PII_{accum} period within the limit. For example, the Balancing Authorities actions may include:

- Identifying and correcting the source of any metering or accounting error(s) and recalculating the hourly Primary Inadvertent Interchange (PII_{hourly}) and the PII_{accum} from the time of the error;
- Validating the implementation of ATEC; or
- Setting L_{max} equal to L_{10} until the PII_{accum} is below the limit in Requirement R1.

Justification: PII_{accum} may grow from month-end adjustments and metering errors, even with the inclusion of I_{ATEC} in the ACE equation.

Goal: To limit the amount of PII_{accum} that a Balancing Authority can have at the end of each month.

Rationale for R2:

Premise: When a Balancing Authority finds an error in the calculation of its PII, the Balancing Authority needs time to correct the error and recalculate PII and PII_{accum}.

Justification: The drafting team selected 90 days as a reasonable amount of time to correct an error and recalculate PII and PII_{accum}, since recalculation of PII and PII_{accum} is not a real-time operations reliability issue.

Goal: To promote the timely correction of errors in the calculation of PII and PII_{accum}.

Authority from withdrawing ATEC participation, for example, for economic gain during selected hours. If the limits were increased to 60 hours, a Balancing Authority could technically withdraw ATEC participation for one hour from Monday to Friday.

Goal: To promote fair and timely payback of PII_{accum} balances.

- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R3. Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service. *[Violation Risk Factor: Medium] [Time Horizon: Same-day Operations]*

M3. Forms of acceptable evidence of compliance with Requirement R3~~. BAs in the Western Interconnection~~ may include, but are not limited to:

- Dated archived files,
- Historical data,
- Other data that demonstrates the ATEC was out of service for less than 24 hours per calendar quarter.

R4. Each Balancing Authority shall compute the following by 50 minutes after each hour:

4.1. PII_{hourly},

4.2. PII_{accum},

4.3. Automatic Time Error Correction term (I_{ATEC}).

[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]

Rationale for R4:

Premise: PII_{hourly}, PII_{accum}, and I_{ATEC} should be determined before the next scheduling hour begins.

Justification: To promote timely calculations 50 minutes was selected because it is before the next hour ramp begins and permits time to collect the data and resolve interchange metering values.

Goal: To promote the timely calculation of PII_{hourly}, PII_{accum}, and I_{ATEC}.

M4. Forms of acceptable evidence of compliance with Requirement R4 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from internal Balancing Authority tool that demonstrate compliance, or
- Data from any other databases, spreadsheets, displays that demonstrate compliance.

R5. Each Balancing Authority shall be able to change ~~their AGC~~its Automatic Generation Control operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error ~~control~~Control (used in ATEC

Rationale for R5:

Premise: The ACE equation, and hence the AGC mode, will contain any number of parameters based on system operating conditions. Various AGC modes are identified corresponding to those operating conditions, as well as the specific sets of parameters included in the ACE equation.

Justification: Changing to the proper operating mode, corresponding to current operating conditions, affords proper movement of generating units in response to those conditions. The addition of the ATEC term results in an additional AGC mode and a different set of parameters. The inability to correctly calculate the ATEC term would dictate that AGC not be operated in the ATEC mode.

Goal: To set the AGC mode and calculate ACE in a manner that corresponds to the system operating conditions and to accommodate changes in those conditions.

mode~~). The ACE used for NERC reports shall be the same ACE as the AGC~~), to correspond to current operating ~~mode in use. [~~conditions. *[Violation Risk Factor: ~~Lower~~]Medium] [Time Horizon: Real-Time Operations]*

~~**R4.** Regardless~~**M5.** Forms of acceptable evidence of compliance with Requirement R5 include but are not limited to any one of the ~~AGC operating mode each BA in the Western Interconnection~~ following:

- Screen shots from Energy Management System,
- Demonstration using an off-line system.

R6. Each Balancing Authority shall ~~compute its~~ recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly ~~Primary~~ Inadvertent Interchange ~~when hourly checkout is complete. If hourly checkout is not complete by 50 minutes after the hour, compute Primary~~ or ΔTE. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M6. Forms of acceptable evidence of compliance with Requirement R6 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from an internal Balancing Authority tool that demonstrate compliance with, or
- Data from any other databases, spreadsheets, displays that demonstrate compliance.

Rationale for R6:

Premise: Hourly adjustments to hourly Inadvertent Interchange (II) require a recalculation of the corresponding hourly PII value, the corresponding PII_{accum}, and all subsequent PII_{accum} for every hour up to the current hour.

Justification: As PII_{hourly} is corrected, then PII_{accum} should be recalculated.

Goal: To promote accurate, fair and timely payback of accumulated PII balances.

R7. Each Balancing Authority shall make the same adjustment to the PII_{accum} as it did for any month-end meter reading adjustments to Inadvertent Interchange ~~with best available~~. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M7. Forms of acceptable evidence of compliance with Requirement R7 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,

Rationale R7:

Premise: Month-end meter-reading adjustments are made, for example, when a Balancing Authority performs monthly comparisons of recorded month-end Net Actual Interchange (NI_A) values derived from hourly Actual Interchange Telemetered Values against month-end Actual Interchange Register Meter readings.

Justification: Month-end adjustments to II_{accum} are applied as 100% PII_{accum}. 100% was chosen for simplicity to bilaterally assign PII_{accum} to both Balancing Authorities, since the effect of this metering error on system frequency is not easily determined over the course of a month.

Goal: To provide a mechanism by which corresponding month-end II adjustments can be applied to PII_{accum}, when such adjustments cannot be attributed to any one particular hour or series of hours.

- Data, screen shots from an internal Balancing Authority tool that demonstrate compliance,
- Production of data~~. This hourly value shall be added to the appropriate accumulated Primary~~ from any other databases, spreadsheets, displays that demonstrate compliance.

R8. Each Balancing Authority shall payback Inadvertent Interchange ~~balance for either On-Peak or Off-Peak periods. [Risk Factor: Lower~~using ATEC rather than bilateral and unilateral payback. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

Rationale R8:

Premise: ATEC includes automatic unilateral payback of Primary Inadvertent Interchange and Secondary Inadvertent Interchange.

Justification: Additional unilateral and bilateral exchanges disturb the balance and distribution between Primary Inadvertent Interchange and Secondary Inadvertent Interchange throughout the Interconnection; thereby stranding Secondary Inadvertent Interchange.

Goal: To not strand Secondary Inadvertent Interchange.

~~**R4.1.** Each BA in the Western Interconnection shall use the change in Time Error distributed by the Interconnection Time Monitor.~~

~~**R4.2.** All corrections to any previous hour Primary~~ **M8**. Forms of acceptable evidence of compliance with Requirement R8 include but are not limited to historical On-Peak and Off-Peak Inadvertent Interchange ~~shall be added to the appropriate On- or Off-Peak accumulated Primary Inadvertent Interchange.~~

R4.3. Month-end Inadvertent Adjustments are 100% Primary Inadvertent Interchange and shall be added to the appropriate On- or Off-Peak accumulated Primary Inadvertentdata, data from the WECC Interchange, unless such adjustments can be pinpointed to specific hours in which case R4.2 applies. Tool, and ACE data.

R4.4. Each BA in the Western Interconnection shall synchronize its Time Error to the nearest

0.001 seconds of the system Time Error by comparing its reading at the designated time each day to the reading broadcast by the Interconnection Time Monitor. Any difference shall be applied as an adjustment to its current Time Error.

C. **Measures**

M1. For Requirement R1, a BA shall provide upon request a document showing that it is correctly calculating its hourly Primary Inadvertent Interchange number that is used to calculate its accumulated Primary Inadvertent Interchange and how it is used in its ACE equation for Automatic Time Error Correction.

M2. For Requirement R2, a BA shall record the date, time, reason, and notification [to other BAs within the Western Interconnection] for any time it is not operating utilizing Automatic Time Error Correction (ATEC) in its AGC system.

M3. For Requirement R3, a BA in the Western Interconnection must be able to demonstrate its ability to change its AGC operating mode when requested or during compliance audits and readiness reviews.

M4. For Requirement R4, a BA in the Western Interconnection must record its hourly Primary Inadvertent Interchange and keep an accurate record of its accumulation of Primary Inadvertent Interchange for both

C. Compliance

1. Compliance Monitoring Process

1.1 Compliance Enforcement Authority

The Regional Entity shall serve as the Compliance Enforcement Authority.

For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

For responsible entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

1.2 Compliance Monitoring and Assessment Processes:

Compliance Audits

Self-Certifications

Spot Checking

Compliance Investigations

Self-Reporting

Complaints

1.3 Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of PII_{hourly}, PII_{accum} (On-Peak and Off-Peak ~~accounts. These records must be available for review when requested or during compliance audits and readiness reviews.~~

~~D. Compliance~~

~~1. Compliance Monitoring Process~~

~~1.1. Compliance Monitoring Responsibility~~

~~Regional Entity~~

~~Compliance Monitoring Period and Reset time Frame~~

~~The reporting period for ATEC is one calendar quarter, starting on the first second of the quarter and ending on the final second of the quarter.~~

~~The Performance-reset Period is one calendar quarter.~~

~~1.2. Data Retention~~

~~Each Balancing Authority in the Western Interconnection shall retain its hourly calculation of total and Primary Inadvertent Interchange calculated hourly, as well as the amount of Primary Inadvertent paid back hourly~~), ΔTE and any month-end adjustments for the preceding calendar year (January – December~~**) plus**~~), as well as the current calendar year.

~~Each Balancing Authority in the Western Interconnection shall retain its total accumulated Inadvertent and total Primary Inadvertent, updated hourly, for On- and Off-Peak for the preceding calendar year (January – December) plus the current year.~~

Each Balancing Authority in the Western Interconnection shall retain ~~its record of~~ the amount of time ~~it~~the Balancing Authority operated without ATEC ~~and the notification to the Interconnection of these times~~ for the preceding calendar year (January – December~~) plus~~), as well as the current ~~year.~~

~~The Compliance Monitor shall retain audit data for three~~ calendar ~~years~~year.

1.~~3.~~ 4 Additional Compliance Information

~~The Compliance Monitor shall use quarterly data to monitor compliance. The Compliance Monitor may also use periodic audits (on site, per a schedule), with spot reviews and investigations initiated in response to a complaint to assess performance.~~

~~The Balancing Authority in the Western Interconnection shall have the following documentation available for its Compliance Monitor to inspect during a scheduled, on-site review or within five business days of a request as part of a triggered investigation:~~

~~1.3.1. Source data for calculating Primary Inadvertent.~~

~~1.3.2. Data showing On- and Off-Peak Primary Inadvertent accumulations.~~

~~1.3.3. Data showing hourly payback of Primary Inadvertent.~~

~~1.3.4. Documentation on number of times not on ATEC and reasons for going off ATEC.~~

~~2. Violation Severity Levels~~

~~**2.1. Lower:** Time not in ATEC Mode greater than one day and less than or equal to three days, or if a Balancing Authority in the Western Interconnection operates without ATEC and does not notify other Balancing Authorities in the Western Interconnection 2 times in quarter.~~

~~**2.2. Moderate:** Time not in ATEC Mode greater than three days and less than or equal to five days, or if a Balancing Authority in the Western Interconnection operates without ATEC and does not notify other Balancing Authorities in the Western Interconnection 3 times in quarter.~~

~~**2.3. High:** Time not in ATEC Mode greater than five days and less than or equal to seven days, or if a Balancing Authority in the Western Interconnection operates without ATEC and does not notify other Balancing Authorities in the Western Interconnection 4 times in quarter.~~

~~**2.4. Severe:** Time not in ATEC Mode greater than seven days, or if a Balancing Authority in the Western Interconnection operates without ATEC and does not notify other Balancing Authorities in the Western Interconnection more than 4 times in quarter or Balancing Authority in the Western Interconnection cannot change AGC operating mode or Balancing Authority in the Western Interconnection incorrectly calculates Primary Inadvertent.~~

~~**Standard BAL-004-WECC-01 — Automatic Time Error Correction**~~

~~**Version History**~~

None

Table of Compliance Elements

Version R #	Date Time Horizon	Action VRF	Change Tracking Violation Severity Levels			
1	February 4, 2003	Effective Date.	New Lower VSL	Moderate VSL	High VSL	Severe VSL
1	October 17, 2006	Created Standard from Procedure.	Errata			
1	February 6, 2007	Changed the Standard Version from 0 to 1 in the Version History Table.	Errata			
1 R1	February 6, 2007 Operations Assessment	Medium	The upper limit bounds to the amount of Automatic Time Error Correction term was inadvertently omitted during the Standard Translation. The bound was added to the requirement R1.4. Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 150%, but was less than or equal to 160% of the previous calendar year's Peak Demand or peak	Errata Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 160%, but was less than or equal to 170% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 170%, but was less than or equal to 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.

~~Version #~~	~~Date~~Time Horizon	~~Action~~VRF	~~Change Tracking~~Violation Severity Levels			
~~1~~	~~February 4, 2003~~	~~Effective Date.~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
			generation for generation-only Balancing Authorities.			
~~1~~R2	~~February 6, 2007~~Operations Assessment	Medium	~~The statement "The Time Monitor may declare offsets in 0.001 second increments" was moved from TEoffset to TDadj and offsets was corrected to adjustments.~~The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 90 days of the discovery of the error; but made the required recalculations and adjustments within 120 days.	~~Errata~~The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 120 days of the discovery of the error; but made the required recalculations and adjustments within 150 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 150 days of the discovery of the error; but made the required recalculations and adjustments within 180 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust PII_{accum} within 180 days of the discovery of the error.
~~1~~R3	~~February 6, 2007~~Real-Time Operations	Medium	~~The reference to seconds was deleted from the TE offset term.~~The Balancing Authority operated	~~Errata~~The Balancing Authority operated during a calendar quarter without ATEC in service for more	The Balancing Authority operated during a calendar quarter without ATEC in service for more	The Balancing Authority operated during a calendar quarter without ATEC in service for more

~~Version~~R #	~~Date~~Time Horizon	~~Action~~VRF	~~Change Tracking~~Violation Severity Levels			
~~1~~	~~February 4, 2003~~	~~Effective Date.~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
			during a calendar quarter without ATEC in service for more than an accumulated 24 hours, but less than or equal to 72 hours.	than an accumulated 72 hours, but less than or equal to 120 hours.	than an accumulated 120 hours, but less than or equal to 168 hours	than an accumulated 168 hours.
~~1~~R4	~~June 19, 2007~~Operations Assessment	Medium	~~The standard number BAL-STD-004-1 was changed to BAL-004-WECC-01 to be consistent with the NERC Regional Reliability Standard Numbering Convention.~~The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within 50 minutes, but made the required calculations in less than or equal to two hours.	~~Errata~~The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within two hours, but made the required calculations in less than or equal to four hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within four hours, but made the required calculations in less than or equal to six hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within six hours.
R5	Real-Time Operations	Medium	N/A	N/A	N/A	The Balancing Authority is not able to change its AGC

~~Version #~~	~~Date~~Time Horizon	~~Action~~VRF	~~Change Tracking~~Violation Severity Levels			
~~1~~	~~February 4, 2003~~	~~Effective Date.~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
						operating mode between Flat Frequency (for blackout restoration; Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; or Tie Line Bias plus Time Error control (used in ATEC mode).
R6	Operations Assessment	Medium	N/A	N/A	N/A	When making adjustments to hourly Inadvertent Interchange or ΔTE, the Balancing Authority did not recalculate the PII_{hourly} and the PII_{accum} for the On-Peak and Off-Peak periods.
R7	Operations Assessment	Medium	N/A	N/A	N/A	When making any month-end meter reading adjustments to Inadvertent Interchange, the Balancing Authority

~~Version #~~	~~Date~~Time Horizon	~~Action~~VRF	~~Change Tracking~~Violation Severity Levels			
~~1~~	~~February 4, 2003~~	~~Effective Date.~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
						did not make the same adjustment to the PII_{accum}.
R8	Operations Assessment	Medium	N/A	N/A	N/A	The Balancing Authority paid back Inadvertent Interchange using bilateral and unilateral payback rather than using ATEC.

~~5 of 5~~

Guidelines and Technical Basis

Requirement R1:

Requirement R2:

Requirement R3:

Requirement R4:

Requirement R5:

Requirement R6:

Requirement R7:

Requirement R8:

Name (0 Responses)
Organization (0 Responses)
Group Name (5 Responses)
Lead Contact (5 Responses)
Question 1 (5 Responses)
Question 1 Comments (5 Responses)
Question 2 (5 Responses)
Question 2 Comments (5 Responses)
Question 3 (5 Responses)
Question 3 Comments (5 Responses)
Question 4 (5 Responses)
Question 4 Comments (5 Responses)
Question 5 (5 Responses)
Question 5 Comments (5 Responses)

Group
Salt River Project
Chris Chavez
Yes
No
No
No
Yes
Group
PacifiCorp
Sandra Shaffer
Yes
No
No
No
Yes
PacifiCorp is concerned with treatment of after-the-fact corrections of Primary Inadvertent Interchange and the potential for after-the-fact violations. For example, if a meter error is discovered and the meter has accumulated inadvertent for a long period of time, when the correction is made to fix all past values for that meter, it could put accumulated inadvertent into the violation range. Currently, entities are required to make this correction as soon as possible. Would entities now be required to make the after-the-fact corrections slowly, in order to not push accumulated inadvertent values beyond acceptable levels? Or will entities now be required to make the correction at the beginning of the month in order to have enough time to return the accumulated inadvertent to acceptable levels prior to the end of the month?
Group
NorthWestern Energy

John Canavan
Yes
No
No
No
No
Group
Bonneville Power Administration
Chris Higgins
Yes
No
No
No
Yes
Group
Constellation Energy
Nicholas L. Hall
Yes
No
No
No
Yes
The proposed regional reliability standard meets these criteria, yet still poses several concerns, as follow: R1: The notion of a monthly limit on Accumulated Primary Inadvertent Interchange creates a potentially troublesome burden on Balancing Authorities, in that under this approach, significant system events occurring at the end of a month can have an undue impact on the performance metric. A Balancing Authority may be implementing ATEC and all other applicable control mechanisms appropriately throughout the month and still experience Primary Inadvertent balances that approach the defined limit for monthly performance. In such an instance, a significant system event occurring on the last day, or even the last hour, of the month could force a Balancing Authority out of compliance with this requirement. Given that the intent of this requirement is to ensure that Balancing Authorities' Primary Inadvertent balances are limited on an ongoing basis, there are other metrics that would similarly provide limitations, while better recognizing that the maintenance of appropriate Inadvertent Balances is a continual effort. It is preferable to utilize a metric that avoids overemphasizing the impact of a significant and unanticipated system event merely because it occurs late in a given month. Much as CPS1 is measured on a rolling 12 month basis, recognizing that impacts to system frequency play out over longer time frames and can counteract each other on that

larger scale, a rolling 12 month obligation would make sense for the management of Inadvertent balances. As with CPS1, a monthly calculation can be performed as a check-measure, with each monthly inadvertent value averaged into a rolling 12 month limitation. This still holds entities to comply with an Inadvertent balance limit of 150% of previous year's peak, but acknowledges that inadvertent is an ongoing concern, rather than an isolated monthly concern. This alternate approach also helps in protecting Balancing Authorities from the undue impact of a last minute event. R8: The exclusion of methods of Inadvertent management other than ATEC places an unreasonable limitation on the ability of a Balancing Authority to maintain compliance with R1. As R1 creates new obligations for entities, WECC should be open to new methodologies for compliance, especially those which are already acceptably used in other interconnections. While the prevention of stranding Secondary Inadvertent Interchange is a valid concern, the standard should not specifically prohibit the development of methodologies by which alternate Inadvertent management processes can be employed without stranding Secondary Inadvertent Interchange. As shown by historical practices, there are occasions where Balancing Authorities have had a need to enable bilateral mechanisms to manage these balances, so a prohibition is not appropriate. The drafting team should revise R8 to allow for alternative methodologies for compliance.

Additional Comment NorthWestern Energy:

R1. Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PIIaccum) for both the On-Peak period and the Off-Peak period are each individually less than or equal to: 1.1. For load-serving Balancing Authorities, 150% of the previous calendar year's integrated hourly Peak Demand. This requirement would tie entities' hands if they acquired a large accumulation of primary inadvertent. Our requirement would be 150% of the previous calendar year's integrated hourly peak demand, looking at a conservative year the peak demand could be estimated at 1650 MW. 150% of 1650 equals 2475 MW. Under this new standard we would be required to keep our primary inadvertent accumulation under 2475 MW at the conclusion of each month. This should not be an issue on a normal operating basis but if an error was found in the primary inadvertent calculation and we corrected the error from the time of its occurrence to the current hour we could end up with a large accumulation. We would have to pay back or reduce the accumulated primary inadvertent to below 2475 MW before the month's end. R2. Each Balancing Authority shall, upon discovery of an error in the calculation of PIIhourly, recalculate within 90 days, the value of PIIhourly and adjust the PIIaccum from the time of the error. [Violation RiskIn this requirement we do not like the 90 day limit. WE understand the intent to have BAs correct the error in a reasonable time frame but undue circumstances could prevent a re-calculation from happening as fast as we would like and the 90 day limit opens the door for a possible compliance violation.R3. Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service. [Violation Risk Factor: Medium] [Time Horizon: Same-day Operations] In this requirement we do not like only being able to have ATEC out of service for up to 24 hours per calendar quarter. This requirement is in the current BAL-004-WECC-1 standard and we almost ran into issues when we had to take a generator offline. The 24 hours per calendar quarter seems like a very small time frame given certain system conditions or events.

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Consideration of Comments

BAL-004-WECC-02 Automatic Time Error Correction

The Regional Standards Group thanks all commenters who submitted comments on the Regional Reliability Standard BAL-004-WECC-02. This standard was posted for a 45-day public comment period from January 23, 2012 through March 9, 2012. Stakeholders were asked to provide feedback on the standard through a special electronic comment form. There were five sets of comments, including comments from seven different people from five entities representing four of the 10 Industry Segments as shown in the table on the following pages.

All comments submitted may be reviewed in their original format on the standard's project page:

http://www.nerc.com/filez/regional_standards/regional_reliability_standards_under_development.html

If you feel that your comment has been overlooked, please let us know immediately. The goal is to give every comment serious consideration in this process! If you feel there has been an error or omission, you can contact the Vice President of Standards and Training, Herb Schrayshuen, at 404-446-2560 or at herb.schrayshuen@nerc.net. In addition, there is a NERC Reliability Standards Appeals Process.[1]

[1] The appeals process is in the Reliability Standards Development Procedures: http://www.nerc.com/standards/newstandardsprocess.html.

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Index to Questions, Comments, and Responses

The Industry Segments are:

1 — Transmission Owners
2 — RTOs, ISOs
3 — Load-serving Entities
4 — Transmission-dependent Utilities
5 — Electric Generators
6 — Electricity Brokers, Aggregators, and Marketers
7 — Large Electricity End Users
8 — Small Electricity End Users
9 — Federal, State, Provincial Regulatory or other Government Entities
10 — Regional Reliability Organizations, Regional Entities

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
1.	Group	Chris Higgins	Bonneville Power Administration	X		X		X	X				
	Additional Member	**Additional Organization**	**Region**	**Segment Selection**									
	1. James	Murphy	WECC	1									
2.	Group	Nicholas L. Hall	Constellation Energy					X					
	Additional Member	**Additional Organization**	**Region**	**Segment Selection**									
	1. Brenda Powell	Constellation Energy Commodities Group	WECC	5									
3.	Individual	Chris Chavez	Salt River Project	X		X		X	X				
4.	Individual	Sandra Shaffer	PacifiCorp	X		X		X	X				
5.	Individual	John Canavan	NorthWestern Energy	X									

1. **Do you agree the proposed standard is being developed in a fair and open process, using the associated Regional Reliability Standards Development Procedure?**

Summary Consideration: All commenters agreed the BAL-004-WECC-2 Standard was developed in a fair and open process. In developing the BAL-004-WECC-2 Regional Reliability Standard the Process for Developing and Approving WECC Standards was followed until February 29, 2012 and the Reliability Standards Development Procedures were followed after March 1, 2012.

Organization	Yes or No	Question 1 Comment
Bonneville Power Administration	Yes	
Constellation Energy	Yes	
Salt River Project	Yes	
PacifiCorp	Yes	
NorthWestern Energy	Yes	

2. Does the proposed standard pose an adverse impact to reliability or commerce in a neighboring region or interconnection?

Summary Consideration: The commenters do not believe the standard poses an adverse impact to reliability or commerce.

Organization	Yes or No	Question 2 Comment
Bonneville Power Administration	No	
Constellation Energy	No	
Salt River Project	No	
PacifiCorp	No	
NorthWestern Energy	No	

3. Does the proposed standard pose a serious and substantial threat to public health, safety, welfare, or national security?

Summary Consideration: The commenters do not believe the standard poses a serious and substantial threat to public health, safety, welfare, or national security.

Organization	Yes or No	Question 3 Comment
Bonneville Power Administration	No	
Constellation Energy	No	
Salt River Project	No	
PacifiCorp	No	
NorthWestern Energy	No	

4. Does the proposed standard pose a serious and substantial burden on competitive markets within the interconnection that is not necessary for reliability?

Summary Consideration: The commenters do not believe the BAL-004-WECC-2 Standard poses a serious and substantial burden on competitive markets within the interconnection that is not necessary for reliability.

Organization	Yes or No	Question 4 Comment
Bonneville Power Administration	No	
Constellation Energy	No	
Salt River Project	No	
PacifiCorp	No	
NorthWestern Energy	No	

5. Does the proposed regional reliability standard meet at least one of the following criteria?

- **The proposed standard has more specific criteria for the same requirements covered in a continent-wide standard.**
- **The proposed standard has requirements that are not included in the corresponding continent-wide reliability standard.**
- **The proposed regional difference is necessitated by a physical difference in the bulk power system.**

Summary Consideration: Four of the five commenters agreed with the standard drafting team that the proposed BAL-004-WECC-2 Standard met the criteria for a Regional Reliability Standard; i.e., the BAL-004-WECC-2 – Automatic Time Error Correction Standard contains automatic time-error correction requirements that are not contained in the NERC BAL-004-1 — Time Error Correction Standard. The other commenters expressed concern that, if controlling practices resulted in a value near the limit for Accumulated Primary Inadvertent Interchange and the Balancing Authority also experienced a meter reading error; they could incur a violation of Requirement R1. The drafting team reviewed the historical data for on-peak and off-peak Accumulated Primary Inadvertent Interchange of large and small Balancing Authorities operating in the Western Interconnection. The drafting team determined that 150 percent of the previous year's peak demand or peak generation (for generation-only Balancing Authorities) was a reasonable value when a Balancing Authority instituted good controlling practices when balanced against meter-reading corrections and the size of each Balancing Authority.

The entity that did not agree that the standard met the criteria above, did not explain why the BAL-004-WECC-2 Standard did not meet the regional standard criteria. Its comments were similar to the other comments.

Organization	Yes or No	Question 5 Comment
Bonneville Power Administration	Yes	
Constellation Energy	Yes	The proposed regional reliability standard meets these criteria, yet still poses several concerns, as follow:R1: The notion of a monthly limit on Accumulated Primary Inadvertent Interchange creates a potentially troublesome burden on Balancing Authorities, in that under this approach, significant system events occurring at the end of a month can have an undue impact on the performance metric. A Balancing Authority may be implementing ATEC and all other applicable control mechanisms

Organization	Yes or No	Question 5 Comment
		appropriately throughout the month and still experience Primary Inadvertent balances that approach the defined limit for monthly performance. In such an instance, a significant system event occurring on the last day, or even the last hour, of the month could force a Balancing Authority out of compliance with this requirement. Given that the intent of this requirement is to ensure that Balancing Authorities' Primary Inadvertent balances are limited on an ongoing basis, there are other metrics that would similarly provide limitations, while better recognizing that the maintenance of appropriate Inadvertent Balances is a continual effort. It is preferable to utilize a metric that avoids overemphasizing the impact of a significant and unanticipated system event merely because it occurs late in a given month. Much as CPS1 is measured on a rolling 12 month basis, recognizing that impacts to system frequency play out over longer time frames and can counteract each other on that larger scale, a rolling 12 month obligation would make sense for the management of Inadvertent balances. As with CPS1, a monthly calculation can be performed as a check-measure, with each monthly inadvertent value averaged into a rolling 12 month limitation. This still holds entities to comply with an Inadvertent balance limit of 150% of previous year's peak, but acknowledges that inadvertent is an ongoing concern, rather than an isolated monthly concern. This alternate approach also helps in protecting Balancing Authorities from the undue impact of a last minute event. R8: The exclusion of methods of Inadvertent management other than ATEC places an unreasonable limitation on the ability of a Balancing Authority to maintain compliance with R1. As R1 creates new obligations for entities, WECC should be open to new methodologies for compliance, especially those which are already acceptably used in other interconnections. While the prevention of stranding Secondary Inadvertent Interchange is a valid concern, the standard should not specifically prohibit the development of methodologies by which alternate Inadvertent management processes can be employed without stranding Secondary Inadvertent Interchange. As shown by historical practices, there are occasions where Balancing Authorities have had a need to enable bilateral mechanisms to manage these balances, so a prohibition is not appropriate. The drafting team should revise

Organization	Yes or No	Question 5 Comment
		R8 to allow for alternative methodologies for compliance.
Response: • After consideration of the rolling 12-month comment, the drafting team felt that Balancing Authorities, when maintaining good control, should not be operating at the limits or near the limits specified in Requirement R1 of BAL-004-WECC-02. If a Balancing Authority institutes good controlling practices, a single month-end meter correction should not result in a violation the 150 percent limit for either the on-peak or off-peak period. A rolling 12-month average could result in giving Balancing Authorities the perception of acceptable performance measures by masking a bad meter. One of the intents of BAL-004-WECC-02 and the WECC Variance to BAL-001-0.1a is for Balancing Authorities to identify the bad meters as soon as possible and make corrections. • The drafting team does not believe the wording of Requirement R8 precludes the development of new or alternate methodologies to correct Inadvertent and/or Primary Inadvertent Interchange. The intent of Requirement R8 prohibits the use of methodologies that are known to strand Secondary Inadvertent Interchange across the Western Interconnection, which a bilateral exchange does.		
Salt River Project	Yes	
PacifiCorp	Yes	PacifiCorp is concerned with treatment of after-the-fact corrections of Primary Inadvertent Interchange and the potential for after-the-fact violations. For example, if a meter error is discovered and the meter has accumulated inadvertent for a long period of time, when the correction is made to fix all past values for that meter, it could put accumulated inadvertent into the violation range. Currently, entities are required to make this correction as soon as possible. Would entities now be required to make the after-the-fact corrections slowly, in order to not push accumulated inadvertent values beyond acceptable levels? Or will entities now be required to make the correction at the beginning of the month in order to have enough time to return the accumulated inadvertent to acceptable levels prior to the end of the month?
Response: • As long as corrections for errors to Primary Inadvertent Interchange are made within the 90-day limit per Requirement R2, the		

Organization	Yes or No	Question 5 Comment
standard does not prescribe when those corrections should be made.		
NorthWestern Energy	No	R1. Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PIIaccum) for both the On-Peak period and the Off-Peak period are each individually less than or equal to: 1.1. For load-serving Balancing Authorities, 150% of the previous calendar year's integrated hourly Peak Demand. This requirement would tie entities' hands if they acquired a large accumulation of primary inadvertent. Our requirement would be 150% of the previous calendar year's integrated hourly peak demand, looking at a conservative year the peak demand could be estimated at 1650 MW. 150% of 1650 equals 2475 MW. Under this new standard we would be required to keep our primary inadvertent accumulation under 2475 MW at the conclusion of each month. This should not be an issue on a normal operating basis but if an error was found in the primary inadvertent calculation and we corrected the error from the time of its occurrence to the current hour we could end up with a large accumulation. We would have to pay back or reduce the accumulated primary inadvertent to below 2475 MW before the month's end. R2. Each Balancing Authority shall, upon discovery of an error in the calculation of PIIhourly, recalculate within 90 days, the value of PIIhourly and adjust the PIIaccum from the time of the error. [Violation Risk In this requirement we do not like the 90 day limit. We understand the intent to have BAs correct the error in a reasonable time frame but undue circumstances could prevent a re-calculation from happening as fast as we would like and the 90 day limit opens the door for a possible compliance violation.R3. Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service. [Violation Risk Factor: Medium] [Time Horizon: Same-day Operations] In this requirement we do not like only being able to have ATEC out of service for up to 24 hours per calendar quarter. This requirement is in the current BAL-004-WECC-1 standard and we almost ran into issues when we had to take a generator offline. The 24 hours per calendar quarter seems like a very small time

Organization	Yes or No	Question 5 Comment
		frame given certain system conditions or events.

Response:

- Regarding the comment for R1: As long as corrections for errors are made within the 90-day limit per Requirement R2, the standard does not prescribe when those corrections should be made to Primary Inadvertent Interchange. If a Balancing Authority institutes good controlling practices, a single month-end meter correction should not result in a violation the 150 percent limit for either the on-peak or off-peak period.
- Regarding the comment for R2: The drafting team believes that 90 days are sufficient for correcting an error.
- Regarding the comment for R3: The drafting team believes the accumulative 24-hour exception period per quarter in Requirement R3 is the appropriate amount of time for ATEC to be out of service. By having an exception period in Requirement R3 the drafting team recognizes that there are times when Balancing Authorities are required to or have no choice other than to operate in other modes. The intent of the drafting team is to minimize these periods. Balancing Authorities should have policies and procedures in place to maintain control and to meet these time frames.

END OF REPORT

Modification of BAL-004-WECC-1

WECC-0068 is a Request to: 1) implement clarifying modifications as directed by FERC, 2) make additional changes as necessary to clarify the existing standard Requirements, and 3) seek a variance to existing NERC Standards or other clarification that the Balancing Authorities in the Western Interconnection shall use the Automatic Time Error Correction Area Control Error for control and reporting purposes.

SAR Information

Click Here to view the SAR

WECC Site News

There are currently no active announcements.

Development History

Version and Associated Documents for Comment	Action Item (30/45 Day/Final Posting)	Comments Window	Responses to Comments	Responses Posted	Notes
WECC-0068 BAL-001-0 1a WECC Regional Variance Version 5 Clean.docx WECC-0068 BAL-001-0 1a WECC Regional Variance Version 5 2-20-12 redline to 1-18-12.docx WECC-0068 BAL-001-0 1a WECC Regional Variance Version 5 redline to NERC.docx WECC-0068 BAL-004-WECC-2 Version 5 Clean.docx WECC-0068 BAL-004-WECC-2 Version 5 2-20-12 redline to 1-18-12.docx WECC-0068 BAL-004-WECC-2 Version 5 redline to Original.docx WECC-0068 Mapping Document and Issues Table for BAL-	Posting 5 to the OC for Approval These documents are simultaneously posted for 30-day comment. Non-substantive changes have been made to the preamble of BAL-001-0.1a and the background section of BAL-004-WECC-02. A substantive change has been made to R1 of BAL-004-WECC-02 in that the word "monthly" has been removed. No further changes have been made.	Open: February 23, 2012 Closed: March 25, 2012 MIDNIGHT (Mountain)	WECC-0068 BAL-004-WECC-1 Consideration of Comments Posting 5 7-11-2012.docx Responses to the NERC 45-Day Posting are found here: WECC-0068 Attachment V Version 1 NERC Cons of Comments BAL-004-WECC-1.docx WECC-0068 Attachment W Version 1 NERC Cons of Comments BAL-001-0-1.a.docx	NOTE: No substantive Comments were received on this WECC posting - only a statement in agreement.	NERC filing is being compiled. This document is targeted for presentation to the NERC BOT in December 2012. On 6/26/2012, this document was approved by the WECC Board of Directors. On 5/18/2012, this document was approved by the WECC Ballot Pool.

004-WECC-2 and Variance to BAL-001-0 1a 2-20-12.docx					
WECC-0068 BAL-001-0 1a WECC Regional Variance Posting 4 1-18-12.docx WECC-0068 BAL-001-0 1a WECC Regional Variance Posting 4 4 1-18-12 redline to NERC.docx WECC-0068 BAL-004-WECC-2 Posting 4 1-18-12.docx WECC-0068 BAL-004-WECC-2 Posting 4 1-18-12 redline to Original.docx WECC-0068 Mapping Document and Issues Table for BAL-004-WECC-2 and Variance to BAL-001-0 1a 1-18-12.docx	Posting 4 to the OC for Approval	NA	NA	NA	Although forwarded to the Operating Committee for approval at the March 2012 Operating Committee meeting, on March 1, 2012 the Reliability Standards Development Procedures superseded the Process for Developing and Approving WECC Standards. Version 4 was never posted for comment. Version 4 became Version 5. . WECC-0068 Transmittal Letter Mraz to OC 2-3-2012.doc
WECC-0068 BAL-001-0 1a WECC Regional Variance Posting 3 12-12-11.docx WECC-0068 BAL-001-0 1a WECC Regional Variance Posting 3 12-12-11redline.docx WECC-0068 BAL-004-WECC-2 Posting 3 12-12-11.docx WECC-0068 BAL-004-WECC-2 Posting 3 12-12-11redline.docx WECC-0068 Mapping Document and Issues Table for BAL-004-WECC-2 and Variance to BAL-001-0 1a 12-13-11.docx	Posting 3	Open: December 15, 2011 Closed: January 16, 2012	WECC-0068 BAL-004-WECC-1 Consideration of Comments Posting 3 2-3-2012.docx	February 3, 2012	
WECC-0068 BAL-001-0 1a WECC Regional Variance Posting 2 11-4-2011 Clean.docx	Posting 2	Open: November 4, 2011 Closed: December 5, 2011	WECC-0068 BAL-004-WECC-1 Consideration of Comments Posting 2_12-13-11.docx	December 13, 2011	

WECC-0068 BAL-001-0 1a WECC Regional Variance Posting 2 11-4-2011 Redline.docx WECC-0068 BAL-001-0 1a WECC Regional Variance Posting 2 11-4-2011 Redline NERC Doc.docx WECC-0068 BAL-004-WECC-2 Posting 2 11-3-11 Clean.docx WECC-0068 BAL-004-WECC-2 Posting 2 11-3-11 Redline.docx WECC-0068 Consolidation of NERC and Control ACEs 11-4-11.docx WECC-0068 Attachment 2 - WECC Frequency Bias Posting 2 11-3-11.xlsm WECC-0068 Mapping Document and Issues Table for BAL-004-WECC-2 and Variance to BAL-001-0 1a_11-3-11.docx					
WECC-0068 BAL-001-0 1a WECC VAR 4-15-11 Clean.docx WECC-0068 BAL-001-0 1a WECC VAR 4-15-11 Redline.docx WECC-0068 BAL-004-WECC-1 Revisions 4-15-11.docx WECC-0068 BAL-004-WECC-2 4-15-11 Clean.docx WECC-0068 BAL-004-WECC-2 4-15-11 Redline.docx	Posting 1	Open: April 15, 2011 Closed: June 1, 2011	WECC-0068 BAL-004-WECC-1 Consideration of Comments Posting 1.docx	June 29, 2011	

WECC-0068 Modification To BAL-004-WECC-1 Posting Of Version 5 (There Was No Posting 4 For Comment.)

Survey Name:	WECC-0068 Modification to BAL-004-WECC-1 Posting of Version 5 (There was no Posting 4 for Comment.)
Survey Description:	WECC-0068 Modification of BAL-004-WECC-1 has been posted for 30-Day Comment. This window closes at MIDNIGHT (Mountain) on March 25, 2012. Non-substantive changes have been made to the preamble of BAL-001-0.1a and the background section of BAL-004-WECC-02. A substantive change has been made to R1 of BAL-004-WECC-02 in that the word "monthly" has been removed. No other substantive changes have been made. This document is simulatenously posted for comment regarding the change to R1 only. The drafting team will meet on March 26, 2012 to determine whether additional substantive changes are needed. If so, the documents will be pulled from the Operating Committee's approval agenda. Please confine all comments to the change in R1 of BAL-004-WECC-02.
Time Created:	2/23/2012 3:27 PM
Number of Responses:	1

Show a graphical summary of responses
Show all responses

WECC-0068 Modification To BAL-004-WECC-1 Posting 3

Survey Name:	WECC-0068 Modification to BAL-004-WECC-1 Posting 3
Survey Description:	WECC-0068 Modification of BAL-004-WECC-1 has been posted for 30-Day Comment. The window closes January 16, 2012.
Time Created:	12/13/2011 6:02 PM
Number of Responses:	2

Show a graphical summary of responses
Show all responses

WECC-0068 Modification To BAL-004-WECC-1 Posting 2

Survey Name:	WECC-0068 Modification to BAL-004-WECC-1 Posting 2
Survey Description:	WECC-0068 Modification of BAL-004-WECC-1 has been posted for 30-Day Comment. The comment window closes December 5, 2011.
Time Created:	6/30/2011 2:48 PM
Number of Responses:	5

Show a graphical summary of responses
Show all responses

WECC-0068 Modification To BAL-004-WECC-1 Posting 1

(More Items...)

Documents

Name	Modified
NERC Filing - Final Filing 10-24-2012	10/24/2012 10:11 AM
Posting 1 NERC 45 Day	8/15/2012 9:18 AM
Posting 5 to OC	2/22/2012 4:16 PM
Posting 4 to OC	2/3/2012 1:13 PM
	12/13/2011 5:51 PM

Staff Support

Steve Rueckert
(801) 883-6878

Posting 3	
Posting 2	11/4/2011 12:07 PM
Posting 1	4/14/2011 3:15 PM
BAL-004-WECC-2 ballot comments	5/25/2012 9:32 AM
BAL-001-0_1a	5/24/2012 1:58 PM
BAL-001-0-1a	5/24/2012 1:58 PM
WECC-0068 NERC Notice for January Meetings	1/25/2012 10:11 AM
WECC-0068 NERC Notice for December Meetings	12/1/2011 1:20 PM

(More Items...)

Standards Authorization Request
WECC-0068 Modification of BAL-004-WECC-1
Automatic Time Error Correction (ATEC)
Attachment A

Title	WECC-0068 Modification of BAL-004-WECC-1
First Name	Steve
Last Name	Rueckert
Email	steve@wecc.biz
Phone Number	801 883-6878
Fax	801 582-0353
Organization	WECC
Alternate Contact	Shannon Black
Request Type	Revision to Existing Standard
Issue	In the order approving BAL-004-WECC-1 the Federal Energy Regulatory Commission (FERC) directed the Western Electricity Coordinating Council (WECC) to make several clarifying modifications to the standard. FERC directed WECC to use the FERC-approved Process for Developing and Approving WECC Standards to make those clarifying modifications. In addition, WECC staff has taken the opportunity to make additional modifications to the existing standard to clarify the intent without changing the requirements. There is also confusion in Requirement R3 that the Area Control Error (ACE) used for North America Electricity Corporation (NERC) reports shall be the same ACE as the Automatic Generation Control (AGC) operating mode in use. This seems to conflict with the NERC response to Notice of Proposed Rulemaking comments that entities may use ATEC ACE for control but should use Raw ACE for reporting.
Purpose	Implement clarifying modifications as directed by FERC. Make additional changes as necessary to clarify the existing standard requirements. Seek a variance to existing NERC Standards or other clarification that the Balancing Authorities (BA) in the Western Interconnection shall use ATEC ACE for control and reporting purposes
Responsible Entities	Balancing Authority
Notes	
Detailed Description	The BAs would continue to be required to meet the requirements of the

	BAL-004-WECC-1 Standard. Requested modifications are for clarity.
Preliminary Technical Assessment and Reference Documents	None
Does the proposed request comply with all of the following Market Interface Principles?	1. The planning and operation of bulk electric systems shall recognize that reliability is an essential requirement of a robust North American economy, 2. Standard or Criterion shall not give any market participant an unfair competitive advantage, 3. Standard or Criterion shall neither mandate nor prohibit any specific market structure, 4. Standard or Criterion shall not preclude market solutions to achieving compliance with that Standard, 5. Standard or Criterion shall not require the public disclosure of commercially sensitive information.
Reliability Principles	1. Interconnected bulk electric systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions
Merchant Function	
Related Standards/Criterion	NERC BAL-001 Bal-004-WECC-1: http://www.wecc.biz/Standards/Approved%20Standards/BAL-004-WECC-1.pdf
Is this Request in response to a NERC "Fill-in-the-Blank" Standard?	
Attachments	Order 723 - Snapshot.doc

*** * * * * * STAFF ONLY * * * * * ***

Status	Board approved June 25, 2012.
Comment	Pre-SRRC Notice to Rueckert on 10/12/09. Pre-SRRC comments close 10/30/09. SRRC Notice to Rueckert 10/26/09; goal SRRC meet 11/2/09. Now waiting for PWG meeting to occur on 11/3; then have SRRC determine.
WECC Tracking Number	WECC-0068
Date Assigned to SC	12/1/2009
Drafting Next Meeting	3/23/2012
Standing	
SC Assigned to Draft	OC/Mraz/Wilson
Board	6/25/2012
Archive/Withdrawn Date	

URL	WECC-0068 Modification of BAL-004-WECC-1
Grouping	WECC Standards
NERC/WECC Standard/Criterion Number	BAL-004-WECC-1

Posting 1

Document Title	WECC Regional Variance to NERC Standard BAL-001-0.1a
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Regional Variance 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.

Development Steps Completed:

Completed Actions	Completion Date
• Request received	9/26/2009
• Requested deemed Complete/Valid/Team Site created	10/6/2009
• Pre-SRRC Announcement	10/16/2009
• SRRC notified	10/26/2009
• SRRC assigned the Request to Standing Committee • Due to lack of manpower/resources this request was placed on hold until July 2010, by Mr. Don Watkins, OC chair.	11/2009
• Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair.	7/16/2010
• Drafting team (DT) announced / notice sent to DT members	7/16/2010
• Notice of Development / First 30-day notice	9/2/2010
• New OC chair orientation meeting	8/18/2010
• First DT meeting (sequence may vary for items #6-9 depending on SC's DT assignment choice)	11/10/10
• Notice of concurrence sent by DT (See Step 3) • New meeting announcement / also included in first meeting minutes	11/10/2010
• DT meetings completed	12/15/10 1/18/11 2/10/11 3/11-12/11
• Complete first draft of Complete Quality Control Checklist	4/13/2011
• Post first draft for 45-day comment period	4/15/2011

Description of Current Draft:

In FERC Order No.723 to Docket No. RM08-12-000, issued May 29, 2009, approving BAL-004-WECC-1; FERC directed WECC to make several clarifying modifications to the standard. FERC directed WECC to go through the FERC-approved Process for Developing and Approving WECC Standards to make the clarifying modifications. In addition, WECC staff identified additional modifications that needed to be

made to the existing standard, to clarify the intent without changing the requirements. There is also confusion regarding the requirement that the Area Control Error (ACE) equation used for NERC reports shall be the same ACE equation as the AGC operating mode in use. This seems to conflict with the NERC response to the NOPR comments that entities may use an ATEC ACE equation with automatic time error correction (ATEC ACE) for control, but should use Raw ACE for reporting.

The purpose of this proposed WECC Regional Variance is to replace requirements R1 and Section D Compliance 2 in the existing NERC BAL-001-0.1a standard with three new requirements. In requirement E.B.1, the drafting team proposes to replace the NERC ACE equation with an ACE equation that includes the ATEC term. By replacing the NERC Raw ACE equation with the ATEC ACE equation through a Regional Variance, it will permit the Western Interconnection to use the ATEC ACE for control and reporting purposes.

In order to obtain a Regional Variance[1] to a NERC Reliability Standard, it must be demonstrated that:

- The variance is not inconsistent with or less stringent than the NERC reliability standard;
- Is necessitated by a physical difference; or
- Is an alternative methodology with the same reliability objective.

.

The drafting team for Project WECC-0068 also requests withdrawal of BAL-001-1.1a Appendix 2 Interpretation of requirement R1. By creating a Regional Variance that replaces requirement R1, the interpretation for requirement R1 is no longer needed.

Replacing the NERC ACE equation with an ATEC ACE equation is an alternative methodology with the same reliability objective as the existing BAL-001-0.1a standard, because it is a method of automatically scheduling Primary Inadvertent Interchange (PII) back to other Balancing Authorities. The inclusion of the Automatic Time Error Correction term in the ACE equation changes the Balancing Authority's target control point. The current NERC ACE equation requires that Balancing Authorities control the frequency and Interchange within their Balancing Authority Area to a target point of zero, but it allows the control to stay within a predefined range of $\pm L_{10}$. The proposed ACE equation, with an Automatic Time Error adjustment, works similarly to the NERC equation; however, the target point for control is adjusted by the Automatic Time Error Control adjustment (ATEC). The ATEC component defines a new control point that is limited by $L_{10,}$ and is equivalent to making an interchange schedule that would automatically payback Primary Inadvertent Interchange. The modification to the ACE equation is equivalent to making an interchange schedule or making an adjustment because of a metering error. Since the amount of the adjustment during any one hour is limited by L_{10}, Balancing Authorities automatically limit the risk and the amount of the transaction. If Balancing Authorities permit the ATEC component $\boldsymbol{(I_{ATEC})}$ to exceed L_{10}, there is potential for CPS2 violations and poor frequency control.
The drafting team is proposing to keep the same violation severity levels in the Regional Variance to the NERC standard because it is a measurement of how well a Balancing Authority is measuring to its point of control. The addition of $\boldsymbol{I_{ATEC}}$ to the ACE equation adjusts the target point for controlling frequency and interchange. The risk to reliability is increased because limits are set in the magnitude of the $\boldsymbol{I_{ATEC}}$

[1] "Entity variance" means an aspect of a reliability standard that applies only within a particular entity or a subset of entities within a limited portion of a regional entity, such as a variance that would apply to a regional transmission organization or particular market or to a subset of bulk power system owners, operators or users. An entity variance may not be inconsistent with or less stringent than the reliability standards as it would otherwise exist without the entity variance. An entity variance shall be approved only through the NERC standards development procedure and shall be made part of the NERC reliability standards."

adjustment. Therefore, the addition of the $\boldsymbol{I_{ATEC}}$ component meets the standard of justification for a Regional Variance as an alternative methodology, with the same reliability objective as the NERC Reliability Standard. In addition, the proposed WECC variance to BAL-001-1.1a is not inconsistent with — or less stringent than — the NERC BAL-001-0.1a Reliability Standard.

Balancing Authorities in the Western Interconnect are to use ATEC ACE for control. In WECC's variance to NERC BAL-001-0.1a, Balancing Authorities in the Western Interconnection are permitted to operate synchronously to the Interconnection, while automatically correcting time error thus mitigating Inadvertent Interchange. The ATEC component in the ACE equation has been effective in mitigating two main issues in the Western Interconnection. First, it has been used to reduce manual time error corrections, or the amount of manual adjustments of timing errors that accumulate on clocks, which mark certain interconnection scheduled frequency deviations. Second, since time error is directly related to Inadvertent Interchange, the procedure has been used to reduce accumulated Inadvertent Interchange, or the difference between the actual and scheduled interchange. The use of ATEC has reduced the number of hours of Manual Time Error Correction for the Western Interconnection.

The ATEC procedure effectively reduces the Manual Time Error Corrections by requiring Balancing Authorities in the Western Interconnection to determine their contribution to the Interconnection time error. The Balancing Authority does this by calculating its Primary Inadvertent Interchange (PII). The BAL-004-WECC-01 standard requires that each Balancing Authority calculate its PII from its hourly Inadvertent Interchange, and feed the resulting PII into its Area Control Error or ACE equation to continuously correct for its portion of the time error automatically, as opposed to manually, as specified in the continent-wide standard on Time Error Correction BAL-004-1. Although the maximum payback is bounded between limits, the continuous correction enables equitable payback of Inadvertent Interchange.

Future Development Plan:

Anticipated Actions	Anticipated Date
• Meet to answer to comments, address impact statement, draft responses	06/03/2011
• Post responses to comments	06/30/2011
• Post the second draft for 30-day comment period	06/30/2011
• Meet to answer to comments, address impact statement, draft responses	08/13/2011
• Post responses to comments	08/02/2011
• Post draft standard for 45-day NERC comment period	08/2011
• NERC comment period ends	09/30/ 2011
• Post for comment and Operating Committee approval	09/09/2011
• Operating Committee approves proposed standard	10/13-15/ 2011
• Post draft standard for WECC Board approval	10/2011
• WECC Board approves proposed standard	11-12/2011
• Post draft standard for 15-day NERC comment period	12/2011
• NERC comment period ends	01/2012

Anticipated Actions	Anticipated Date
• DT completes review and consideration of industry comments to NERC posting	01/2012
• Submit NERC Board of Trustees approval request	01/2012
• Receive NERC Board approval	02/2012

.

Implementation Plan

The Implementation Plan is to make the Regional Variance to NERC Reliability Standard BAL-001-0.1a and the WECC Regional Reliability Standard BAL-004-WECC-2 effective on the first day of the second quarter, after FERC approval. Since entities are already controlling with the ATEC ACE equation, but are reporting using the NERC Raw ACE equation for reporting CPS1, the transition to controlling and reporting using the ATEC ACE should be minimal. It should not require much time to implement the limits and actions needed when a BA's Accumulated Primary Inadvertent Interchange exceeds the defined limits.

Definitions of Terms Used in Regional Variance to a NERC 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 definitions will be removed from the standard and added to the Glossary.

None

A. Introduction

1. Title: **Real Power Balancing Control Performance**

2. Number: BAL-001-0.1a

3. Purpose: To maintain Interconnection steady-state frequency within defined limits by balancing real power demand and supply in real-time.

4. Applicability:

4.1. Balancing Authorities

5. Effective Date: WECC Regional Variance Standard to BAL-001-0.1a effective on the first day of the second quarter, after FERC approval.

B. Requirements

R1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit ε_1^2 is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \in_1^2 \; or \; \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\in_1^2} \le 1$$

The equation for ACE is:

$ACE = (NI_A - NI_S) - 10B\,(F_A - F_S) - I_{ME}$

where:

- NI_A is the algebraic sum of actual flows on all tie lines.
- NI_S is the algebraic sum of scheduled flows on all tie lines.
- B is the Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.
- F_A is the actual frequency.
- F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.
- I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

R2. Each Balancing Authority shall operate such that its average ACE for at least 90% of clock-ten-minute periods (6 non-overlapping periods per hour) during a calendar month is within a specific limit, referred to as L_{10}.

$$AVG_{10-\text{minute}}(ACE_i) \le L_{10}$$

where:

$$L_{10} = 1.65 \in_{10} \sqrt{(-10B_i)(-10B_s)}$$

ε_{10} is a constant derived from the targeted frequency bound. It is the targeted root-mean-square (RMS) value of ten-minute average Frequency Error based on frequency performance over a given year. The bound, ε_{10}, is the same for every Balancing Authority Area within an Interconnection, and B_s is the sum of the Frequency Bias Settings of the Balancing Authority Areas in the respective Interconnection. For Balancing Authority Areas with variable bias, this is equal to the sum of the minimum Frequency Bias Settings.

R3. Each Balancing Authority providing Overlap Regulation Service shall evaluate Requirement R1 (i.e., Control Performance Standard 1 or CPS1) and Requirement R2 (i.e., Control Performance Standard 2 or CPS2) using the characteristics of the combined ACE and combined Frequency Bias Settings.

R4. Any Balancing Authority receiving Overlap Regulation Service shall not have its control performance evaluated (i.e. from a control performance perspective, the Balancing Authority has shifted all control requirements to the Balancing Authority providing Overlap Regulation Service).

C. Measures

M1. Each Balancing Authority shall achieve, as a minimum, Requirement 1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-\text{month}}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement R1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{sampling cycles in clock-minute}}}{n_{\text{sampling cycles in clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{sampling cycles in clock-minute}}}{n_{\text{sampling cycles in clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B} \right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}} \right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error will be used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minute samples in hour}}}$$

The reporting Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-hour average-month}} = \frac{\sum_{\text{days-in-month}} [(\text{CF}_{\text{clock-hour}})(n_{\text{one-minute samples in clock-hour}})]}{\sum_{\text{days-in month}} [n_{\text{one-minute samples in clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}} [(\text{CF}_{\text{clock-hour average-month}})(n_{\text{one-minute samples in clock-hour averages}})]}{\sum_{\text{hours-in day}} [n_{\text{one-minute samples in clock-hour averages}}]}$$

The 12-month compliance factor becomes:

$$\text{CF}_{\text{12-month}} = \frac{\sum_{\text{i=1}}^{12} (CF_{\text{month-i}})(n_{(\text{one-minute samples in month})-\text{i}})]}{\sum_{\text{i=1}}^{12} [n_{(\text{one-minute samples in month})\text{-i}}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

M2. Each Balancing Authority shall achieve, as a minimum, Requirement R2 (CPS2) compliance of 90%. CPS2 relates to a bound on the ten-minute average of ACE. A compliance percentage is calculated as follows:

$$CPS2 = \left[1 - \frac{\text{Violations}_{\text{month}}}{\left(\text{Total Periods}_{\text{month}} - \text{Unavailable Periods}_{\text{month}}\right)}\right] * 100$$

The violations per month are a count of the number of periods that ACE clock-ten-minutes exceeded L_{10}. ACE clock-ten-minutes is the sum of valid ACE samples within a clock-ten-minute period divided by the number of valid samples.

Violation clock-ten-minutes

= 0 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| \leq L_{10}$$

= 1 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| > L_{10}$$

Each Balancing Authority shall report the total number of violations and unavailable periods for the month. L_{10} is defined in Requirement R2.

Since CPS2 requires that ACE be averaged over a discrete time period, the same factors that limit total periods per month will limit violations per month. The calculation of total periods per month and violations per month, therefore, must be discussed jointly.

A condition may arise which may impact the normal calculation of total periods per month and violations per month. This condition is a sustained interruption in the recording of ACE.

In order to ensure that the average ACE calculated for any ten-minute interval is representative of that ten-minute interval, it is necessary that at least half the ACE data samples are present for that interval. Should half or more of the ACE data be unavailable due to loss of telemetering or computer unavailability, that ten-minute interval shall be omitted from the calculation of CPS2.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Regional Reliability Organization.

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar month.

1.3. Data Retention

The data that supports the calculation of CPS1 and CPS2 (Appendix 1-BAL-001-0) are to be retained in electronic form for at least a one-year period. If the CPS1 and CPS2 data for a Balancing Authority Area are undergoing a review to address a question that has been raised regarding the data, the data are to be saved beyond the normal retention period until the question is formally resolved. Each Balancing Authority shall retain for a rolling 12-month period the values of: one-minute average ACE (ACE_i), one-minute average Frequency Error, and, if using variable bias, one-minute average Frequency Bias.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance – CPS1

2.1. Level 1: The Balancing Authority Area's value of CPS1 is less than 100% but greater than or equal to 95%.

2.2. Level 2: The Balancing Authority Area's value of CPS1 is less than 95% but greater than or equal to 90%.

2.3. Level 3: The Balancing Authority Area's value of CPS1 is less than 90% but greater than or equal to 85%.

2.4. Level 4: The Balancing Authority Area's value of CPS1 is less than 85%.

3. Levels of Non-Compliance – CPS2

3.1. Level 1: The Balancing Authority Area's value of CPS2 is less than 90% but greater than or equal to 85%.

3.2. Level 2: The Balancing Authority Area's value of CPS2 is less than 85% but greater than or equal to 80%.

3.3. Level 3: The Balancing Authority Area's value of CPS2 is less than 80% but greater than or equal to 75%.

3.4. Level 4: The Balancing Authority Area's value of CPS2 is less than 75%.

E. Regional Variances

E.A. The ERCOT Control Performance Standard 2 Waiver approved November 21, 2002.

E.B. Regional Variance for the Western Electricity Coordinating Council

The following Interconnection-wide variance shall be applicable in the Western Electricity Coordinating Council (WECC) and replaces, in their entirety Requirement R1 and Section D. Compliance 2. Please note that the ACE equation is replaced in its entirety with the following equation.

Requirements and Measures[1]

E.B.1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit $\in_1^2$ is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

[1] The number for each measure corresponds with the number for each requirement, i.e. M.E.B.1 means the measure for requirement E.B.1.

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \in_1^2 \; or \; \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\in_1^2} \le 1$$

The equation for ACE in the Western Interconnection is:

$$ACE = (NI_A - NI_S) - 10B(F_A - F_S) - I_{ME} + I_{ATEC}$$

Where:

NI_A is the algebraic sum of actual flows on all tie lines.

F_A is the actual frequency.

F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.

B = Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.

I_{ME} = **Meter Error Correction (MW)** that is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

Rationale for E.B.1

Assumption: Controlling a Balancing Authority Area using the ACE equation with an ATEC correction component will not reduce reliability.

Justification: Adding the $\boldsymbol{I_{ATEC}}$ term to the ACE equation reduces number of manual time error corrections and PII_{accum}.

Goal: To establish an ACE equation that permits the implementation of automatic time error correction.

$I_{ATEC} = \frac{PII_{accum}^{on/off\ peak}}{(1-Y)*H}$ when operating in Automatic Time Error Correction control mode. I_{ATEC} shall be zero when operating in any other AGC mode.

NI_S is the algebraic sum of scheduled flows on all tie lines.

Y = B / B_S.

H = Number of Hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3.

B_S = Frequency Bias for the Interconnection (MW / 0.1 Hz).

Primary **I**nadvertent **I**nterchange **(PII_{hourly})** is **(1-Y) * (II_{actual} - B * ΔTE/6)**

II_{actual} is the hourly Inadvertent Interchange for the last hour.

ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where:

$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE_{offset})$

TD_{adj} is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks.

t is the number of minutes of Manual Time Error Correction that occurred during the hour.

TE_{offset} is 0.000 or +0.020 or -0.020.

$PII_{accum}^{on/off\ peak}$ is the Balancing Authority's accumulated **PII_{hourly}** in MWh. An On-Peak and Off-Peak accumulation accounting is required.

Where:

$$PII_{accum}^{on/off\ peak} = \textbf{last period's } PII_{accum}^{on/off\ peak} + PII_{hourly}$$

[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]

M.E.B.1. Each Balancing Authority shall have and provide upon request evidence that it operated such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit that demonstrates compliance with requirement E.B.1. This limit is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

E.B.2. Each Balancing Authority shall limit the absolute value of I_{ATEC}, the Automatic Time Error Correction term as follows: *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*

$$\left| \boldsymbol{I_{ATEC}} \right| \leq L_{max}$$

M.E.B.2. Each Balancing Authority shall have and provide upon request evidence that its absolute value for I_{ATEC} is less than or equal to $\boldsymbol{L_{max}}$. Acceptable evidence is dated Energy Management System (EMS) displays, WECC Western Interchange Tool, EMS application code, or other archived data that demonstrates compliance with requirement E.B.2.

Rationale for E.B.2

Assumption: Large adjustments in $\boldsymbol{I_{ATEC}}$ may result in CPS2 violations.

Justification: Balancing Authorities should not violate CPS2.

Goal: The goal of requirement E.B.2 is to limit $\boldsymbol{I_{ATEC}}$ so that Balancing Authorities do not experience CPS2 violations.

E.B.3. Each Balancing Authority shall set L_{max} within the limits as follows:

$$0.20 * |B| \leq L_{max} \leq L_{10}$$

[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]

Rationale for E.B.3

Assumption: Operating within an L_{max} less than 0.02 * |B| may not provide sufficient correction for PII and operating with an L_{max} greater than L_{10} may result in CPS2 violations.

Justification: L_{max} should be limited to prevent Balancing Authorities from violating CPS2.

Goal: The goal of requirement E.B.3 is to develop a range for L_{max} where Balancing Authorities are less likely to experience CPS2 violations.

Adopted by NERC Board of Trustees:
Mandatory Effective Date:
Developed as: **WECC-0068**

M.E.B.3. A Balancing Authority shall have and provide upon request evidence that demonstrates L_{max} is within the limits in requirement R3. Acceptable evidence is dated Energy Management System (EMS) displays, WECC Western Interchange Tool, EMS application code, or other archived data that demonstrates compliance with requirement E.B.3.

Table of Compliance Elements

E #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
E.B.1	Real-time Operations	Medium	The Balancing Authority Area's value of CPS1 is less than 100% but greater than or equal to 95%.	The Balancing Authority Area's value of CPS1 is less than 95% but greater than or equal to 90%.	The Balancing Authority Area's value of CPS1 is less than 90% but greater than or equal to 85%.	The Balancing Authority Area's value of CPS1 is less than 85%.
E.B.2	Real-time Operations	Medium	N/A	N/A	N/A	The Balancing Authority Area's absolute value for $\boldsymbol{I_{ATEC}}$ is greater than L_{max}.
E.B.3	Operations Planning	Medium	N/A	N/A	N/A	The Balancing Authority did not set L_{max} to within the limits in E.B.3 i.e. $(.0.20 * \|B\| \leq L_{max} \leq L_{10})$

F. Associated Documents

E.A. Appendix 2 — Interpretation of Requirement R1 (October 23, 2007).

Version History

Version	Date	Action	Change Tracking
0	February 8, 2005	BOT Approval	New
0	April 1, 2005	Effective Implementation Date	New
0	August 8, 2005	Removed "Proposed" from Effective Date	Errata
0	July 24, 2007	Corrected R3 to reference M1 and M2 instead of R1 and R2	Errata
0a	December 19, 2007	Added Appendix 2 – Interpretation of R1 approved by BOT on October 23, 2007	Revised
0a	January 16, 2008	In Section A.2., Added "a" to end of standard number In Section F, corrected automatic numbering from "2" to "1" and removed "approved" and added parenthesis to "(October 23, 2007)"	Errata
0	January 23, 2008	Reversed errata change from July 24, 2007	Errata
0.1a	October 29, 2008	Board approved errata changes; updated version number to "0.1a"	Errata
0.1a	May 13, 2009	Approved by FERC	
		WECC Regional Variance	

Appendix 1-BAL-001-0
CPS1 and CPS2 Data

CPS1 DATA	Description	Retention Requirements
ε_1	A constant derived from the targeted frequency bound. This number is the same for each Balancing Authority Area in the Interconnection.	Retain the value of ε_1 used in CPS1 calculation.
ACE_i	The clock-minute average of ACE.	Retain the 1-minute average values of ACE (525,600 values).
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value(s) of B_i used in the CPS1 calculation.
F_A	The actual measured frequency.	Retain the 1-minute average frequency values (525,600 values).
F_S	Scheduled frequency for the Interconnection.	Retain the 1-minute average frequency values (525,600 values).

CPS2 DATA	Description	Retention Requirements
V	Number of incidents per hour in which the absolute value of ACE clock-ten-minutes is greater than L_{10}.	Retain the values of V used in CPS2 calculation.
ε_{10}	A constant derived from the frequency bound. It is the same for each Balancing Authority Area within an Interconnection.	Retain the value of ε_{10} used in CPS2 calculation.
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value of B_i used in the CPS2 calculation.
B_s	The sum of Frequency Bias of the Balancing Authority Areas in the respective Interconnection. For systems with variable bias, this is equal to the sum of the minimum Frequency Bias Setting.	Retain the value of B_s used in the CPS2 calculation. Retain the 1-minute minimum bias value (525,600 values).
U	Number of unavailable ten-minute periods per hour used in calculating CPS2.	Retain the number of 10-minute unavailable periods used in calculating CPS2 for the reporting period.

Document Title	WECC Regional Variance to NERC Standard BAL-001-0.1a
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Regional Variance 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.

Development Steps Completed:

Completed Actions	Completion Date
• Request received	9/26/2009
• Requested deemed Complete/Valid/Team Site created	10/6/2009
• Pre-SRRC Announcement	10/16/2009
• SRRC notified	10/26/2009
• SRRC assigned the Request to Standing Committee • Due to lack of manpower/resources this request was placed on hold until July 2010, by Mr. Don Watkins, OC chair.	11/2009
• Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair.	7/16/2010
• Drafting team (DT) announced / notice sent to DT members	7/16/2010
• Notice of Development / First 30-day notice	9/2/2010
• New OC chair orientation meeting	8/18/2010
• First DT meeting (sequence may vary for items #6-9 depending on SC's DT assignment choice)	11/10/10
• Notice of concurrence sent by DT (See Step 3) • New meeting announcement / also included in first meeting minutes	11/10/2010
• DT meetings completed	12/15/10 1/18/11 2/10/11 3/11-12/11
• Complete first draft of Complete Quality Control Checklist	4/13/2011
• Post first draft for 45-day comment period	4/15/2011

Description of Current Draft:

In FERC Order No.723 to Docket No. RM08-12-000, issued May 29, 2009, approving BAL-004-WECC-1; FERC directed WECC to make several clarifying modifications to the standard. FERC directed WECC to go through the FERC-approved Process for Developing and Approving WECC Standards to make the clarifying modifications. In addition, WECC staff identified additional modifications that needed to be

made to the existing standard, to clarify the intent without changing the requirements. There is also confusion regarding the requirement that the Area Control Error (ACE) equation used for NERC reports shall be the same ACE equation as the AGC operating mode in use. This seems to conflict with the NERC response to the NOPR comments that entities may use an ATEC ACE equation with automatic time error correction (ATEC ACE) for control, but should use Raw ACE for reporting.

The purpose of this proposed WECC Regional Variance is to replace requirements R1 and Section D Compliance 2 in the existing NERC BAL-001-0.1a standard with three new requirements. In requirement E.B.1, the drafting team proposes to replace the NERC ACE equation with an ACE equation that includes the ATEC term. By replacing the NERC Raw ACE equation with the ATEC ACE equation through a Regional Variance, it will permit the Western Interconnection to use the ATEC ACE for control and reporting purposes.

In order to obtain a Regional Variance[1] to a NERC Reliability Standard, it must be demonstrated that:

- The variance is not inconsistent with or less stringent than the NERC reliability standard;
- Is necessitated by a physical difference; or
- Is an alternative methodology with the same reliability objective.

The drafting team for Project WECC-0068 also requests withdrawal of BAL-001-1.1a Appendix 2 Interpretation of requirement R1. By creating a Regional Variance that replaces requirement R1, the interpretation for requirement R1 is no longer needed.

Replacing the NERC ACE equation with an ATEC ACE equation is an alternative methodology with the same reliability objective as the existing BAL-001-0.1a standard, because it is a method of automatically scheduling Primary Inadvertent Interchange (PII) back to other Balancing Authorities. The inclusion of the Automatic Time Error Correction term in the ACE equation changes the Balancing Authority's target control point. The current NERC ACE equation requires that Balancing Authorities control the frequency and Interchange within their Balancing Authority Area to a target point of zero, but it allows the control to stay within a predefined range of $\pm L_{10}$. The proposed ACE equation, with an Automatic Time Error adjustment, works similarly to the NERC equation; however, the target point for control is adjusted by the Automatic Time Error Control adjustment (ATEC). The ATEC component defines a new control point that is limited by L_{10}, and is equivalent to making an interchange schedule that would automatically payback Primary Inadvertent Interchange. The modification to the ACE equation is equivalent to making an interchange schedule or making an adjustment because of a metering error. Since the amount of the adjustment during any one hour is limited by L_{10}, Balancing Authorities automatically limit the risk and the amount of the transaction. If Balancing Authorities permit the ATEC component (I_{ATEC}) to exceed L_{10}, there is potential for CPS2 violations and poor frequency control.
The drafting team is proposing to keep the same violation severity levels in the Regional Variance to the NERC standard because it is a measurement of how well a Balancing Authority is measuring to its point of control. The addition of I_{ATEC} to the ACE equation adjusts the target point for controlling frequency and interchange. The risk to reliability is increased because limits are set in the magnitude of the I_{ATEC}

[1] "Entity variance" means an aspect of a reliability standard that applies only within a particular entity or a subset of entities within a limited portion of a regional entity, such as a variance that would apply to a regional transmission organization or particular market or to a subset of bulk power system owners, operators or users. An entity variance may not be inconsistent with or less stringent than the reliability standards as it would otherwise exist without the entity variance. An entity variance shall be approved only through the NERC standards development procedure and shall be made part of the NERC reliability standards."

adjustment. Therefore, the addition of the I_{ATEC} component meets the standard of justification for a Regional Variance as an alternative methodology, with the same reliability objective as the NERC Reliability Standard. In addition, the proposed WECC variance to BAL-001-1.1a is not inconsistent with — or less stringent than — the NERC BAL-001-0.1a Reliability Standard.

Balancing Authorities in the Western Interconnect are to use ATEC ACE for control. In WECC's variance to NERC BAL-001-0.1a, Balancing Authorities in the Western Interconnection are permitted to operate synchronously to the Interconnection, while automatically correcting time error thus mitigating Inadvertent Interchange. The ATEC component in the ACE equation has been effective in mitigating two main issues in the Western Interconnection. First, it has been used to reduce manual time error corrections, or the amount of manual adjustments of timing errors that accumulate on clocks, which mark certain interconnection scheduled frequency deviations. Second, since time error is directly related to Inadvertent Interchange, the procedure has been used to reduce accumulated Inadvertent Interchange, or the difference between the actual and scheduled interchange. The use of ATEC has reduced the number of hours of Manual Time Error Correction for the Western Interconnection.

The ATEC procedure effectively reduces the Manual Time Error Corrections by requiring Balancing Authorities in the Western Interconnection to determine their contribution to the Interconnection time error. The Balancing Authority does this by calculating its Primary Inadvertent Interchange (PII). The BAL-004-WECC-01 standard requires that each Balancing Authority calculate its PII from its hourly Inadvertent Interchange, and feed the resulting PII into its Area Control Error or ACE equation to continuously correct for its portion of the time error automatically, as opposed to manually, as specified in the continent-wide standard on Time Error Correction BAL-004-1. Although the maximum payback is bounded between limits, the continuous correction enables equitable payback of Inadvertent Interchange.

Future Development Plan:

Anticipated Actions	Anticipated Date
• Meet to answer to comments, address impact statement, draft responses	06/03/2011
• Post responses to comments	06/30/2011
• Post the second draft for 30-day comment period	06/30/2011
• Meet to answer to comments, address impact statement, draft responses	08/13/2011
• Post responses to comments	08/02/2011
• Post draft standard for 45-day NERC comment period	08/2011
• NERC comment period ends	09/30/ 2011
• Post for comment and Operating Committee approval	09/09/2011
• Operating Committee approves proposed standard	10/13-15/ 2011
• Post draft standard for WECC Board approval	10/2011
• WECC Board approves proposed standard	11-12/2011
• Post draft standard for 15-day NERC comment period	12/2011
• NERC comment period ends	01/2012

Anticipated Actions	Anticipated Date
• DT completes review and consideration of industry comments to NERC posting	01/2012
• Submit NERC Board of Trustees approval request	01/2012
• Receive NERC Board approval	02/2012

.

Implementation Plan

The Implementation Plan is to make the Regional Variance to NERC Reliability Standard BAL-001-0.1a and the WECC Regional Reliability Standard BAL-004-WECC-2 effective on the first day of the second quarter, after FERC approval. Since entities are already controlling with the ATEC ACE equation, but are reporting using the NERC Raw ACE equation for reporting CPS1, the transition to controlling and reporting using the ATEC ACE should be minimal. It should not require much time to implement the limits and actions needed when a BA's Accumulated Primary Inadvertent Interchange exceeds the defined limits.

Definitions of Terms Used in Regional Variance to a NERC 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 definitions will be removed from the standard and added to the Glossary.

None

A. Introduction

1. Title: **Real Power Balancing Control Performance**

2. Number: BAL-001-0.1a

3. Purpose: To maintain Interconnection steady-state frequency within defined limits by balancing real power demand and supply in real-time.

4. Applicability:

4.1. Balancing Authorities

~~**5. Effective Date:** May 13, 2009~~

5. Effective Date: WECC Regional Variance Standard to BAL-001-0.1a effective on the first day of the second quarter, after FERC approval.

B. Requirements

R1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit ε_1^2 is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \epsilon_1^2 \text{ or } \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\epsilon_1^2} \le 1$$

The equation for ACE is:

$ACE = (NI_A - NI_S) - 10B\,(F_A - F_S) - I_{ME}$

where:

- NI_A is the algebraic sum of actual flows on all tie lines.
- NI_S is the algebraic sum of scheduled flows on all tie lines.
- B is the Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.
- F_A is the actual frequency.
- F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.
- I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

R2. Each Balancing Authority shall operate such that its average ACE for at least 90% of clock-ten-minute periods (6 non-overlapping periods per hour) during a calendar month is within a specific limit, referred to as L_{10}.

$$AVG_{10-\text{minute}}(ACE_i) \le L_{10}$$

where:

$$L_{10} = 1.65 \in_{10} \sqrt{(-10B_i)(-10B_s)}$$

ε_{10} is a constant derived from the targeted frequency bound. It is the targeted root-mean-square (RMS) value of ten-minute average Frequency Error based on frequency performance over a given year. The bound, ε_{10}, is the same for every Balancing Authority Area within an Interconnection, and B_s is the sum of the Frequency Bias Settings of the Balancing Authority Areas in the respective Interconnection. For Balancing Authority Areas with variable bias, this is equal to the sum of the minimum Frequency Bias Settings.

R3. Each Balancing Authority providing Overlap Regulation Service shall evaluate Requirement R1 (i.e., Control Performance Standard 1 or CPS1) and Requirement R2 (i.e., Control Performance Standard 2 or CPS2) using the characteristics of the combined ACE and combined Frequency Bias Settings.

R4. Any Balancing Authority receiving Overlap Regulation Service shall not have its control performance evaluated (i.e. from a control performance perspective, the Balancing Authority has shifted all control requirements to the Balancing Authority providing Overlap Regulation Service).

C. Measures

M1. Each Balancing Authority shall achieve, as a minimum, Requirement 1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-\text{month}}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement R1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{sampling cycles in clock-minute}}}{n_{\text{sampling cycles in clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{sampling cycles in clock-minute}}}{n_{\text{sampling cycles in clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B} \right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}} \right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error will be used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minute samples in hour}}}$$

The reporting Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-hour average-month}} = \frac{\sum_{\text{days-in-month}} [(\text{CF}_{\text{clock-hour}})(n_{\text{one-minute samples in clock-hour}})]}{\sum_{\text{days-in month}} [n_{\text{one-minute samples in clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}} [(\text{CF}_{\text{clock-hour average-month}})(n_{\text{one-minute samples in clock-hour averages}})]}{\sum_{\text{hours-in day}} [n_{\text{one-minute samples in clock-hour averages}}]}$$

The 12-month compliance factor becomes:

$$\text{CF}_{\text{12-month}} = \frac{\sum_{\text{i=1}}^{12} (CF_{\text{month-i}})(n_{(\text{one-minute samples in month})-\text{i}})]}{\sum_{\text{i=1}}^{12} [n_{(\text{one-minute samples in month})\text{-i}}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

M2. Each Balancing Authority shall achieve, as a minimum, Requirement R2 (CPS2) compliance of 90%. CPS2 relates to a bound on the ten-minute average of ACE. A compliance percentage is calculated as follows:

$$CPS2 = \left[1 - \frac{\text{Violations}_{\text{month}}}{\left(\text{Total Periods}_{\text{month}} - \text{Unavailable Periods}_{\text{month}}\right)}\right] * 100$$

The violations per month are a count of the number of periods that ACE clock-ten-minutes exceeded L_{10}. ACE clock-ten-minutes is the sum of valid ACE samples within a clock-ten-minute period divided by the number of valid samples.

Violation clock-ten-minutes

= 0 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| \leq L_{10}$$

= 1 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| > L_{10}$$

Each Balancing Authority shall report the total number of violations and unavailable periods for the month. L_{10} is defined in Requirement R2.

Since CPS2 requires that ACE be averaged over a discrete time period, the same factors that limit total periods per month will limit violations per month. The calculation of total periods per month and violations per month, therefore, must be discussed jointly.

A condition may arise which may impact the normal calculation of total periods per month and violations per month. This condition is a sustained interruption in the recording of ACE.

In order to ensure that the average ACE calculated for any ten-minute interval is representative of that ten-minute interval, it is necessary that at least half the ACE data samples are present for that interval. Should half or more of the ACE data be unavailable due to loss of telemetering or computer unavailability, that ten-minute interval shall be omitted from the calculation of CPS2.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Regional Reliability Organization.

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar month.

1.3. Data Retention

The data that supports the calculation of CPS1 and CPS2 (Appendix 1-BAL-001-0) are to be retained in electronic form for at least a one-year period. If the CPS1 and CPS2 data for a Balancing Authority Area are undergoing a review to address a question that has been raised regarding the data, the data are to be saved beyond the normal retention period until the question is formally resolved. Each Balancing Authority shall retain for a rolling 12-month period the values of: one-minute average ACE (ACE_i), one-minute average Frequency Error, and, if using variable bias, one-minute average Frequency Bias.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance – CPS1

2.1. Level 1: The Balancing Authority Area's value of CPS1 is less than 100% but greater than or equal to 95%.

2.2. Level 2: The Balancing Authority Area's value of CPS1 is less than 95% but greater than or equal to 90%.

2.3. Level 3: The Balancing Authority Area's value of CPS1 is less than 90% but greater than or equal to 85%.

2.4. Level 4: The Balancing Authority Area's value of CPS1 is less than 85%.

3. Levels of Non-Compliance – CPS2

3.1. Level 1: The Balancing Authority Area's value of CPS2 is less than 90% but greater than or equal to 85%.

3.2. Level 2: The Balancing Authority Area's value of CPS2 is less than 85% but greater than or equal to 80%.

3.3. Level 3: The Balancing Authority Area's value of CPS2 is less than 80% but greater than or equal to 75%.

3.4. Level 4: The Balancing Authority Area's value of CPS2 is less than 75%.

E. Regional ~~Differences~~Variances

~~1.~~E.A. The ERCOT Control Performance Standard 2 Waiver approved November 21, 2002.

E.B. Regional Variance for the Western Electricity Coordinating Council

The following Interconnection-wide variance shall be applicable in the Western Electricity Coordinating Council (WECC) and replaces, in their entirety Requirement R1 and Section D. Compliance 2. Please note that the ACE equation is replaced in its entirety with the following equation.

Requirements and Measures[1]

E.B.1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit $\in_1^2$ is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

[1] The number for each measure corresponds with the number for each requirement, i.e. M.E.B.1 means the measure for requirement E.B.1.

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \epsilon_1^2 \; or \; \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\epsilon_1^2} \le 1$$

The equation for ACE in the Western Interconnection is:

$$ACE = (NI_A - NI_S) - 10B(F_A - F_S) - I_{ME} + I_{ATEC}$$

Where:

NI_A is the algebraic sum of actual flows on all tie lines.

F_A is the actual frequency.

F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.

B = Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.

I_{ME} = **Meter Error Correction (MW)** that is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

Rationale for E.B.1

Assumption: Controlling a Balancing Authority Area using the ACE equation with an ATEC correction component will not reduce reliability.

Justification: Adding the ***I_{ATEC}*** term to the ACE equation reduces number of manual time error corrections and PII_{accum}.

Goal: To establish an ACE equation that permits the implementation of automatic time error correction.

$$I_{ATEC} = \frac{PII_{accum}^{on/off\ peak}}{(1-Y)*H}$$ when operating in Automatic Time Error Correction control mode. I_{ATEC} shall be zero when operating in any other AGC mode.

NI_S is the algebraic sum of scheduled flows on all tie lines.

Y = $B_/ B_S$.

H = Number of Hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3.

B_S = Frequency Bias for the Interconnection (MW / 0.1 Hz).

Primary **I**nadvertent **I**nterchange **(PII_{hourly})** is **(1-Y) * (II_{actual} - B * ΔTE/6)**

II_{actual} is the hourly Inadvertent Interchange for the last hour.

ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where:

$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE_{offset})$

TD_{adj} is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks.

t is the number of minutes of Manual Time Error Correction that occurred during the hour.

TE_{offset} is 0.000 or +0.020 or -0.020.

$PII_{accum}^{on/off\ peak}$ is the Balancing Authority's accumulated **PII_{hourly}** in MWh. An On-Peak and Off-Peak accumulation accounting is required.

Where:

$$PII_{accum}^{on/off\ peak} = \textbf{last period's}\ PII_{accum}^{on/off\ peak} + PII_{hourly}$$

[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]

M.E.B.1. Each Balancing Authority shall have and provide upon request evidence that it operated such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit that demonstrates compliance with requirement E.B.1. This limit is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

E.B.2. Each Balancing Authority shall limit the absolute value of I_{ATEC}, the Automatic Time Error Correction term as follows: *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*

$$|I_{ATEC}| \leq L_{max}$$

M.E.B.2. Each Balancing Authority shall have and provide upon request evidence that its absolute value for I_{ATEC} is less than or equal to L_{max}. Acceptable evidence is dated Energy Management System (EMS) displays, WECC Western Interchange Tool, EMS application code, or other archived data that demonstrates compliance with requirement E.B.2.

Rationale for E.B.2

Assumption: Large adjustments in I_{ATEC} may result in CPS2 violations.

Justification: Balancing Authorities should not violate CPS2.

Goal: The goal of requirement E.B.2 is to limit I_{ATEC} so that Balancing Authorities do not experience CPS2 violations.

E.B.3. Each Balancing Authority shall set L_{max} within the limits as follows:

$$0.20 * |B| \leq L_{max} \leq L_{10}$$

[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]

Rationale for E.B.3

Assumption: Operating within an L_{max} less than 0.02 * |B| may not provide sufficient correction for PII and operating with an L_{max} greater than L_{10} may result in CPS2 violations.

Justification: L_{max} should be limited to prevent Balancing Authorities from violating CPS2.

Goal: The goal of requirement E.B.3 is to develop a range for L_{max} where Balancing Authorities are less likely to experience CPS2 violations.

Adopted by NERC Board of Trustees:
Mandatory Effective Date:
Developed as: **WECC-0068**

M.E.B.3. A Balancing Authority shall have and provide upon request evidence that demonstrates L_{max} is within the limits in requirement R3. Acceptable evidence is dated Energy Management System (EMS) displays, WECC Western Interchange Tool, EMS application code, or other archived data that demonstrates compliance with requirement E.B.3.

Table of Compliance Elements

E #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
E.B.1	Real-time Operations	Medium	The Balancing Authority Area's value of CPS1 is less than 100% but greater than or equal to 95%.	The Balancing Authority Area's value of CPS1 is less than 95% but greater than or equal to 90%.	The Balancing Authority Area's value of CPS1 is less than 90% but greater than or equal to 85%.	The Balancing Authority Area's value of CPS1 is less than 85%.
E.B.2	Real-time Operations	Medium	N/A	N/A	N/A	The Balancing Authority Area's absolute value for $\boldsymbol{I_{ATEC}}$ is greater than L_{max}.
E.B.3	Operations Planning	Medium	N/A	N/A	N/A	The Balancing Authority did not set L_{max} to within the limits in E.B.3 i.e. ($.0.20 * \|B\| \leq L_{max} \leq L_{10}$)

F. Associated Documents

~~1.~~E.A. Appendix 2 — Interpretation of Requirement R1 (October 23, 2007).

Version History

Version	Date	Action	Change Tracking
0	February 8, 2005	BOT Approval	New
0	April 1, 2005	Effective Implementation Date	New
0	August 8, 2005	Removed "Proposed" from Effective Date	Errata
0	July 24, 2007	Corrected R3 to reference M1 and M2 instead of R1 and R2	Errata
0a	December 19, 2007	Added Appendix 2 – Interpretation of R1 approved by BOT on October 23, 2007	Revised
0a	January 16, 2008	In Section A.2., Added "a" to end of standard number In Section F, corrected automatic numbering from "2" to "1" and removed "approved" and added parenthesis to "(October 23, 2007)"	Errata
0	January 23, 2008	Reversed errata change from July 24, 2007	Errata
0.1a	October 29, 2008	Board approved errata changes; updated version number to "0.1a"	Errata
0.1a	May 13, 2009	Approved by FERC	
		WECC Regional Variance	

Appendix 1-BAL-001-0
CPS1 and CPS2 Data

CPS1 DATA	Description	Retention Requirements
ε_1	A constant derived from the targeted frequency bound. This number is the same for each Balancing Authority Area in the Interconnection.	Retain the value of ε_1 used in CPS1 calculation.
ACE_i	The clock-minute average of ACE.	Retain the 1-minute average values of ACE (525,600 values).
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value(s) of B_i used in the CPS1 calculation.
F_A	The actual measured frequency.	Retain the 1-minute average frequency values (525,600 values).
F_S	Scheduled frequency for the Interconnection.	Retain the 1-minute average frequency values (525,600 values).

CPS2 DATA	Description	Retention Requirements
V	Number of incidents per hour in which the absolute value of ACE clock-ten-minutes is greater than L_{10}.	Retain the values of V used in CPS2 calculation.
ε_{10}	A constant derived from the frequency bound. It is the same for each Balancing Authority Area within an Interconnection.	Retain the value of ε_{10} used in CPS2 calculation.
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value of B_i used in the CPS2 calculation.
B_s	The sum of Frequency Bias of the Balancing Authority Areas in the respective Interconnection. For systems with variable bias, this is equal to the sum of the minimum Frequency Bias Setting.	Retain the value of B_s used in the CPS2 calculation. Retain the 1-minute minimum bias value (525,600 values).
U	Number of unavailable ten-minute periods per hour used in calculating CPS2.	Retain the number of 10-minute unavailable periods used in calculating CPS2 for the reporting period.

Appendix 2

Interpretation of Requirement 1

Request: *Does the WECC Automatic Time Error Control Procedure (WATEC) violate Requirement 1 of BAL-001-0?*

Interpretation:
Requirement 1 of BAL-001 — Real Power Balancing Control Performance, is the definition of the area control error (ACE) equation and the limits established for Control Performance Standard 1 (CPS1).

BAL-001-0

R1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit ε12 is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

- The WATEC procedural documents ask Balancing Authorities to maintain raw ACE for CPS reporting and to control via WATEC-adjusted ACE.
- As long as Balancing Authorities use raw (unadjusted for WATEC) ACE for CPS reporting purposes, the use of WATEC for control is not in violation of BAL-001 Requirement 1.

FERC Directives for BAL-004-WECC-1 Automatic Time Error Correction
April 14, 2011

Received From	FERC Order 723[1] Snapshot WECC-0068 Mod. To BAL-004-WECC-1	The BAL-004-WECC-2 and Variance to BAL-001-1.1a Completed Actions
FERC	P 30. As explained in the NOPR, the Commission is concerned that the phrases "large accumulation" and "in such a situation," as used in Requirement R1.2, leaves to individual interpretation when a "large" amount of primary inadvertent has accumulated. The ERO and WECC agree that the provision should be clarified. Accordingly, the Commission adopts its NOPR proposal and directs WECC to develop revisions to the provision so that a Balancing Authority will know specifically which circumstances trigger the actions required by Requirement R1.2.	See draft BAL-004-WECC-2 Requirements R1 and R2. These requirements eliminate the questionable terms, replacing them with quantifiable thresholds and specific circumstances.
FERC	P 34. Consistent with the NOPR, pursuant to Section 215(d)(5) of the FPA, the Commission directs WECC to develop a modification to the Regional Reliability Standard consistent with WECC's and NERC's explanation that the limit set forth in Requirement 2 of "24 hours per calendar quarter" is an accumulated total for the period – resulting from either a singular event or a cumulative time limit from a number of events.	See draft BAL-004-WECC-2 Requirement R4, which has been revised to specify an accumulation over the period.
FERC	P 44. FERC requires that BAs use Raw ACE for CPS reporting and WATEC ACE for control. The Interconnect prefers to use the WATEC ACE for control and CPS reporting. Develop a Regional Variance to BAL-001-0.1a to resolve the issue.	See Draft BAL-001-1.1a. Section E.B is a Regional Variance for WECC that replaces Requirement R1 and Section D Compliance 2. This Regional Variance establishes a single ACE equation for use in WECC for all NERC standards referencing ACE.

[1] 127 FERC ¶ 61,176 UNITED STATES OF AMERICA FEDERAL ENERGY REGULATORY COMMISSION, 18 CFR Part 40, Docket No. RM08-12-000; Order No.723, Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction (Issued May 21, 2009)

Received From	FERC Order 723[1] Snapshot WECC-0068 Mod. To BAL-004-WECC-1	The BAL-004-WECC-2 and Variance to BAL-001-1.1a Completed Actions
		Furthermore, the Drafting Team for WECC-0068 requests withdrawal of BAL-001-1.1a Appendix 2 Interpretation of Requirement 1.
FERC	P 51. FERC adopts its NOPR proposal and directs that the violation risk factors assigned to BAL-004-WECC-01, Requirements R1, R2, R3, and R4, be modified from "lower" to "medium." The ERO and WECC must submit a filing that includes the directed modifications within 60 days of the effective date of this Final Rule.	NERC and WECC, in their compliance filing of August 28, 2009,[2] adjusted the Violation Risk Factors to medium as directed. Likewise, the corresponding requirements in BAL-001-1.1a E.B.1, BAL-004-WECC-2 R4, BAL-004-WECC-2 R6, and BAL-004-WECC-2 R5, respectively, have been assigned Violation Risk Factors of Medium.
FERC	P 54. The Commission adopts its NOPR proposal and directs the ERO and WECC to submit violation severity levels for each Requirement and sub-Requirement that has been assigned a violation risk factor. To allow adequate time for the development of the violation severity levels, the ERO and WECC must submit a filing that includes the directed violation severity levels within 120 days of the effective date of this Final Rule.	NERC and WECC in its compliance filing of October 23, 2009[3] adjusted the violation severity levels as directed. The drafting team has established similar violation severity levels for each requirement in both BAL-001-01.1a E.B and BAL-004-WECC-2.

[2] North American Electric Reliability Corporation compliance filing to Docket No. RM08-12-000; Order No. 723 – directed Modification of Violation Risk Factors (submitted August 28, 2009).

[3] North American Electric Reliability Corporation compliance filing to Docket No. RM08-12-000; Order No. 723 – directed Modification of Violation Severity Levels (submitted October 23, 2009).

The Project WECC-0068 (BAL-004-WECC-2 and Regional Variance to BAL-001-0.1a)
Drafting Team Completed Actions
April 14, 2011

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
R1. Each BA that operates synchronously to the Western Interconnection shall continuously operate utilizing Automatic Time Error Correction (ATEC) in its Automatic Generation Control (AGC) system. [Risk Factor: Lower] $ACE_{ATEC} = (NI_A - NI'_S) - 10B_i (F_A - F_S) - T_{0b} + I_{ME}$ **Where:** **NI_A =** Net Interchange Actual (MW). **F_A =** Frequency Actual (Hz). **F_S** = Frequency Scheduled (Normally 60 Hz). **B_i** = Frequency Bias for the Balancing Authority's Area (MW / 0.1 Hz). **T_{0b} =** Remaining Bilateral Payback for Inadvertent Interchange created prior to implementing automatic payback (MW). **I_{ME} =** Meter Error Correction (MW).	**E.B.1.** Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit $\in_1^2$ is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee. $AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \in_1^2$ *or* $\frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\in_1^2} \le 1$ **E.B.2.** The equation for ACE in the Western Interconnection is:	Establishing a Regional Variance in BAL-001-01.1a in which an ACE equation for WECC is specified provides the following benefits from a Standards perspective: a) Locates in a single standard the definition of ACE for all Interconnections; b) Identifies a single ACE formula for all Interconnections with common terminology and uncommon	Reducing the NERC ACE and "control" ACE to a single ACE, allows Operations to "control to the target." This means that control actions will directly affect the monitored, measured objective function.

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
$NI'_S = NI_S - \frac{II^{on/off\ peak}_{Primary}}{(-Y)*H}$ **NI_S =** Net Interchange Scheduled (MW). **Y** = B_i / B_S. **H** = Number of Hours used to payback Inadvertent Interchange Energy. The WECC Performance Work Group has set the value of H to 3. **B_S** = Frequency Bias for the Interconnection (MW / 0.1 Hz). $II^{on/off\ peak}_{primary}$ = is the Balancing Authority's accumulated primary inadvertent interchange in MWh. An On-Peak and Off-Peak accumulation accounting is required. Where: $II^{on/off\ peak}_{primary}$ **= last period's** $II^{on/off\ peak}_{primary}$ **+ (1-Y) * (II_{actual} - B_i * ΔTE/6)** **II_{actual}** is the hourly Inadvertent Interchange for the last hour.	$ACE = (NI_A - NI_S) - 10B(F_A - F_S) - I_{ME} + I_{ATEC}$ **Where:** **NI_A** is the algebraic sum of actual flows on all tie lines. **F_A** is the actual frequency. **F_S** is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections. **B** = Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz. I_{ME} = **Meter Error Correction (MW)** that is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero. $I_{ATEC} = \frac{PII^{on/off\ peak}_{accum}}{(-Y)*H}$ when operating in Automatic Time Error Correction control mode. I_{ATEC} shall be zero when operating in any other AGC mode. **NI_S** is the algebraic sum of scheduled flows on all tie lines.	differences (i.e., there is no longer a NERC ACE and a "control" ACE); and c) Eliminates consideration of exceptional circumstances governing multiple ACEs.	

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where: **$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE\ offset)$** **$TD_{adj}$** is any operator adjustment to the control center Time Error to correct for differences with the time monitor. **t** is the number of minutes of Manual Time Error Correction that occurred during the hour. **TE offset** is 0.000 or +0.020 or -0.020.	**Y** = B / B_S. **H** = Number of Hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3. **B_S** = Frequency Bias for the Interconnection (MW / 0.1 Hz). **P**rimary **I**nadvertent **I**nterchange **(PII_{hourly})** is **$(1-Y) * (II_{actual} - B * \Delta TE/6)$** **$II_{actual}$** is the hourly Inadvertent Interchange for the last hour. **ΔTE** is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where: **$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE_{offset})$** **$TD_{adj}$** is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks. **t** is the number of minutes of Manual Time Error Correction that occurred during the hour. **TE_{offset}** is 0.000 or +0.020 or -0.020. $PII_{accum}^{on/off\ peak}$ is the Balancing Authority's accumulated **PII_{hourly}** in MWh. An On-Peak and Off-Peak accumulation accounting is required.		

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
	Where: $PII_{accum}^{on/off\ peak}$ = **last period's** $PII_{accum}^{on/off\ peak}$ + $PII_{\mathbf{hourly}}$		
R1.1. The absolute value of the WECC Automatic Time Error Correction term is limited as follows: $\left\| \frac{II_{primary}^{on/off\ peak}}{(1\text{-}Y)\cdot H} \right\| \le L_{max}$ Where L_{max} is chosen by the BA and is bounded as follows: $0.20 * \|B_i\| \le L_{max} \le L_{10}$ L_{10} is the Balancing Authority CPS2 limit in MW. If the WECC Automatic Time Error Correction term is less than the upper limit, use the calculated WECC Automatic Time Error Correction term.	**E.B.3.** Each Balancing Authority shall limit the absolute value of I_{ATEC}, the Automatic Time Error Correction term as follows: $\left\| I_{ATEC} \right\| \le L_{max}$ **E.B.4.** Each Balancing Authority shall set L_{max} within the limits as follows: $0.20 * \|B\| \le L_{max} \le L_{10}$	Provides clarity in requirements and actions to be taken by the Operators. Relocating this requirement to BAL-001-0.1a consolidates all requirements affecting calculation of terms in the ACE equation.	Eliminates potential confusion regarding limitation of the ATEC term, which could affect the final ACE value, subsequent control of units, and associated impact on system frequency.
R1.2 Large accumulations of primary	**R1.** When a Balancing Authority's Accumulated Primary		

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
inadvertent point to an invalid implementation of ATEC, loose control, metering or accounting errors. A BA [Balancing Authority] in such a situation should identify the source of the error(s) and make the corrections, recalculate the primary inadvertent from the time of the error, adjust the accumulated primary inadvertent caused by the error(s), validate the implementation of ATEC, set L_{max} equal to $L_{10,}$ and continue to operate with ATEC reducing the accumulation as system parameters allow.	Inadvertent Interchange **(**PII_{accum}**)** for either the On-Peak or Off-Peak periods exceeds 24 times (L_{10}),[1] plus the absolute value of the previous month's On-Peak or Off-Peak month-end adjustments for meter readings, the Balancing Authority shall: **1.1** Identify and correct the source of any metering or accounting error(s); **1.2** Recalculate the hourly Primary Inadvertent Interchange **(**PII_{hourly}) and the PII_{accum} from the time of the error; **1.3** Validate the implementation of ATEC; and **1.4** Set L_{max} equal to $L_{10.}$until the PII_{accum} for either the On-Peak or Off-Peak period is below 24 times L_{10}, plus the absolute value of the previous month's On-Peak or Off-Peak month-end adjustments for meter readings. **R2**. Each Balancing Authority's PII_{accum} shall not exceed 200% of the previous calendar year's Peak Demand.		
R2. Each BA [Balancing Authority] that is synchronously connected to the Western Interconnection, and operates in any AGC operating mode other than ATEC, shall notify all other BAs of its operating mode through the designated Interconnection	**R4.** Each Balancing Authority shall not have ATEC out of service for more than an accumulated 24 hours per calendar quarter.	Resolve that the "out of service" duration is an accumulation over the specified period. Also recognizes that	

[1] In requirement R1, the L_{10} for each Balancing Authority Area with a variable bias is calculated using the average bias for the previous calendar year; and, for Generation Only Balancing Authority Areas, the value for L_{10} is calculated by using 1% of installed capacity as published by NERC.

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
communication system. Each BA, while synchronously connected to the Western Interconnection, will be allowed to have ATEC out of service for a maximum of 24 hours per calendar quarter, for reasons including maintenance and testing. [Risk Factor: Lower]		extremely short interruptions in ATEC need not be communicated to the Interconnection. For example, computer maintenance processes could result in momentary interruptions (e.g., system upgrades) that do not require notifying neighboring BAs.	
R3. BAs in the Western Interconnection shall be able to change their AGC operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error control (used in ATEC mode). The ACE used for NERC reports shall be the same ACE as the AGC operating mode in use. [Risk Factor: Lower]	**R6.** Each Balancing Authority shall be able to change its AGC operating mode between Flat Frequency (for blackout restoration; Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error control (used in ATEC mode).		
R4. Regardless of the AGC operating mode, each BA in the Western Interconnection	**R5.** By 50 minutes after each hour each Balancing Authority shall compute the following:		

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
shall compute its hourly Primary Inadvertent Interchange when hourly checkout is complete. If hourly checkout is not complete by 50 minutes after the hour, compute Primary Inadvertent Interchange with best available data. This hourly value shall be added to the appropriate accumulated Primary Inadvertent Interchange balance for either On-Peak or Off-Peak periods. [Risk Factor: Lower]	**5.1.** $PII_{\mathbf{hourly}}$, **5.2.** On-Peak PII_{accum}, **5.3.** Off-Peak PII_{accum}, **5.4.** Automatic Time Error Correction term (I_{ATEC})		
R4.1 Each BA in the Western Interconnection shall use the change in Time Error distributed by the Interconnection Time Monitor.		This adjustment is included as part of equation in requirement E.B.1. as ΔTE.	
R4.2 All corrections to any previous hour Primary Inadvertent Interchange shall be added to the appropriate On-Peak or Off-Peak accumulated Primary Inadvertent Interchange.	**R3**. If an error in the calculation of PII is discovered, each Balancing Authority shall recalculate PII and adjust the PII_{accum} from the time of the error, within 90 days of the discovery.		
R4.3 Month-end Inadvertent Adjustments are 100% Primary Inadvertent Interchange and shall be added to the appropriate On-Peak or Off-Peak accumulated Primary Inadvertent Interchange, unless such adjustments can be	**R8.** For any month end adjustments for meter readings to Inadvertent Interchange, each Balancing Authority shall make the same adjustment to the PII_{accum}.		

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
pinpointed to specific hours in which case R4.2 applies.			
R4.4 Each BA in the Western Interconnection shall synchronize its Time Error to the nearest 0.001 seconds of the system Time Error by comparing its reading at the designated time each day to the reading broadcast by the Interconnection Time Monitor. Any difference shall be applied as an adjustment to its current Time Error.		This adjustment is included as part of equation in requirement E.B.1. as ΔTE.	
	R7. When making adjustments to hourly Inadvertent Interchange or ΔTE, each Balancing Authority shall recalculate the PII_{hourly} and On- or Off-Peak PII_{accum}.		
Definitions of Terms Used in Regional Standard **Automatic Time Error Correction:** A frequency control automatic action that a BA uses to offset its frequency contribution, to support the Interconnection's scheduled frequency. **Primary Inadvertent Interchange:** The component of area (n) inadvertent interchange caused by the regulating deficiencies of the area (n).	**Definitions of Terms Used in Regional Standard** **Automatic Time Error Correction:** A frequency control automatic action that a BA uses to offset its frequency contribution to support the Interconnection's scheduled frequency. **Primary Inadvertent Interchange:** The component of area (n) inadvertent interchange caused by the regulating deficiencies of the area (n).	The definition for Secondary Inadvertent Interchange was removed because it is not used in the proposed standard.	

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
Secondary Inadvertent Interchange: The component of area (n) inadvertent interchange caused by the regulating deficiencies of area (i).			

WECC Standard BAL-004-WECC-02
Automatic Time Error Correction

Version 1, Open: 4/15/2011 Closed: 6/1/2011

Document Title	WECC Standard BAL-004-WECC-02
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1	4/15/2011	Version 1 Posted	
2		(Insert completion steps as needed)	
3		Standing Committee Approval	
4		WECC Board Approval	

WECC 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.

.

Development Steps Completed:

Completed Actions	Completion Date
• Request received	9/26/2009
• Requested deemed Complete/Valid/Team Site created	10/6/2009
• Pre-SRRC announcement	10/16/2009
• SRRC notified	10/26/2009
• SRRC assigned the Request to Standing Committee • Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
• Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	7/16/2010
• Drafting team (DT) announced / notice sent to DT members	7/16/2010
• Notice of development / first 30-day notice	9/2/2010
• New committee chair orientation meeting	8/18/2010
• First DT meeting	11/10/2010
• Notice of Concurrence sent by DT (see step 3) • New meeting announcement / also included in first meeting minutes	11/10/2010
• DT meetings completed	12/15/10 1/18/11 2/10/11 3/11–12/11 3/24/11 4/11/11
• Complete first draft and Complete Quality Control Checklist	04/13/2011
• Post first draft for 45-day comment period	04/15/2011

Description of Current Draft:

In the FERC Order No.723 to Docket No. RM08-12-000, issued May 29, 2009, approving BAL-004-WECC-1; FERC directed WECC to make several clarifying modifications to the standard. FERC directed WECC to go through the FERC-approved Process for Developing and Approving WECC Standards and make clarifying modifications. In addition, WECC staff

identified additional modifications to the existing standard that were required to clarify the intent without changing the requirements. There is also confusion over the requirement that the Area Control Error (ACE) equation used for NERC reports shall be the same ACE equation as the AGC operating mode in use. This seems to conflict with the NERC response to NOPR comments that entities may use an ATEC ACE equation, with automatic time error correction (ATEC ACE) for control, but should use Raw ACE for reporting.

The primary purpose of the following refinements is WECC's Regional Reliability Standard (BAL-004-WECC-2) to implement the directives in FERC Order 723,[1] and to make other clarifications to BAL-004-WECC-1 as the industry deems necessary, without reducing the Western Interconnection's reliability:

1. The Commission is concerned that the phrases "large accumulation" and "in such a situation" as used in Requirement R1.2 leave when a "large" amount of primary inadvertent has accumulated up to individual interpretation. The ERO and WECC agree that the provision could be further clarified. Accordingly, the Commission adopts its NOPR proposal and directs WECC to develop revisions to the provision so that a balancing authority will know specifically the circumstances that trigger the actions required by Requirement R1.2.
2. Consistent with the NOPR, pursuant to section 215(d)(5) of the FPA, the Commission directs WECC to develop a modification to the Regional Reliability Standard consistent with WECC's and NERC's explanation that the limit set forth in Requirement 2 of "24 hours per calendar quarter" is an accumulated total for the period — resulting from either a singular event or a cumulative time limit from a number of events.
3. FERC requires that Balancing Authorities use Raw ACE for CPS reporting and WATEC ACE for control. The Interconnection prefers to use the WATEC ACE for control and CPS reporting. Develop a regional variance to BAL-001-0.1a to resolve the issue.
4. FERC adopts its NOPR proposal and directs that the violation risk factors assigned to BAL-004-WECC-01, Requirements R1, R2, R3, and R4, be modified from "lower" to "medium." The ERO and WECC must submit a filing within 60 days of the effective date of this Final Rule that includes the directed modifications.
5. The Commission adopts its NOPR proposal and directs the ERO and WECC to submit violation severity levels for each Requirement and sub-Requirement that has been assigned a violation risk factor. To allow adequate time for the development of the violation severity levels, the ERO and WECC must submit a filing within 120 days of the effective date of this Final Rule that includes the directed violation severity levels.

The implementation of an ATEC ACE is part of a regional variance to the NERC BAL-001-0.1a Standard associated with this posting. The purpose of this BAL-004-WECC-2 Regional Standard is to include the other requirements in BAL-004-WECC-1 with the additional refinements directed by FERC. Refinements from the existing BAL-004-WECC-1 include:

[1] 127 FERC ¶ 61,176 UNITED STATES OF AMERICA FEDERAL ENERGY REGULATORY COMMISSION, 18 CFR Part 40, Docket No. RM08-12-000; Order No.723, Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction (Issued May 21, 2009)

1. A requirement Balancing Authorities to set L_{max} equal to $L_{10}$when an Accumulated Primary Inadvertent Interchange exceeds 24 times $L_{10.}$
2. A requirement that limits a Balancing Authority's Primary Inadvertent to 200% of the previous calendar year's Peak Demand.
3. A clarification in response to the FERC order that the accumulated ATEC out of service shall not exceed 24 hours during a calendar quarter.

The proposed standard retains the requirement for Balancing Authorities to compute the Automatic Time Error Correction and Primary Inadvertent Interchange by 50 minutes after the hour, and requires that Balancing Authorities have the ability to operate in other modes. In addition, Balancing Authorities are required to recalculate Primary Inadvertent Interchange when hourly and month-end adjustments are made.

Development Plan:

Anticipated Actions	Anticipated Date
• Meet to answer to comments, address impact statement and draft responses	06/03/2011
• Post responses to comments	06/30/2011
• Post the second draft for a 30-day comment period	06/30/2011
• Meet to answer to comments, address impact statement and draft responses	08/13/2011
• Post responses to comments	08/02/2011
• Post draft standard for a 45-day NERC comment period	08/2011
• NERC comment period ends	09/30/2011
• Post for comment and Operating Committee approval	09/9/2011
• Operating Committee approves proposed standard	10/13-15/2011
• Post draft standard for WECC Board approval	10/2011
• WECC Board approves proposed standard	11-12/2011
• Post draft standard for 15-day NERC comment period	12/2011
• NERC comment period ends	01/2012
• DT completes review and consideration of industry comments to NERC posting	01/2012
• Submit NERC Board approval request	01/2012
• Receive NERC Board approval	02/2012
• Request FERC approval	02/2012

.

Implementation Plan

The Implementation Plan is to make the regional variance to NERC Reliability Standard BAL-001-0.1a and WECC Regional Reliability Standard BAL-004-WECC-2 effective on the first day of the second quarter, after FERC approval. Since entities are already controlling their Balancing Authority Area with the ATEC ACE equation – but are reporting using the NERC Raw ACE equation for reporting CPS1 – the transition to controlling and reporting using the ATEC ACE should be minimal. It should not take much time to implement the limits and actions required when a Balancing Authority's Accumulated Primary Inadvertent Interchange exceeds the defined limits.

Definitions of Terms Used in Regional 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 definitions will be removed from the standard and added to the NERC Glossary.

> Insert any new definitions. The DT is encouraged NOT to create new definitions; however, if a capitalized term is used in the body of document, it must have corresponding definition. New definitions are not needed where the capitalized terms are proper nouns. Usually, a new term is only added to define a technical term not otherwise understood without the definition.

Automatic Time Error Correction: A frequency control automatic action that a Balancing Authority uses to offset its frequency contribution to support the Interconnection's scheduled frequency.

Primary Inadvertent Interchange (PII): The component of area (n) inadvertent interchange caused by the regulating deficiencies of the area (n).

A. Introduction

1. Title: **Automatic Time Error Correction**

2. Number: BAL-004-WECC-02

3. Purpose: To maintain Interconnection frequency and to ensure that Time Error Corrections and Primary Inadvertent Interchange (PII) payback are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection.

4. Applicability

4.1. Functional Entities

Balancing Authorities that operate synchronously to the Western Interconnection.

5. Effective Date: On the first day of the second quarter, after FERC approval.

6. Background:

In February 2003, WECC Automatic Time Error Correction (ATEC) Procedure became effective for all Balancing Authorities in the Western Interconnection. The original intent was to try to minimize the number of Manual Time Error Corrections in the Western Interconnection. ATEC provides the added benefit of a superior approach over the current NERC Manual Time Error Correction (BAL-004-0) for assigning costs and providing for the equitable payback of inadvertent interchange. In October 2006, the WECC Procedure became a WECC Standard. In May 2009, FERC issued Order No.723 that approved Regional Reliability Standard BAL-004-WECC-1 (Automatic Time Error Correction), as submitted by NERC. The effective date of the BAL-004-WECC-1 standard was July 1, 2009. In addition, the Commission directed WECC to develop several modifications to the Regional Reliability Standard BAL-004-WECC-1. The Regional Reliability Standard BAL-004-WECC-1 requires Balancing Authorities within the Western Interconnection to maintain Interconnection frequency within a predefined frequency profile, and to ensure that Time Error Corrections are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection. FERC directed WECC to make several clarifying modifications to the standard through the FERC-approved Process for Developing and Approving WECC Standards. In September 2009, WECC received WECC Standards/Regional Criterion Request Form (Request) WECC-0068, which is a modification of BAL-004-WECC-1. In July 2010, the chair of the WECC Operating Committee assigned the Request to the Performance Work Group (PWG) for development.

B. Requirements and Measures

R1. When a Balancing Authority's Accumulated Primary Inadvertent Interchange **(**PII_{accum}**)** for either the On-Peak or Off-Peak periods exceeds 24 times (L_{10}),[2] plus the absolute value of the previous month's On-Peak or Off-Peak month-end adjustments for meter readings, the Balancing Authority shall:

1.1 Identify and correct the source of any metering or accounting error(s);

1.2 Recalculate the hourly Primary Inadvertent Interchange **(**PII_{hourly}) and the PII_{accum} from the time of the error;

1.3 Validate the implementation of ATEC; and

1.4 Set L_{max} equal to $L_{10.}$until the PII_{accum} for either the On-Peak or an Off-Peak period is below 24 times L_{10}, plus the absolute value of the previous month's On-Peak or Off-Peak month-end adjustments for meter readings. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

Rationale for R1:

Assumption: The 24 times L_{10} is the value for PII_{accum} where Balancing Authorities should take predefined additional actions to reduce PII_{accum}.
Justification: Balancing Authorities should take predefined actions to minimize PII_{accum} once an activation point is exceeded.
Goal: To establish a PII_{accum} limit that requires a Balancing Authority to take predefined actions to reduce its PII_{accum} in a manner that does not adversely affect the reliability of the Interconnection.

M1. Each Balancing Authority shall have, and provide upon request, evidence that demonstrates that when its PII_{accum} exceeded 24 times L_{10}, plus the absolute value of the previous month's month-end On-Peak or Off-Peak period adjustments for meter readings, it performed the following:

1.1 Identified and corrected the source of any metering or accounting error(s);

1.2 Recalculated the PII_{hourly} and the PII_{accum} from the time of the error;

1.3 Validated the implementation of ATEC; and

1.4 Set L_{max} equal to $L_{10.}$until the PII_{accum} for either the On-Peak or Off Peak periods is below 24 times L_{10} plus the absolute value of the previous month's On-Peak or Off-Peak month end adjustments for meter readings.

Acceptable evidence of the above is one of the following:

- Data, screen shots, etc., from the WIT Tool that demonstrate compliance with requirement R1;
- Data, screen shots, etc., from the internal Balancing Authority tool that demonstrate compliance with requirement R1; or

[2] In requirement R1, the L_{10} for each Balancing Authority Area with a variable bias is calculated using the average bias for the previous calendar year; and, for Generation Only Balancing Authority Areas, the value for L_{10} is calculated by using 1% of installed capacity as published by NERC.

- Any other databases, spreadsheets, displays, etc., that demonstrate compliance with requirement R1.

R2. Each Balancing Authority's PII_{accum} shall not exceed 200% of the previous calendar year's Peak Demand. *[Violation Risk Factor Medium:] [Time Horizon: Operations Assessment]*

M2. Each Balancing Authority has, and provides upon request, evidence that demonstrates that the Balancing Authority's PII_{accum} did not exceeded 200% of the previous calendar year's Peak Demand. Acceptable evidence of the above is one of the following:

- Data, screen shots, etc., from the WIT Tool that demonstrate compliance with requirement R2;
- Data, screen shots, etc., from the internal Balancing Authority tool that demonstrate compliance with requirement R2; or
- Any other databases, spreadsheets, displays, etc., that demonstrate compliance with requirement R2.

Rationale for R2:

Assumption: Balancing Authority should make sure that PII_{accum} does not exceed 200% of the previous year's Peak Demand.
Justification: PII_{accum} may grow from month-end adjustments and metering errors, even with the inclusion of I_{ATEC} in the ACE equation.
Goal: To limit the amount of PII_{accum} that a Balancing Authority can have at one time.

R3. If an error in the calculation of PII is discovered, each Balancing Authority shall recalculate PII and adjust the PII_{accum} from the time of the error, within 90 days of the discovery. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M3. A Balancing Authority shall provide upon request evidence and that it recalculated the PII and adjusted the PII_{accum} within 90 days of the discovery. Acceptable evidence of the above is one of the following:

- Data, screen shots, etc., from the WIT Tool that demonstrate compliance with requirement R3;
- Data, screen shots, etc., from the internal Balancing Authority tool that demonstrate compliance with requirement R3; or
- Any other databases, spreadsheets, displays, etc., that demonstrate compliance with requirement R3.

Rationale for R3:

Assumption: When a Balancing Authority finds an error in the calculation of PII, Balancing Authorities need time to correct the error and recalculate PII and PII_{accum}.
Justification: The drafting team selected 90 days as a reasonable amount of time to correct an error and recalculate PII and $PII_{accum,}$ since recalculation of PII and PII_{accum} is not a real-time operations reliability issue.
Goal: To promote the timely correction of errors in the calculation of PII and PII_{accum}.

R4. Each Balancing Authority shall not have ATEC out of service for more than an accumulated 24 hours per calendar quarter. *[Violation Risk Factor: Medium] [Time Horizon: Same-day Operations]*

M4. Each Balancing Authority shall have and provide upon request, evidence ATEC was not out of service for more than 24 hours per calendar quarter. Acceptable evidence is dated achieved files, historian data, and other data that demonstrates the ATEC was in service as required by requirement R4.

R5. By 50 minutes after each hour, each Balancing Authority shall compute the following:

5.1. $PII_{\mathbf{hourly}}$,

5.2. On peak PII_{accum},

5.3. Off peak PII_{accum},

5.4. Automatic Time Error Correction term (I_{ATEC}).

[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]

M5. The Balancing Authority shall have and shall produce upon request the following on an hourly basis:

5.1. $PII_{\mathbf{hourly}}$,

5.2. On peak PII_{accum},

5.3. Off peak PII_{accum},

5.4. I_{ATEC}.

Acceptable evidence of the above is one of the following:

- Data, screen shots, etc., from the WIT Tool that demonstrate compliance with requirement R5;
- Data, screen shots, etc., from internal Balancing Authority tool that demonstrate compliance with requirement R5; or
- Any other databases, spreadsheets, displays, etc. that demonstrate compliance with requirement R5.

Rationale for R4:

Assumption: When a Balancing Authority does not participating in ATEC, payback of PII_{accum} is delayed.
Justification: The limit of 24 hours per quarter discourages a Balancing Authority from withdrawing ATEC participation, for example, for economic gain during selected hours. If the limits were increased to 60 hours, a Balancing Authority could technically withdraw ATEC participation for one hour from Monday to Friday.
Goal: To promote fair and timely payback of PII_{accum} balances.

Rationale for R5:

Assumption: $PII_{\mathbf{hourly}}$, PII_{accum}, and I_{ATEC} should be determined before the next scheduling hour begins.
Justification: To promote timely calculations 50 minutes was selected because it is before the next hour ramp begins and permits time to collect the data and resolve interchange metering values.
Goal: To promote the timely calculation of $PII_{\mathbf{hourly}}$, PII_{accum}, and I_{ATEC}.

R6. Each Balancing Authority shall be able to change its AGC operating mode between Flat Frequency (for blackout restoration; Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error Control (used in ATEC mode). *[Violation Risk Factor: Medium] [Time Horizon: Real-Time Operations]*

M6. Each Balancing Authority demonstrates upon request that it has the ability to operate as required by requirement R6 in Flat Frequency (for blackout restoration; Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error Control. Acceptable demonstration shall include use of a test system.

Rationale for R6:

Assumptions: The ACE equation, and hence the AGC mode, will contain any number of parameters based on system operating conditions. Various AGC modes are identified corresponding to those operating conditions, as well as the specific sets of parameters included in the ACE equation.
Justification: Changing to the proper operating mode, corresponding to current operating conditions, affords proper movement of generating units in response to those conditions. The addition of the ATEC term results in an additional AGC mode and a different set of parameters. The inability to correctly calculate the ATEC term would dictate that AGC not be operated in the ATEC mode.
Goal: To set the AGC mode and calculate ACE in a manner that corresponds to the system operating conditions and to accommodate changes in those conditions.

R7. When making adjustments to hourly Inadvertent Interchange or ΔTE, each Balancing Authority shall recalculate the PII_{hourly} and On- or Off-Peak PII_{accum}. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M7. For each hour requested, each Balancing Authority shall provide the calculated PII_{hourly} and On-Peak or Off-Peak PII_{accum} for each hour of the request. Acceptable evidence of the above shall include one of the following:

- Data, screen shots, etc., from the WIT Tool that demonstrate compliance with requirement R7:
- Data, screen shots, etc., from an internal Balancing Authority tool that demonstrate compliance with requirement R7; or
- Any other databases, spreadsheets, displays, etc., that demonstrate compliance with requirement R7.

Rationale for R7:

Assumptions: Hourly adjustments to hourly II requires a recalculation of the corresponding hourly PII value, the corresponding PII_{accum}, and all subsequent PII_{accum} for every hour up to the current hour.
Justification: As hourly PII is corrected, then PII_{accum} should be recalculated.
Goal: To promote accurate, fair and timely payback of accumulated PII balances.

R8. For any month end adjustments for meter readings to Inadvertent Interchange, each Balancing Authority shall make the same adjustment to the PII_{accum}. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M8. Each Balancing Authority shall have, and provide upon request, all month-end adjustments and On-Peak or Off-Peak PII_{accum} adjustments. Acceptable evidence of the above shall include one of the following:

- Data, screen shots, etc., from the WIT Tool that demonstrate compliance with requirement R8;
- Data, screen shots, etc from an internal Balancing Authority tool that demonstrate compliance with requirement R8;
- Any other databases, spreadsheets, displays, etc., that demonstrate compliance with requirement R8.

Rationale R8:

Assumptions: Month-end adjustments are required, for example, when a Balancing Authority performs monthly comparisons of recorded PII_{hourly} against actual revenue-grade meter readings.
Justification: Month-end adjustments to II are applied as 100% PII. 100% was chosen for simplicity to bilaterally assign PII to both Balancing Authorities, since the effect of this metering error on system frequency is not easily determined over the course of a month.
Goal: To provide a mechanism by which corresponding month-end II adjustments can be applied to PII_{accum}, when such adjustments cannot be attributed to any one particular hour or series of hours.

C. Compliance

Compliance Enforcement Authority

Regional Entity

Evidence Retention

Each Balancing Authority in the Western Interconnection shall retain its hourly calculation of total PII_{accum} and PII_{hourly}; as well as the amount of PII paid back hourly for the preceding calendar year (January – December), plus the current year.

Each Balancing Authority in the Western Interconnection shall retain its PII_{hourly} and total On-Peak and Off-Peak PII_{accum} for the preceding calendar year (January – December), plus the current year.

Each Balancing Authority in the Western Interconnection shall retain in its records the amount of time it operated without ATEC; and the notification to the Interconnection of those times for the preceding calendar year (January – December), plus the current year.

Compliance Monitoring and Assessment Processes:

- Compliance Audits
- Self-Certifications

- Spot Checking
- Compliance Violation Investigations
- Self-Reporting
- Complaints

Additional Compliance Information

None

Table of Compliance Elements

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	Operations Assessment	Medium	Balancing Authority did not validate the implementation of ATEC.	Balancing Authority did not recalculate the PII_{hourly} and the PII_{accum} from the time of the error.	Balancing Authority did not identify and correct the source of any metering or accounting error(s).	Balancing Authority did not set L_{max} equal to L_{10}, until the PII_{accum} is below 24 times L_{10} of the previous calendar year's peak demand (or peak generation for generation-only Balancing Authorities).
R2	Operations Assessment	Medium	The Balancing Authority's PII_{accum} exceeded 200% for any hour, but was less than or equal to 250% of the previous calendar year's Peak Demand.	The Balancing Authority's PII_{accum} exceeded for any hour 250%, but was less than or equal to 300% of the previous calendar year's Peak Demand.	The Balancing Authority's PII_{accum} exceeded for any hour 300%, but was less than or equal to 350% of the previous calendar year's Peak Demand.	The Balancing Authority's PII_{accum} exceeded for any hour 350% of the previous calendar year's Peak Demand.
R3	Operations Assessment	Medium	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} I from the time of the error within 90 days of the discovery; but did make the required	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} from the time of the error within 120 days of the discovery; but did make the required	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} from the time of the error within 150 days of the discovery; but did make the required	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} from the time of the error within 180 days of the discovery.

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
			recalculations and adjustments within 120 days.	recalculations and adjustments within 150 days.	recalculations and adjustments within 180 days.	
R4	Real-Time Operations	Medium	The Balancing Authority operated without ATEC in service for more than 24 hours, but less than or equal to 72 hours during a calendar quarter.	The Balancing Authority operated without ATEC in service for more than 72 hours, but less than or equal to 120 hours during a calendar quarter.	The Balancing Authority operated without ATEC in service for more than 120 hours, but less than or equal to 168 hours during a calendar quarter.	The Balancing Authority operated without ATEC in service for more than 168 hours during a calendar quarter.
R5	Operations Assessment	Medium	The Balancing Authority did not compute all of the PII terms and I_{ATEC} within 50 minutes, but made the required calculations in less than or equal to two hours.	The Balancing Authority did not compute all of the PII terms or I_{ATEC} within two hours, but made the required calculations in less than or equal to four hours.	The Balancing Authority did not compute all of the PII terms and I_{ATEC} within four hours, but made the required calculations in less than or equal to six hours.	The Balancing Authority did not compute all of the PII terms and I_{ATEC} within six hours.
R6	Real-Time Operations	Medium	N/A	N/A	N/A	The Balancing Authority is not able to change its AGC operating mode between Flat Frequency (for blackout restoration; Flat Tie Line (for loss

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						of frequency telemetry); Tie Line Bias; or Tie Line Bias plus Time Error control (used in ATEC mode).
R7	Operations Assessment	Medium	N/A	N/A	N/A	When making adjustments to hourly Inadvertent Interchange or ΔTE, the Balancing Authority did not recalculate the PII_{hourly} and the On-Peak or Off-Peak PII_{accum}.
R8	Operations Assessment	Medium	N/A	N/A	N/A	When making any month end adjustments for meter readings to Inadvertent Interchange, the Balancing Authority did not make the same adjustment to the PII_{accum}.

D. Interpretations

None.

E. Associated Documents

None.

Guidelines and Technical Basis

Requirement R1:

Requirement R2:

Requirement R3:

Requirement R4:

Requirement R5:

Requirement R6:

Requirement R7:

Requirement R8:

WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction

Modification of BAL-004-WECC-1
Version 1, Open: ; Closed:

Document Title	WECC Standard BAL-004-WECC-02
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

WECC 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.

.

Development Steps Completed:

Completed Actions	Completion Date
• ~~Post Draft Standard for initial industry comments~~Request received	~~November 14, 2006~~9/26/2009
• Requested deemed Complete/Valid/Team Site created	10/6/2009
• Pre-SRRC announcement	10/16/2009
• SRRC notified	10/26/2009
• ~~Drafting Team to review and respond to initial industry comments~~SRRC assigned the Request to Standing Committee • Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	~~January 30, 2007~~11/2009
• Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	7/16/2010
• Drafting ~~Team posted a second draft for industry comments~~team (DT) announced / notice sent to DT members	~~March 13, 2007~~7/16/2010
• Notice of development / first 30-day notice	9/2/2010
• New committee chair orientation meeting	8/18/2010
• First DT meeting	11/10/2010
• Notice of Concurrence sent by DT (see step 3) • New meeting announcement / also included in first meeting minutes	11/10/2010
• ~~Drafting Team posted a revised second draft for industry comments~~DT meetings completed	~~April~~ 12~~, 2007~~/15/10 1/18/11 2/10/11 3/11–12/11 3/24/11 4/11/11
• ~~Drafting Team posted a third draft for Operating Committee approval~~Complete first draft and Complete Quality Control Checklist	~~May 14, 2007~~04/13/2011
• ~~WECC Operating Committee approved proposed standard~~	~~June 14, 2007~~
• ~~Drafting Team posted the ATEC Standard for Board approval~~	~~June 22, 2007~~
• ~~WECC Board of Directors approved proposed standard~~	~~July 27, 2007~~

• ~~WECC submits ATEC Standard to NERC for posting~~	~~August 7, 2008~~
• ~~NERC posts the ATEC Standard~~Post first draft for 45 ~~days~~-day comment period	~~September 21, 2007~~04/15/2011
• ~~NERC Board Approval~~	~~March 26, 2008~~

Description of Current Draft:

~~The Automatic Time Error Correction (ATEC) component is now included in the NI's term instead of as a separate term in the ACE equation. This only changes the order of the terms in the ATEC ACE equation, not the calculated ACE.~~

In the FERC Order No.723 to Docket No. RM08-12-000, issued May 29, 2009, approving BAL-004-WECC-1; FERC directed WECC to make several clarifying modifications to the standard. FERC directed WECC to go through the FERC-approved Process for Developing and Approving WECC Standards and make clarifying modifications. In addition, WECC staff identified additional modifications to the existing standard that were required to clarify the intent without changing the requirements. There is also confusion over the requirement that the Area Control Error (ACE) equation used for NERC reports shall be the same ACE equation as the AGC operating mode in use. This seems to conflict with the NERC response to NOPR comments that entities may use an ATEC ACE equation, with automatic time error correction (ATEC ACE) for control, but should use Raw ACE for reporting.

The primary purpose of the following refinements is WECC's Regional Reliability Standard (BAL-004-WECC-2) to implement the directives in FERC Order 723,[1] and to make other clarifications to BAL-004-WECC-1 as the industry deems necessary, without reducing the Western Interconnection's reliability:

1. The Commission is concerned that the phrases "large accumulation" and "in such a situation" as used in Requirement R1.2 leave when a "large" amount of primary inadvertent has accumulated up to individual interpretation. The ERO and WECC agree that the provision could be further clarified. Accordingly, the Commission adopts its NOPR proposal and directs WECC to develop revisions to the provision so that a balancing authority will know specifically the circumstances that trigger the actions required by Requirement R1.2.
2. Consistent with the NOPR, pursuant to section 215(d)(5) of the FPA, the Commission directs WECC to develop a modification to the Regional Reliability Standard consistent with WECC's and NERC's explanation that the limit set forth in Requirement 2 of "24 hours per calendar quarter" is an accumulated total for the period — resulting from either a singular event or a cumulative time limit from a number of events.
3. FERC requires that Balancing Authorities use Raw ACE for CPS reporting and WATEC ACE for control. The Interconnection prefers to use the WATEC ACE for control and CPS reporting. Develop a regional variance to BAL-001-0.1a to resolve the issue.

[1] 127 FERC ¶ 61,176 UNITED STATES OF AMERICA FEDERAL ENERGY REGULATORY COMMISSION, 18 CFR Part 40, Docket No. RM08-12-000; Order No.723, Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction (Issued May 21, 2009)

4. FERC adopts its NOPR proposal and directs that the violation risk factors assigned to BAL-004-WECC-01, Requirements R1, R2, R3, and R4, be modified from "lower" to "medium." The ERO and WECC must submit a filing within 60 days of the effective date of this Final Rule that includes the directed modifications.
5. The Commission adopts its NOPR proposal and directs the ERO and WECC to submit violation severity levels for each Requirement and sub-Requirement that has been assigned a violation risk factor. To allow adequate time for the development of the violation severity levels, the ERO and WECC must submit a filing within 120 days of the effective date of this Final Rule that includes the directed violation severity levels.

The implementation of an ATEC ACE is part of a regional variance to the NERC BAL-001-0.1a Standard associated with this posting. The purpose of this BAL-004-WECC-2 Regional Standard is to include the other requirements in BAL-004-WECC-1 with the additional refinements directed by FERC. Refinements from the existing BAL-004-WECC-1 include:

1. A requirement Balancing Authorities to set L_{max} equal to $L_{10}$when an Accumulated Primary Inadvertent Interchange exceeds 24 times $L_{10.}$
2. A requirement that limits a Balancing Authority's Primary Inadvertent to 200% of the previous calendar year's Peak Demand.
3. A clarification in response to the FERC order that the accumulated ATEC out of service shall not exceed 24 hours during a calendar quarter.

The proposed standard retains the requirement for Balancing Authorities to compute the Automatic Time Error Correction and Primary Inadvertent Interchange by 50 minutes after the hour, and requires that Balancing Authorities have the ability to operate in other modes. In addition, Balancing Authorities are required to recalculate Primary Inadvertent Interchange when hourly and month-end adjustments are made.

Future Development Plan:

Anticipated Actions	Anticipated Date
• Meet to answer to comments, address impact statement and draft responses	06/03/2011
• Post responses to comments	06/30/2011
• Post the second draft for a 30-day comment period	06/30/2011
• Meet to answer to comments, address impact statement and draft responses	08/13/2011
• Post responses to comments	08/02/2011
• Post draft standard for a 45-day NERC comment period	08/2011
• NERC comment period ends	09/30/2011
• Post for comment and Operating Committee approval	09/9/2011
• Operating Committee approves proposed standard	10/13-15/2011

• Post draft standard for WECC Board approval	10/2011
• WECC Board approves proposed standard	11-12/2011
• Post draft standard for 15-day NERC comment period	12/2011
• NERC comment period ends	01/2012
• DT completes review and consideration of industry comments to NERC posting	01/2012
• Submit NERC Board approval request	01/2012
• Receive NERC Board approval	02/2012
~~1.~~• Request FERC ~~Approval~~approval	~~May 2008~~02/2012
~~2. Request Canadian Regulatory Approval~~	~~2008~~

.

Implementation Plan

The Implementation Plan is to make the regional variance to NERC Reliability Standard BAL-001-0.1a and WECC Regional Reliability Standard BAL-004-WECC-2 effective on the first day of the second quarter, after FERC approval. Since entities are already controlling their Balancing Authority Area with the ATEC ACE equation – but are reporting using the NERC Raw ACE equation for reporting CPS1 – the transition to controlling and reporting using the ATEC ACE should be minimal. It should not take much time to implement the limits and actions required when a Balancing Authority's Accumulated Primary Inadvertent Interchange exceeds the defined limits.

Definitions of Terms Used in Regional 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 definitions will be removed from the standard and added to the NERC Glossary.

Insert any new definitions. The DT is encouraged NOT to create new definitions; however, if a capitalized term is used in the body of document, it must have corresponding definition. New definitions are not needed where the capitalized terms are proper nouns. Usually, a new term is only added to define a technical term not otherwise understood without the definition.

Automatic Time Error Correction: A frequency control automatic action that a Balancing Authority uses to offset its frequency contribution to support the Interconnection's scheduled frequency.

Primary Inadvertent Interchange~~:~~ (PII): The component of area (n) inadvertent interchange caused by the regulating deficiencies of the area (n).

~~**Secondary Inadvertent Interchange:** The component of area (n) inadvertent interchange caused by the regulating deficiencies of area (i).~~

A. Introduction

1. Title: **Automatic Time Error Correction**

2. Number: BAL-004-WECC-~~01~~02

3. Purpose: To maintain Interconnection frequency ~~within a predefined frequency profile under all conditions (i.e. normal and abnormal), and~~ and to ensure that Time Error Corrections and Primary Inadvertent Interchange (PII) payback are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection.

4. Applicability~~:~~

4.1. Functional Entities

~~1.~~Balancing Authorities ~~(BA)~~ that operate synchronously to the Western Interconnection.

5. Effective Date: On the first day of the ~~first~~second quarter, after ~~applicable regulatory~~FERC approval.

~~B. Requirements~~

~~**R1.** Each BA that operates synchronously to the Western Interconnection shall continuously operate utilizing Automatic Time Error Correction (ATEC) in its Automatic Generation Control (AGC) system. [Risk Factor: Lower]~~

$$ACE_{ATEC} = (NI_A - NI'_S) - 10B_i(F_A - F_S) - T_{0b} + I_{ME}$$

~~**Where:**~~

~~NI_A = Net Interchange Actual (MW).~~

~~F_A = Frequency Actual (Hz).~~

~~F_S = Frequency Scheduled (Normally 60 Hz).~~

~~B_i = Frequency Bias for the~~ **6. Background:**

In February 2003, WECC Automatic Time Error Correction (ATEC) Procedure became effective for all Balancing Authorities in the Western Interconnection. The original intent was to try to minimize the number of Manual Time Error Corrections in the Western Interconnection. ATEC provides the added benefit of a superior approach over the current NERC Manual Time Error Correction (BAL-004-0) for assigning costs and providing for the equitable payback of inadvertent interchange. In October 2006, the WECC Procedure became a WECC Standard. In May 2009, FERC issued Order No.723 that approved Regional Reliability Standard BAL-004-WECC-1 (Automatic Time Error Correction), as submitted by NERC. The effective date of the BAL-004-WECC-1 standard was July 1, 2009. In addition, the Commission directed WECC to develop several modifications to the Regional Reliability Standard BAL-004-WECC-1. The

Regional Reliability Standard BAL-004-WECC-1 requires Balancing Authorities within the Western Interconnection to maintain Interconnection frequency within a predefined frequency profile, and to ensure that Time Error Corrections are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection. FERC directed WECC to make several clarifying modifications to the standard through the FERC-approved Process for Developing and Approving WECC Standards. In September 2009, WECC received WECC Standards/Regional Criterion Request Form (Request) WECC-0068, which is a modification of BAL-004-WECC-1. In July 2010, the chair of the WECC Operating Committee assigned the Request to the Performance Work Group (PWG) for development.

B. Requirements and Measures

When a Balancing Authority's ~~Area (MW / 0.1 Hz).~~

R1. ~~T_{0b} = **Remaining Bilateral Payback for**~~ Accumulated Primary Inadvertent Interchange ~~**created prior to implementing automatic payback (MW).**~~ **(**PII_{accum}**)** for either the On-Peak or Off-Peak periods exceeds 24 times (L_{10}),[1] plus the absolute value of the previous month's On-Peak or Off-Peak month-end adjustments for meter readings, the Balancing Authority shall:

~~I_{ME} = Meter Error Correction (MW).~~

~~$NI'_S = NI_S - \frac{II_{Primary}^{on/off\ peak}}{(-Y) * H}$~~

~~NI_S = Net Interchange Scheduled (MW).~~

~~$Y = B_i / B_S$.~~

1.1 ~~H = **Number**~~ Identify and correct the source of ~~**Hours used to payback**~~ any metering or accounting error(s);

1.2 Recalculate the hourly Primary Inadvertent Interchange ~~**Energy. The WECC Performance Work Group has set the**~~

Rationale for R1:

Assumption: The 24 times L_{10} is the value for PII_{accum} where Balancing Authorities should take predefined additional actions to reduce PII_{accum}.
Justification: Balancing Authorities should take predefined actions to minimize PII_{accum} once an activation point is exceeded.
Goal: To establish a PII_{accum} limit that requires a Balancing Authority to take predefined actions to reduce its PII_{accum} in a manner that does not adversely affect the reliability of the Interconnection.

[1] In requirement R1, the L_{10} for each Balancing Authority Ar
bias for the previous calendar year; and, for Generation Onl
calculated by using 1% of installed capacity as published by

(PII$_{hourly}$) and the PII$_{accum}$ from the time of the error;

1.3 Validate the implementation of ATEC; and

1.4 Set L_{max} equal to L_{10} until the PII$_{accum}$ for either the On-Peak or an Off-Peak period is below 24 times L_{10}, plus the absolute value of ~~H~~the previous month's On-Peak or Off-Peak month-end adjustments for meter readings. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M1. Each Balancing Authority shall have, and provide upon request, evidence that demonstrates that when its PII$_{accum}$ exceeded 24 times L_{10}, plus the absolute value of the previous month's month-end On-Peak or Off-Peak period adjustments for meter readings, it performed the following:

1.1 Identified and corrected the source of any metering or accounting error(s);

1.2 Recalculated the PII$_{hourly}$ and the PII$_{accum}$ from the time of the error;

1.3 Validated the implementation of ATEC; and

1.4 Set L_{max} equal to ~~3.~~ L_{10} until the PII$_{accum}$ for either the On-Peak or Off Peak periods is below 24 times L_{10} plus the absolute value of the previous month's On-Peak or Off-Peak month end adjustments for meter readings.

~~B_S = **Frequency Bias for**~~

Acceptable evidence of the ~~Interconnection (MW / 0.1 Hz).~~

~~$H^{on/off\ peak}_{primary}$ =~~above is one of the following:

- Data, screen shots, etc., from the WIT Tool that demonstrate compliance with requirement R1;
- Data, screen shots, etc., from the internal Balancing Authority tool that demonstrate compliance with requirement R1; or
- Any other databases, spreadsheets, displays, etc., that demonstrate compliance with requirement R1.

R2. Each Balancing Authority's PII$_{accum}$ shall not exceed 200% of the previous calendar year's Peak Demand. *[Violation Risk Factor Medium:] [Time Horizon: Operations Assessment]*

M2. Each Balancing Authority has, and provides upon request, evidence that demonstrates that the Balancing Authority's PII$_{accum}$ did not exceeded 200% of the previous calendar year's Peak Demand. Acceptable evidence of the above is one of the following:

- Data, screen shots, etc., from the WIT Tool that demonstrate compliance with requirement R2;

Rationale for R2:

Assumption: Balancing Authority should make sure that PII$_{accum}$ does not exceed 200% of the previous year's Peak Demand.
Justification: PII$_{accum}$ may grow from month-end adjustments and metering errors, even with the inclusion of I_{ATEC} in the ACE equation.
Goal: To limit the amount of PII$_{accum}$ that a Balancing Authority can have at one time.

Developed as: **WECC-0068**
Adopted by NERC Board of Trustees:
Mandatory Effective Date:

- Data, screen shots, etc., from the internal Balancing Authority tool that demonstrate compliance with requirement R2; or
- Any other databases, spreadsheets, displays, etc., that demonstrate compliance with requirement R2.

R3. If an error in the calculation of PII is discovered, each Balancing Authority shall recalculate PII and adjust the PII_{accum} from the time of the error, within 90 days of the discovery. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M3. A Balancing Authority shall provide upon request evidence and that it recalculated the PII and adjusted the PII_{accum} within 90 days of the discovery. Acceptable evidence of the above is one of the following:

- Data, screen shots, etc., from the WIT Tool that demonstrate compliance with requirement R3;
- Data, screen shots, etc., from the internal Balancing Authority tool that demonstrate compliance with requirement R3; or
- Any other databases, spreadsheets, displays, etc., that demonstrate compliance with requirement R3.

Rationale for R3:

Assumption: When a Balancing Authority finds an error in the calculation of PII, Balancing Authorities need time to correct the error and recalculate PII and PII_{accum}.
Justification: The drafting team selected 90 days as a reasonable amount of time to correct an error and recalculate PII and PII_{accum}, since recalculation of PII and PII_{accum} is not a real-time operations reliability issue.
Goal: To promote the timely correction of errors in the calculation of PII and PII_{accum}.

R4. Each Balancing Authority shall not have ATEC out of service for more than an accumulated ~~**primary inadvertent interchange in MWh. An On-Peak and Off-Peak accumulation accounting is**~~ 24 hours per calendar quarter. *[Violation Risk Factor: Medium] [Time Horizon: Same-day Operations]*

M4. Each Balancing Authority shall have and provide upon request, evidence ATEC was not out of service for more than 24 hours per calendar quarter. Acceptable evidence is dated achieved files, historian data, and other data that demonstrates the ATEC was in service as required~~.~~ by requirement R4.

~~Where:~~

Rationale for R4:

Assumption: When a Balancing Authority does not participating in ATEC, payback of PII_{accum} is delayed.
Justification: The limit of 24 hours per quarter discourages a Balancing Authority from withdrawing ATEC participation, for example, for economic gain during selected hours. If the limits were increased to 60 hours, a Balancing Authority could technically withdraw ATEC participation for one hour from Monday to Friday.
Goal: To promote fair and timely payback of PII_{accum} balances.

~~$II_{primary}^{on/off\ peak}$ = last period's $II_{primary}^{on/off\ peak}$ + (1-Y) * (II_{actual} - B_i * ΔTE/6)~~

~~II_{actual} is the hourly Inadvertent Interchange for the last hour.~~

~~ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor.~~

~~Where:~~

~~ΔTE = $TE_{end\ hour}$ - $TE_{begin\ hour}$ - TD_{adj} (t)*(TE offset)~~

~~TD_{adj} is any operator adjustment to the control center Time Error to correct for differences with the time monitor.~~

~~t is the number of minutes of Manual Time Error Correction that occurred during the hour.~~

~~TE offset is 0.000 or +0.020 or -0.020.~~

~~The absolute value of the WECC~~

R5. By 50 minutes after each hour, each Balancing Authority shall compute the following:

5.1. PII_{hourly},

5.2. On peak PII_{accum},

5.3. Off peak PII_{accum},

~~R1.1.~~**5.4.** Automatic Time Error Correction term ~~is limited as follows:~~(I_{ATEC}~~).~~

$$\left| \frac{II_{primary}^{on/off\ peak}}{(1\text{-}Y)\cdot H} \right| \leq L_{max}$$

~~Where L_{max} is chosen by the~~ *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

Rationale for R5:

Assumption: PII_{hourly}, PII_{accum}, and I_{ATEC} should be determined before the next scheduling hour begins.
Justification: To promote timely calculations 50 minutes was selected because it is before the next hour ramp begins and permits time to collect the data and resolve interchange metering values.
Goal: To promote the timely calculation of PII_{hourly}, PII_{accum}, and I_{ATEC}.

M5. The Balancing Authority ~~and is bounded as follows~~shall have and shall produce upon request the following on an hourly basis:

~~0.20 * |B_i| ≤ L_{max} ≤ L_{10}~~

~~L_{10} is the Balancing Authority CPS2 limit in MW. If the WECC Automatic Time Error Correction term is less than the upper limit, use the calculated WECC Automatic Time Error Correction term.~~

~~**R1.2.** Large accumulations of primary inadvertent point to an invalid implementation of ATEC, loose control, metering or accounting errors. A BA in such a situation should identify the source of the error(s) and make the corrections, recalculate the primary inadvertent from the time of the error, adjust the accumulated primary inadvertent caused by the error(s), validate the~~

~~implementation of ATEC, set L_{max} equal to L_{10} and continue to operate with ATEC reducing the accumulation as system parameters allow.~~

~~**R2.** Each BA that is synchronously connected to the Western Interconnection and operates in any AGC operating mode other than ATEC shall notify all other BAs of its operating mode through the designated Interconnection communication system. Each BA while synchronously connected to the Western Interconnection will be allowed to have ATEC out of service for a maximum of 24 hours per calendar quarter, for reasons including maintenance and testing. [Risk Factor: Lower]~~

~~BAs in the Western Interconnection~~

5.1. PII_{hourly}.

5.2. On peak PII_{accum}.

5.3. Off peak PII_{accum}.

5.4. I_{ATEC}.

Acceptable evidence of the above is one of the following:

- Data, screen shots, etc., from the WIT Tool that demonstrate compliance with requirement R5;
- Data, screen shots, etc., from internal Balancing Authority tool that demonstrate compliance with requirement R5; or
- Any other databases, spreadsheets, displays, etc. that demonstrate compliance with requirement R5.

R6. Each Balancing Authority shall be able to change ~~their~~its AGC operating mode between Flat Frequency (for blackout restoration~~);~~; Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error Control (used in ATEC mode). *[Violation Risk Factor: Medium] [Time Horizon: Real-Time Operations]*

~~**R3.**~~**M6.** Each Balancing Authority demonstrates upon request that it has the ability to operate as required by requirement R6 in Flat Frequency (for blackout restoration; Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error ~~control (used in ATEC mode). The ACE used for NERC reports~~Control. Acceptable demonstration shall ~~be the same ACE as the AGC~~

Developed as: **WECC-0068**
Adopted by NERC Board of Trustees:
Mandatory Effective Date:

Rationale for R6:

Assumptions: The ACE equation, and hence the AGC mode, will contain any number of parameters based on system operating conditions. Various AGC modes are identified corresponding to those operating conditions, as well as the specific sets of parameters included in the ACE equation.
Justification: Changing to the proper operating mode, corresponding to current operating conditions, affords proper movement of generating units in response to those conditions. The addition of the ATEC term results in an additional AGC mode and a different set of parameters. The inability to correctly calculate the ATEC term would dictate that AGC not be operated in the ATEC mode.
Goal: To set the AGC mode and calculate ACE in a manner that corresponds to the system operating conditions and to accommodate changes in those conditions.

operating mode ininclude use. [Risk Factor: Lower] of a test system.

R4. Regardless of the AGC operating mode each BA in the Western Interconnection shall compute its hourly Primary Inadvertent Interchange when hourly checkout is complete. If hourly checkout is not complete by 50 minutes after the hour, compute Primary Inadvertent Interchange with best available data. This hourly value shall be added to the appropriate accumulated Primary Inadvertent Interchange balance for either On-Peak or Off-Peak periods. [Risk Factor: Lower]

R4.1. Each BA in the Western Interconnection shall use the change in Time Error distributed by the Interconnection Time Monitor.

R4.2. All corrections to any previous hour Primary Inadvertent Interchange shall be added to the appropriate On- or Off-Peak accumulated Primary Inadvertent Interchange.

R4.3. Month end Inadvertent Adjustments are 100% Primary Inadvertent Interchange and shall be added to the appropriate On- or Off-Peak accumulated Primary Inadvertent Interchange, unless such adjustments can be pinpointed to specific hours in which case R4.2 applies.

R4.4. Each BA in the Western Interconnection shall synchronize its Time Error to the nearest 0.001 seconds of the system Time Error by comparing its reading at the designated time each day to the reading broadcast by the Interconnection Time Monitor. Any difference shall be applied as an adjustment to its current Time Error.

C. Measures

M1. For Requirement R1, a BA shall provide upon request a document showing that it is correctly calculating its hourly Primary Inadvertent Interchange number that is used to calculate its accumulated Primary Inadvertent Interchange and how it is used in its ACE equation for Automatic Time Error Correction.

M2. For Requirement R2, a BA shall record the date, time, reason, and notification [to other BAs within the Western Interconnection] for any time it is not operating utilizing Automatic Time Error Correction (ATEC) in its AGC system.

M3. For Requirement R3, a BA in the Western Interconnection must be able to demonstrate its ability to change its AGC operating mode when requested or during compliance audits and readiness reviews.

M4. For Requirement R4, a BA in the Western Interconnection must record its hourly Primary Inadvertent Interchange and keep an accurate record of its accumulation of Primary Inadvertent Interchange for both On-Peak and Off-Peak accounts. These records must be available for review when requested or during compliance audits and readiness reviews.

R7. When making adjustments to hourly Inadvertent Interchange or ΔTE, each Balancing Authority shall recalculate the PII_{hourly} and On- or Off-Peak PII_{accum}. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M7. For each hour requested, each Balancing Authority shall provide the calculated PII_{hourly} and On-Peak or Off-Peak PII_{accum} for each hour of the request. Acceptable evidence of the above shall include one of the following:

- Data, screen shots, etc., from the WIT Tool that demonstrate compliance with requirement R7:
- Data, screen shots, etc., from an internal Balancing Authority tool that demonstrate compliance with requirement R7; or
- Any other databases, spreadsheets, displays, etc., that demonstrate compliance with requirement R7.

Rationale for R7:

Assumptions: Hourly adjustments to hourly II requires a recalculation of the corresponding hourly PII value, the corresponding PII_{accum}, and all subsequent PII_{accum} for every hour up to the current hour.
Justification: As hourly PII is corrected, then PII_{accum} should be recalculated.
Goal: To promote accurate, fair and timely payback of accumulated PII balances.

R8. For any month end adjustments for meter readings to Inadvertent Interchange, each Balancing Authority shall make the same adjustment to the PII_{accum}. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M8. Each Balancing Authority shall have, and provide upon request, all month-end adjustments and On-Peak or Off-Peak PII_{accum} adjustments. Acceptable evidence of the above shall include one of the following:

- Data, screen shots, etc., from the WIT Tool that demonstrate compliance with requirement R8;
- Data, screen shots, etc from an internal Balancing Authority tool that demonstrate compliance with requirement R8;
- Any other databases, spreadsheets, displays, etc., that demonstrate compliance with requirement R8.

Rationale R8:

Assumptions: Month-end adjustments are required, for example, when a Balancing Authority performs monthly comparisons of recorded PII_{hourly} against actual revenue-grade meter readings.
Justification: Month-end adjustments to II are applied as 100% PII. 100% was chosen for simplicity to bilaterally assign PII to both Balancing Authorities, since the effect of this metering error on system frequency is not easily determined over the course of a month.
Goal: To provide a mechanism by which corresponding month-end II adjustments can be applied to PII_{accum}, when such adjustments cannot be attributed to any one particular hour or series of hours.

~~D.~~ C. Compliance

1. **Compliance** ~~Monitoring Process~~ **Enforcement Authority**

~~1.1. Compliance Monitoring Responsibility~~

Regional Entity

~~Compliance Monitoring Period and Reset time Frame~~

~~The reporting period for ATEC is one calendar quarter, starting on the first second of the quarter and ending on the final second of the quarter.~~

~~The Performance-reset Period is one calendar quarter.~~

1.2. ~~Data~~**Evidence Retention**

Each Balancing Authority in the Western Interconnection shall retain its hourly calculation of total PII_{accum} and ~~Primary Inadvertent Interchange calculated hourly,~~PII_{hourly}; as well as the amount of ~~Primary Inadvertent~~PII paid back hourly for the preceding calendar year (January – December~~)~~), plus the current year.

Each Balancing Authority in the Western Interconnection shall retain its ~~total accumulated Inadvertent~~PII_{hourly} and total ~~Primary Inadvertent, updated hourly, for~~ On-Peak and Off-Peak PII_{accum} for the preceding calendar year (January – December~~)~~), plus the current year.

Each Balancing Authority in the Western Interconnection shall retain in its ~~record of~~records the amount of time it operated without ATEC; and the notification to the Interconnection of ~~these~~those times for the preceding calendar year (January – December~~)~~), plus the current year.

~~The~~ Compliance ~~Monitor shall retain audit data for three calendar years.~~Monitoring and Assessment Processes:

- Compliance Audits
- Self-Certifications
- Spot Checking
- Compliance Violation Investigations
- Self-Reporting
- Complaints

1.3. **Additional Compliance Information**

~~The Compliance Monitor shall use quarterly data to monitor compliance. The Compliance Monitor may also use periodic audits (on site, per a schedule), with spot reviews and investigations initiated in response to a complaint to assess performance.~~

~~The Balancing Authority in the Western Interconnection shall have the following documentation available for its Compliance Monitor to inspect during a scheduled, on-site review or within five business days of a request as part of a triggered investigation:~~

~~1.3.1. Source data for calculating Primary Inadvertent.~~

~~1.3.2. Data showing On- and Off-Peak Primary Inadvertent accumulations.~~

~~1.3.3. Data showing hourly payback of Primary Inadvertent.~~

~~1.3.4. Documentation on number of times not on ATEC and reasons for going off ATEC.~~

~~2. Violation Severity Levels~~

~~**2.1. Lower:** Time not in ATEC Mode greater than one day and less than or equal to three days, or if a Balancing Authority in the Western Interconnection operates without ATEC and does not notify other Balancing Authorities in the Western Interconnection 2 times in quarter.~~

~~**2.2. Moderate:** Time not in ATEC Mode greater than three days and less than or equal to five days, or if a Balancing Authority in the Western Interconnection operates without ATEC and does not notify other Balancing Authorities in the Western Interconnection 3 times in quarter.~~

~~**2.3. High:** Time not in ATEC Mode greater than five days and less than or equal to seven days, or if a Balancing Authority in the Western Interconnection operates without ATEC and does not notify other Balancing Authorities in the Western Interconnection 4 times in quarter.~~

~~**2.4. Severe:** Time not in ATEC Mode greater than seven days, or if a Balancing Authority in the Western Interconnection operates without ATEC and does not notify other Balancing Authorities in the Western Interconnection more than 4 times in quarter or Balancing Authority in the Western Interconnection cannot change AGC operating mode or Balancing Authority in the Western Interconnection incorrectly calculates Primary Inadvertent.~~

~~**Version History**~~

None

Table of Compliance Elements

~~Version #~~	~~Date~~Time Horizon	~~Action~~VRF	~~Change Tracking~~Violation Severity Levels			
	~~February 4, 2003~~	~~Effective Date~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
~~1~~	~~October 17, 2006~~	~~Created Standard from Procedure.~~	~~Errata~~			
~~1~~R1	~~February 6, 2007~~Operations Assessment	Medium	Balancing Authority did not validate the implementation of ATEC.	~~Changed the Standard Version from 0 to 1 in the Version History Table.~~Balancing Authority did not recalculate the PII_{hourly} and the PII_{accum} from the time of the error.	~~Errata~~Balancing Authority did not identify and correct the source of any metering or accounting error(s).	Balancing Authority did not set L_{max} equal to L_{10}, until the PII_{accum} is below 24 times L_{10} of the previous calendar year's peak demand (or peak generation for generation-only Balancing Authorities).
~~1~~R2	~~February 6, 2007~~Operations Assessment	Medium	~~The upper limit bounds to the amount of Automatic Time Error Correction term was~~	~~Errata~~The Balancing Authority's PII_{accum} exceeded for any hour 250%, but was less than or equal to 300% of the previous	The Balancing Authority's PII_{accum} exceeded for any hour 300%, but was less than or equal to 350% of the previous	The Balancing Authority's PII_{accum} exceeded for any hour 350% of the previous calendar year's Peak Demand.

~~Version R #~~	~~Date~~Time Horizon	~~Action~~VRF	~~Change Tracking~~Violation Severity Levels			
	~~February 4, 2003~~	~~Effective Date.~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
			~~inadvertently omitted during the Standard Translation. The bound was added to the requirement R1.4.~~The Balancing Authority's PII_{accum} exceeded 200% for any hour, but was less than or equal to 250% of the previous calendar year's Peak Demand.	calendar year's Peak Demand.	calendar year's Peak Demand.	
~~1~~R3	~~February 6, 2007~~Operations Assessment	Medium	~~The statement "The Time Monitor may declare offsets in 0.001-second increments" was moved from~~	~~Errata~~The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} from the time of the error within 120 days	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} from the time of the error within 150 days	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} from the time of the error within 180 days

~~Version R #~~	~~Date~~Time Horizon	~~Action~~VRF	~~Change Tracking~~Violation Severity Levels			
	~~February 4, 2003~~	~~Effective Date.~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
			~~TEoffset to TDadj and offsets was corrected to adjustments.~~The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} I from the time of the error within 90 days of the discovery; but did make the required recalculations and adjustments within 120 days.	of the discovery; but did make the required recalculations and adjustments within 150 days.	of the discovery; but did make the required recalculations and adjustments within 180 days.	of the discovery.
~~1~~R4	~~February 6, 2007~~Real-Time Operations	Medium	~~The reference to seconds was deleted from the TE offset term.~~The Balancing Authority	~~Errata~~The Balancing Authority operated without ATEC in service for more than 72 hours, but less	The Balancing Authority operated without ATEC in service for more than 120 hours, but less	The Balancing Authority operated without ATEC in service for more than 168 hours during a

~~Version R #~~	~~Date~~Time Horizon	~~Action~~VRF	~~Change Tracking~~Violation Severity Levels			
	~~February 4, 2003~~	~~Effective Date~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
			operated without ATEC in service for more than 24 hours, but less than or equal to 72 hours during a calendar quarter.	than or equal to 120 hours during a calendar quarter.	than or equal to 168 hours during a calendar quarter.	calendar quarter.
~~1~~R5	~~June 19, 2007~~Operations Assessment	Medium	~~The standard number BAL-STD-004-1 was changed to BAL-004-WECC-01 to be consistent with the NERC Regional Reliability Standard Numbering Convention.~~ The Balancing Authority did not compute all of the PII terms and I_{ATEC} within 50 minutes, but made the required	~~Errata~~The Balancing Authority did not compute all of the PII terms or I_{ATEC} within two hours, but made the required calculations in less than or equal to four hours.	The Balancing Authority did not compute all of the PII terms and I_{ATEC} within four hours, but made the required calculations in less than or equal to six hours.	The Balancing Authority did not compute all of the PII terms and I_{ATEC} within six hours.

~~Version #~~	~~Date~~Time Horizon	~~Action~~VRF	~~Change Tracking~~Violation Severity Levels			
	~~February 4, 2003~~	~~Effective Date~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
			calculations in less than or equal to two hours.			
R6	Real-Time Operations	Medium	N/A	N/A	N/A	The Balancing Authority is not able to change its AGC operating mode between Flat Frequency (for blackout restoration; Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; or Tie Line Bias plus Time Error control (used in ATEC mode).
R7	Operations Assessment	Medium	N/A	N/A	N/A	When making adjustments to hourly

~~Version R #~~	~~Date~~Time Horizon	~~Action~~VRF	~~Change Tracking~~Violation Severity Levels			
	~~February 4, 2003~~	~~Effective Date~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
						Inadvertent Interchange or ΔTE, the Balancing Authority did not recalculate the PII_{hourly} and the On-Peak or Off-Peak PII_{accum}.
R8	Operations Assessment	Medium	N/A	N/A	N/A	When making any month end adjustments for meter readings to Inadvertent Interchange, the Balancing Authority did not make the same adjustment to the PII_{accum}.

D. Interpretations

None.

E. Associated Documents

None.

F. Version Control

Version Control shows approval history and summary of changes.

Version	Date	Action	Change Highlights
1		Version X Posted	
2		(Insert completion steps as needed)	
3		Standing Committee Approval	
4		WECC Board Approval	

Guidelines and Technical Basis

Requirement R1:

Requirement R2:

Requirement R3:

Requirement R4:

Requirement R5:

Requirement R6:

Requirement R7:

Requirement R8:

Comment Report Form for Project WECC-0068 Modification of BAL-004-WECC-1 Posting 1

The Project WECC-0068 (Regional Variance to BAL-001-0.1a — Real Power Balancing Control Performance and refinements to BAL-004-WECC-2 — Automatic Time Error Correction) Drafting Team thanks everyone who submitted comments on the WECC Regional Variance to the NERC BAL-001- 0.1a — Real Power Balancing Control Performance and to BAL-004-WECC-2 — Automatic Time Error Correction. These standards were posted for a 45-day public comment period from April 15, 2011 through June 1, 2011. WECC distributed the notice for the posting on April 15, 2011. The Standard Drafting Team asked stakeholders to provide feedback on the variance to the NERC Reliability Standard through a special Standard Comment Form. WECC received comments from six companies representing two of the 10 Industry Segments, as shown in the table on the following page.

In this "Consideration of Comments" document, stakeholder's comments have been organized so that it is easier to see the responses associated with each stakeholder. All comments received on the standard can be viewed in their original format at:

http://www.wecc.biz/Standards/Development/WECC-0068/Lists/WECC0068%20Modification%20of%20BAL004WECC1%20Posting%201%20for/AllItems.aspx

If you feel that your comment has been overlooked, please let WECC know immediately. WECC's goal is to give every comment serious consideration in this process. If you feel there has been an error or omission, please contact the Director of Standards, Steve Rueckert, at steve@wecc.biz. In addition, there is a WECC Reliability Standards Appeals Process.[1]

[1] The appeals process is described in the Process for Developing and Approving WECC Standards: http://www.wecc.biz/Standards/Documents/WECC%20Standards%20Development%20Process.pdf

Comment Report Form for Project WECC-0068 Modification of BAL-004-WECC-1

The Industry Segments are:

1 — Transmission Owners
2 — RTOs, ISOs
3 — Load-serving Entities
4 — Transmission-dependent Utilities
5 — Electric Generators
6 — Electricity Brokers, Aggregators, and Marketers
7 — Large Electricity End Users
8 — Small Electricity End Users
9 — Federal, State, Provincial Regulatory or other Government Entities
10 – Regional Reliability Organizations, Regional Entities

Commenter		Organization	Industry Segment									
			1	2	3	4	5	6	7	8	9	10
1.	Mark Thompson	Alberta Electric System Operator	✓									
2.	Perpetuo Tan	LDWP	✓				✓					
3.	Aaron Paulson, 360-418-8687 Submitted on behalf of the following SME: James P. Murphy	Bonneville Power Administration	✓									
4.	Craig N. Figart	Avista Corp	✓				✓					
5.	Will Franklin William.l.franklin@xcelenergy.com	Xcel Energy/PSCo	✓				✓					
6.	Nicholas L. Hall	Constellation Energy Control and Dispatch					✓					

Index to Questions, Comments, and Responses

Comment Report Form for Project WECC-0068 Modification of BAL-004-WECC-1

1. **Do you agree that implementing an Area Control Error with an Automatic Time Error Correction (ATEC) component as a Regional Variance to the NERC BAL-001-0.1a – Real Power Control Performance is appropriate? If you answered YES to the previous question, please explain why you support the Regional Variance. If you answered NO to the previous question, please give your reasons for not supporting the Regional Variance and indicate your recommendations for implementing ATEC.**

Summary Consideration:

Commenter	Yes	No	Comment
Mark Thompson, Alberta Electric System Operator mark.thompson@aeso.ca	Yes		Because the WECC equation changes the NERC ACE calculation.
Response: Thank you, the drafting team appreciates and agrees with your comment.			
Perpetuo Tan LDWP			
Response:			
Aaron Paulson, Bonneville Power Administration, 360-418-8687 Submitted on behalf of the following SME: James P. Murphy	Yes		Because the control performance standard should be based on the actual ACE each BA is using for control. Currently WECC's control performance is being based on an offset of each BA's actual control.
Response: Thank you, the drafting team agrees that the actual control performance should be measured against the intended control target.			
Craig N. Figart Avista Corp		No	YES, but NO mostly because I don't want to have to change our existing EMS ACE and CPS calculations.
Response: The drafting team agrees that some EMS algorithms will have to be modified to use only one ACE for both control and reporting. There will be time allowed in the implementation plan to make the required modifications in three to six months after FERC approval.			
Will Franklin Xcel Energy/PSCo William.l.franklin@xcelenergy.com	Yes		We believe that the variance is appropriate to allow entities to be measured on the ACE to which they are actually operating to.
Response: Thank you, the drafting team agrees that the actual control performance should be measured against the intended control target.			
Nicholas L. Hall Constellation Energy Control and Dispatch nicholas.hall@constellation.com	Yes		
Response: Thank you.			

2. Does the addition of the ATEC term *(I_{ATEC})* in the ACE equation create an increased risk to reliability? If you answer YES to the previous question, please identify those increased risks. If you answered NO to the previous question, please explain why you believe there are no increased risks to reliability.

Summary Consideration:

Commenter	Yes	No	Comment
Mark Thompson, Alberta Electric System Operator mark.thompson@aeso.ca		No	There is no evidence that the current ATEC equation reduces reliability and there are other standards are in place to ensure reliability.
Response: Thank you.			
Perpetuo Tan LDWP			
Response:			
Aaron Paulson, Bonneville Power Administration, 360-418-8687 Submitted on behalf of the following SME: James P. Murphy		No	WECC has been operating under the WECC ATEC standard for many years and no reliability issues have arose.
Response: Thank you.			
Craig N. Figart Avista Corp		No	Adding the ATEC term into the ACE equation will cause our CPS1 and 2 calculations to more accurately reflect actual operations, which in theory, should lead to increased reliability.
Response: Thank you			
Will Franklin Xcel Energy/PSCo William.l.franklin@xcelenergy.com			
Response:			
Nicholas L. Hall Constellation Energy Control and Dispatch nicholas.hall@constellation.com		No	
Response: Thank you			

3. Do you agree that limiting I_{ATEC} to L_{max} may prevent CPS2 violations and reduce the reliability risks in the Interconnection? If you answered YES to the previous questions, please explain why you believe the Interconnection reliability risks are reduced. If you answered NO to the previous question, please explain why you believe the Interconnection reliability risks are increased.

Summary Consideration:

Commenter	Yes	No	Comment
Mark Thompson, Alberta Electric System Operator mark.thompson@aeso.ca		No	Systems will now be controlling to the same ACE number that is reported on.
Response: Thank you for your comment. The drafting team agrees that having a single ACE will reduce the likelihood of CPS2 violations created by having a control equation that is different than the performance equation. The limit on L_{max} reduces potential reliability risks to the Interconnection caused by a large ATEC payback term.			
Perpetuo Tan LDWP			
Response:			
Aaron Paulson, Bonneville Power Administration, 360-418-8687 Submitted on behalf of the following SME: James P. Murphy			If each BA is controlling to the ATEC ACE and the ATEC ACE is used as our NERC reporting ACE then there should be no affect on CPS2. Limiting the payback of inadvertent for each hour makes sense to limit the effect on transmission paths and inadvertent. Also, WECC has been operating this way for years with no reliability issues.
Response: Thank you for your comment. The drafting team agrees with your comment.			
Craig N. Figart Avista Corp	Yes		Yes - This is not a change. Don't know for sure but there must have been a good reason for limiting IATEC to Lmax in the original BAL-004. Limiting payback to L_{10} will prevent transmission overloads caused by wide ace deviations.
Response: Thank you for your comment.			
Will Franklin Xcel Energy/PSCo William.l.franklin@xcelenergy.com			
Response:			
Nicholas L. Hall Constellation Energy Control and Dispatch nicholas.hall@constellation.com	Yes		
Response: Thank you			

4. Are the ranges for L_{max} in Requirement E.B.3 (i.e., 0.20 * |B| ≤ L_{max} ≤ L_{10}) appropriate for correcting Primary Inadvertent Interchange (PII) and reducing the likelihood of CPS2 violations? If you answered YES to the previous question, please explain why you believe the range is appropriate. If you answered NO to the previous question, please explain why you believe is not appropriate.

Summary Consideration:

Commenter	Yes	No	Comment
Mark Thompson, Alberta Electric System Operator mark.thompson@aeso.ca	Yes		The AESO believes the range is appropriate and we have not experienced any problems with correcting PII when paying pack known meter errors.
Response: Thank you for the response.			
Perpetuo Tan LDWP			
Response:			
Aaron Paulson, Bonneville Power Administration, 360-418-8687 Submitted on behalf of the following SME: James P. Murphy		No	If each BA is controlling to the ATEC ACE and the ATEC ACE is used as our NERC reporting ACE then there should be no affect on CPS2.
Response: Thank you for the comment.			
Craig N. Figart Avista Corp	Yes		YES - This is not a change. Range was appropriate before, why wouldn't it still be? 0.2 may be low, it could go higher without problems, say 0.5?
Response: Thank you for the comment.			
Will Franklin Xcel Energy/PSCo William.l.franklin@xcelenergy.com			
Response:			
Nicholas L. Hall Constellation Energy Control and Dispatch nicholas.hall@constellation.com	Yes		
Response: Thank you.			

5. As to the Regional Reliability Standard BAL-004-WECC-2: Do you agree with requiring Balancing Authorities to take specific actions required in Requirement R1 to reduce a Balancing Authority's Accumulated Primary Inadvertent Interchange (PII_{accum}) for either the On-Peak or Off-Peak periods, when PII_{accum} exceeds 24 times L_{10}, plus the absolute value of the previous month's On-Peak or Off-Peak month end adjustments for meter readings? Note: The (24 times L_{10}) comes from the maximum Primary Inadvertent (PII) payback that a Balancing Authority can deliver in a 24 hour period. If you answered YES to the previous question, please indicate why you support taking action at this level of PII_{accum}. If you answered NO to the previous question, please explain why you believe level of PII_{accum} is inappropriate and recommend a more appropriate PII_{accum} level. Give technical reasons for your recommendations.

Summary Consideration:

Commenter	Yes	No	Comment
Mark Thompson, Alberta Electric System Operator mark.thompson@aeso.ca		No	The AESO believes that L10 as described in R1.4 is too high for some BAs to maintain reliability.
Response: The drafting team removed Requirement R1.			
Perpetuo Tan LDWP			
Response:			
Aaron Paulson, Bonneville Power Administration, 360-418-8687 Submitted on behalf of the following SME: James P. Murphy		No	Each BA should be allow to take any action they feel necessary (with in compliance) at anytime to keep within a specific amount. BPA would like to recommend that each BA have a maximum of 150% to 200% of peak load from the previous year as the maximum amount of inadvertent that a BA can have. Eliminate R1 and keep R2.
Response: The drafting team has removed Requirement R1 and adopted the recommended maximum limit of 150% of the previous calendar year's integrated hourly Peak Demand.			
Craig N. Figart Avista Corp		No	NO - I would simply create an absolute limit and leave it up to the BA's to figure out how to avoid it (i.e. managing IATEC term, etc.) This 24xL10 limit may be a bit tight, however. I would consider a level closer to 50% of peak load or higher as a more generic bench mark, rather than 24xL10. For Avista, rather than 630MWH, this would be 1200MWH, which allows for plenty of operating room. NOTE: Some BA's may lean toward a threshold as high as 150% Peak Load simply to provide room for end-of-month adjustments, etc.
Response: The drafting team has removed Requirement R1 and adopted the recommended maximum limit of 150% of the previous calendar year's integrated hourly Peak Demand.			

Commenter	Yes	No	Comment
Will Franklin Xcel Energy/PSCo William.l.franklin@xcelenergy.com		No	We believe the 24 x L10 may be premature, especially for BAs that have large non-conforming loads and variable resources. Additionally, the BAAL field trial has the potential to accrue inadvertent and quickly reach this value. Though without much basis, one to two times peak demand may be better criteria for taking additional actions.
Response: The drafting team has removed Requirement R1 and adopted the recommended maximum limit of 150% of the previous calendar year's integrated hourly Peak Demand			
Nicholas L. Hall Constellation Energy Control and Dispatch nicholas.hall@constellation.com	Yes		
Response:			

6. Do you agree with the specific actions Balancing Authorities are required to take in Requirement R1? If you answered YES to the previous question, please indicate why you support those actions. If you answered NO to the previous question, please provide a list of actions that would be more appropriate, and explain why they would be more appropriate.

Summary Consideration:

Commenter	Yes	No	Comment
Mark Thompson, Alberta Electric System Operator mark.thompson@aeso.ca	Yes		We agree with R1, except for R1.4 for reasons noted in Question 11.
Response: The drafting team has removed Requirement R1.			
Perpetuo Tan LDWP			
Response:			
Aaron Paulson, Bonneville Power Administration, 360-418-8687 Submitted on behalf of the following SME: James P. Murphy		No	See 5.
Response: The drafting team has removed Requirement R1.			
Craig N. Figart Avista Corp		No	NO - Let's set this high enough such that for normal operations, we don't have any compliance issues. This limit is really there to motivate BA's not to ever get close.

Commenter	Yes	No	Comment
Response: The drafting team has removed Requirement R1.			
Will Franklin Xcel Energy/PSCo William.l.franklin@xcelenergy.com		No	Requiring an entity to set its L_{Max} to L10 could create operational performance issues with the entity and result in non-compliance with CPS1 and CPS2.
Response: The drafting team has removed Requirement R1.			
Nicholas L. Hall Constellation Energy Control and Dispatch nicholas.hall@constellation.com	Yes		
Response: The drafting team has removed Requirement R1.			

7. Do you agree that setting an upper limit for a Balancing Authority's PII_{accum} of 200% of the previous calendar year's Peak Demand is appropriate, in response to the FERC Order 723 directing that "large accumulation" be defined? If you answered YES to the previous question, please indicate why you support the upper limit. If you answered NO to the previous question, please recommend an upper limit that would be more appropriate and explain why.

Summary Consideration:

Commenter	Yes	No	Comment
Mark Thompson, Alberta Electric System Operator mark.thompson@aeso.ca	Yes		The AESO believes this is an appropriate value and will satisfy the FERC request in Order 723.
Response: Based on comment below, the drafting team modified the limit to 150% of the peak demand.			
Perpetuo Tan LDWP			
Response:			
Aaron Paulson, Bonneville Power Administration, 360-418-8687 Submitted on behalf of the following SME: James P. Murphy	Yes		Each BA needs a reasonable amount of room to operate and allow for month end adjustments.
Response: Thank you for your comment.			
Craig N. Figart Avista Corp		No	NO, this is too high! Let's compromise with just one limit, say 150% peak load, and let the BA's manage their systems so they never get there (i.e. by managing IATEC range 0.2% Bias up to L_{max})

Commenter	Yes	No	Comment
Response: The drafting agrees and modified the limit to 150% of the peak demand.			
Will Franklin Xcel Energy/PSCo William.l.franklin@xcelenergy.com		No	200% appears to be arbitrary. Also, how would a BA be able to correct its inadvertent balance if ATEC was inadequate? Is unilateral or bilateral payback an option?
Response: The drafting team modified the limit to 150% of annual peak demand based upon comments. ATEC paybacks are coordinated unilateral paybacks.			
Nicholas L. Hall Constellation Energy Control and Dispatch nicholas.hall@constellation.com		No	The proposed language hinges on peak load as a determining value for upper limits of PII. This language does not address or consider the nature of Generation Only Balancing Authorities. As Generation Only Balancing Authorities, by nature, do not contain load within their metered boundaries, this methodology for determining upper bounds for PII would result in an unfair burden being placed on Generation Only Balancing Authorities in regard to their PII balances. Since Gen Only BAs do not have load, their upper limit would be 0 using this methodology. This creates an operational requirement which cannot be met. Further clarification on the limit determination methodology is required to address Generation Only Balancing Authorities. Without further clarification addressing the realities of Generation Only Balancing Authorities, this requirement would have to be seen as not applicable to Gen Only BAs, as the regional entity cannot establish requirements which are categorically impossible to meet.
Response: The drafting team modified Requirement R2 (now Requirement R1) to address accumulated primary inadvertent for generation-only Balancing Authorities.			

8. Do you agree that Balancing Authorities shall recalculate PII and adjust the PII_{accum} within 90 days of the discovery of the error? If you answered YES to the previous question, please indicate why you support the 90-day correction period. If you answered NO to the previous question, please recommend an appropriate period and explain why.

Summary Consideration:

Commenter	Yes	No	Comment
Mark Thompson, Alberta Electric System Operator mark.thompson@aeso.ca	Yes		Because this is sufficient time to identify and reconcile meter errors.
Response: Thank you.			
Perpetuo Tan LDWP			
Response:			
Aaron Paulson, Bonneville Power Administration,	Yes		This seems like a reasonable amount of time.

Commenter	Yes	No	Comment
360-418-8687 Submitted on behalf of the following SME: James P. Murphy			
Response: Thank you.			
Craig N. Figart Avista Corp	Yes		YES - sufficient time
Response: Thank you.			
Will Franklin Xcel Energy/PSCo William.l.franklin@xcelenergy.com	Yes		90 Days appears to be an adequate amount of time to address any corrections needed.
Response: Thank you.			
Nicholas L. Hall Constellation Energy Control and Dispatch nicholas.hall@constellation.com	Yes		
Response: Thank you.			

9. Did the drafting team correctly implement in Requirement R4 of BAL-004-2 the FERC directive to clarify that the accumulated total hours of ATEC out of service for the quarter is 24 hours? If you answered NO to the previous question, please recommend revisions to Requirement R4 that would clarify the requirement.

Summary Consideration:

Commenter	Yes	No	Comment
Mark Thompson, Alberta Electric System Operator mark.thompson@aeso.ca	Yes		.
Response: Thank you.			
Perpetuo Tan LDWP			
Response:			
Aaron Paulson, Bonneville Power Administration, 360-418-8687	Yes		

Commenter	Yes	No	Comment
Submitted on behalf of the following SME: James P. Murphy			
Response: Thank you.			
Craig N. Figart Avista Corp	Yes		N/A - not a change
Response: Thank you.			
Will Franklin Xcel Energy/PSCo William.l.franklin@xcelenergy.com			
Response:			
Nicholas L. Hall Constellation Energy Control and Dispatch nicholas.hall@constellation.com	Yes		
Response: Thank you.			

10. Is it appropriate to retire the definition for Secondary Inadvertent Interchange? If you answered NO to the previous question, please explain why you believe the definition should be retained.

Summary Consideration:

Commenter	Yes	No	Comment
Mark Thompson, Alberta Electric System Operator mark.thompson@aeso.ca	Yes		
Response: Thank you.			
Perpetuo Tan LDWP			
Response:			
Aaron Paulson, Bonneville Power Administration, 360-418-8687 Submitted on behalf of the following		No	It should be put in the guidelines and technical section.

Commenter	Yes	No	Comment
SME: James P. Murphy			
Response: The drafting team believes that the definition does not belong in a regional standard since it is not used in the standard. It would be more appropriate to keep the definition as a guideline or other document.			
Craig N. Figart Avista Corp	Yes		
Response: Thank you.			
Will Franklin Xcel Energy/PSCo William.l.franklin@xcelenergy.com	Yes		
Response: Thank you.			
Nicholas L. Hall Constellation Energy Control and Dispatch nicholas.hall@constellation.com	Yes		
Response: Thank you.			

11. The WECC-0068 (Modification of BAL-004-WECC-1) drafting team welcomes additional comments on any and all aspects of the proposed Regional Variance to BAL-001-0.1a, Regional Reliability Standard BAL-004-WECC-2, and addressing the directives of FERC Order 723.

Summary Consideration:

Commenter	Yes	No	Comment
Mark Thompson, Alberta Electric System Operator mark.thompson@aeso.ca			The AESO suggests that section E.B. in the regional variance section of the NERC standard be modified to more fully explain the reason for the variance similar to how it is described in the following excerpt from the page 3 of BAL-001-0.1a in the Regional Variance Development Roadmap section: "The purpose of this proposed WECC Regional Variance is to replace requirements R1 and Section D Compliance 2 in the existing NERC BAL-001-0.1a standard with three new requirements. ~~In requirement~~ E.B.1, ~~the drafting team proposes to~~ replaces the NERC ACE equation with an ACE equation that includes the ATEC term. By replacing the NERC Raw ACE equation with the ATEC ACE equation through a Regional Variance, it will permit the Western Interconnection to use the ATEC ACE for control and reporting purposes." As included in the excerpt above and in section E.B. of the regional variance, the AESO does not understand how the new regional requirements replace "Section D. Compliance 2" and recommends this reference be deleted.
Response: The reasons and justification for the regional variance are identified in the “Description of the Current Draft.” By adding the reason as recommended in the variance, it adds additional information that is not necessary. The purpose for the standard is in the NERC BAL-001-0.1a.			

Comment Report Form for Project WECC-0068 Modification of BAL-004-WECC-1

Commenter	Yes	No	Comment
Perpetuo Tan LDWP			The idea to add the following requirement came after the deadline for the 45-day posting. R9. The Reliability Assurer shall avail of WECC Interconnection expertise to minimize error in the WIT calculation of each participating BA's ATEC including providing Delta TE data corrections when required. M9. The Reliability Assurer shall provide documentation of Delta TE data corrections effected and the efforts used to minimize error in the WIT calculation of each participating BA's ATEC. *The objective of the above changes (or future modifications to it) is to remove from the BA's who use the WIT the responsibility for the accuracy of the ATEC calculation. This will reduce the BA's burden in complying with the ATEC standard. BA's personnel can focus in providing good interchange data to the WIT and implementing ATEC values recommended by the WIT. It also does not expose the Reliability Assurer to non-compliance penalties as long as it does its due diligence.*
Response: The drafting team understands your concern. The drafting team believe the implementation of this recommendation be considered in a separate project as a WECC Criterion or as a modification to an existing INT criterion.			
Aaron Paulson, Bonneville Power Administration, 360-418-8687 Submitted on behalf of the following SME: James P. Murphy			In R2 Additional clarification is needed to determine when a violation has occurred. BPA suggest that at the end of each month the BA shouldn't be above the specified limit. R6 should have a time frame associated with how long it can take to accomplish.
Response: The drafting team revised the requirement to clarify what it is a monthly requirement. The drafting team does not believe that Requirement R6 should have a time frame associated with it.			
Craig N. Figart Avista Corp			Were we not going to include in either BAL-004 or BAL-001 a requirement that the RC be charged with Interconnection Time Monitor responsibilities?
Response: NERC BAL-004-1 Requirement R1 only limits the Interconnection Time Monitor function to Reliability Coordinators. Since there is only one Reliability Coordinator in the Western Interconnection, this Reliability Coordinator has the Time Monitor responsibilities.			
Will Franklin Xcel Energy/PSCo William.l.franklin@xcelenergy.com			We believe that R6 should be rewritten to address only the ATEC functionality. Requiring entities to be able to switch between Flat Freq, Flat Interchange, and TLB has nothing to do with ATEC. Suggested language: *Each Balancing Authority shall be able to change its operating mode to include or remove Automatic Time Error Correction (ATEC).* *In general, we believe that a standard for ATEC is not necessary. Furthermore, we ask that WECC/PWG contemplate removing ATEC altogether. First of all, it is a misnomer to call the process*

Comment Report Form for Project WECC-0068 Modification of BAL-004-WECC-1

Commenter	Yes	No	Comment
			'automatic time error correction' since the main concern of the standard is centered around inadvertent. Manual TECs still occur frequently in the Western Interconnection, despite ATEC being a current requirement. We suggest that the NAESB standard methods of inadvertent payback (such as commonly used in the Eastern Interconnection) are adequate for managing inadvertent.
Response: The drafting team believes Requirement R6 is sufficient as written. This version of the standard is designed to replicate the FERC-approved BAL-004-WECC-1 standard as much as possible. The drafting team is limited to scope of the standard request. Removal of the ATEC standard is outside the scope of the standard request.			
Nicholas L. Hall Constellation Energy Control and Dispatch nicholas.hall@constellation.com			R6 of this proposed regional variance establishes ATEC as an AGC operating mode. NERC has previously and continues to describe ATEC as a "control objective" layered on top of Tie Line Frequency bias, which NERC regards as one of the foundational control modes, referenced in BAL-03 R3, and in the NERC interpretation provided for the same. In order for BAL-03 and this proposed regional variance to be properly aligned and devoid of conflict, language needs to be redrafted to accurately portray ATEC as a "control objective" layered on top of existing control modes (Tie Line Frequency Bias). If this is not accomplished, this variance would be at odds with NERC BAL-03, by mandating that WECC BAs operate in the "Control Mode" of ATEC or Tie Line Bias plus Time Error Control, while NERC specifies that BAs should operate in Tie Line Frequency Bias, further clarifying that ATEC can be acceptably layered on top of that control mode.
Response: The drafting team believes that the current BAL-003-0.1b standard addresses this question in BAL003-0.1b Appendix 1.			

Posting 2

Standard BAL-001-0.1a
Real Power Balancing Control Performance
Modification of NERC BAL-001-0.1a to add WECC Regional Variance
Version 2.
Open: 10/1/2011 Closed: 11/1/2011

Document Title	WECC Regional Variance to NERC Standard BAL-001-0.1a
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1		Version 1 Posted 4/15/11-6/1/11	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Standing Committee Approval	
4		WECC Board Approval	

Regional Variance 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.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	07/16/2010
9. Notice of development / first 30-day notice	09/2/2010
10. New committee chair orientation meeting	08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 01/18/11 02/10/11 03/11–12/11 03/24/11 04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
16. Post first draft for 45-day comment period	04/15/2011
17. Meet to answer to comments, address impact statement and draft responses	06/2-3/2011 06/14/2011 06/23/2011

	06/29/2011
18. Post responses to comments received during 45-day comment period	06/29/2011
19. Meet to answer to comments, address impact statement and draft responses	08/8/2011 08/15/2011 08/30/2011 11/01/2011
20. Post the second draft for a 30-day comment period	11/04/2011

Description of Current Draft:

On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC Standards.[1] Since the approval of BAL-004-WECC-1 the industry has commented that there is confusion concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as that used during Automatic Generation Control (AGC) mode. The use of two ACE equations came as a result of NERC's comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a) [2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation for control but should use raw ACE for CPS reporting.[3] The industry desires to use the same ACE equation for control and reporting because it provides better a measurement of control performance.

The purpose of this proposed WECC Regional Variance to BAL-001-01.a (WECC Variance) is to replace Requirements R1 and Section D. Compliance, Subsection 2. of BAL-001-0.1a with three new requirements. In Requirement E.B.1 of the WECC Variance, the drafting team proposes to replace the NERC ACE equation with an ACE equation that includes the ATEC term. Replacing the NERC raw ACE equation with the ATEC ACE equation through a Regional Variance will require Balancing Authorities in the Western Interconnection to use the ATEC ACE for control and CPS reporting purposes. Using the ATEC ACE equation for CPS reporting is more appropriate because, as discussed further below, it is a more accurate measure of how well a Balancing Authority is controlling to its control performance target.

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).
[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).
[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

The drafting team for Project WECC-0068 also requests withdrawal of the BAL-001-0.1a Appendix 2 Interpretation of Requirement R1and the BAL-003-0.1b Appendix 1 Interpretation of Requirement R3. By creating a Regional Variance that replaces Requirement R1, these interpretations are no longer needed. The drafting team revised the definition for Area Control Error (ACE) in the WECC Regional Definitions to closely align with NERC definition for ACE while at the same recognizing concept of ATEC.

In order to obtain a Regional Variance[4] to a NERC Reliability Standard, it must be demonstrated that:

- The variance is not inconsistent with or less stringent than the NERC reliability standard;
- Is necessitated by a physical difference; or
- Is an alternative methodology with the same reliability objective.

Replacing the NERC ACE equation with an ATEC ACE equation is an alternative methodology with the same reliability objective as the existing BAL-001-0.1a standard. It is a method of automatically scheduling Primary Inadvertent Interchange (PII) back to other Balancing Authorities. The inclusion of the Automatic Time Error Correction term in the ACE equation changes the Balancing Authority's control performance target. The current NERC ACE equation requires that Balancing Authorities control the frequency and Interchange within their Balancing Authority Area to a target point of zero, but it allows the control to stay within a predefined range called L_{max} which is between 0.20 * |B| and $\pm L_{10}$. The proposed ACE equation, with an Automatic Time Error adjustment, works similarly to the NERC equation; however, the target point for control is adjusted by the ATEC adjustment. The ATEC component defines a new control point and is equivalent to making an interchange schedule that would automatically payback PII. The modification to the ACE equation is equivalent to making an adjustment because of a metering error. Since the amount of the adjustment during any one hour is limited by L_{max}, Balancing Authorities automatically limit the risk to the interconnection and the amount of the transaction.

The addition of the $\boldsymbol{I_{ATEC}}$ component meets the standard of justification for a Regional Variance as an alternative methodology, with the same reliability objective as the NERC Reliability Standard. In addition, the proposed WECC variance to BAL-001-0.1a is consistent with — or more stringent than — the NERC BAL-001-0.1a Reliability Standard. The reasons the WECC Variance meets the standard of justification are:

1. The addition of $\boldsymbol{I_{ATEC}}$ to the ACE equation and adjustment to the control performance target used for controlling frequency and interchange does not place any addition risk to reliability because limits are set in the magnitude of the $\boldsymbol{I_{ATEC}}$ adjustment.
2. The Regional Variance allows the use of the same control performance target for control and reporting providing a better methodology for measuring performance.
3. It is another control methodology that achieves the same reliability objective as BAL-001-0.1a.

[4] "Entity variance" means an aspect of a reliability standard that applies only within a particular entity or a subset of entities within a limited portion of a regional entity, such as a variance that would apply to a regional transmission organization or particular market or to a subset of bulk power system owners, operators or users. An entity variance may not be inconsistent with or less stringent than the reliability standards as it would otherwise exist without the entity variance. An entity variance shall be approved only through the NERC standards development procedure and shall be made part of the NERC reliability standards." (Rules of Procedure of the North American Electric Reliability Corporation, Section 200 — Definition of Terms, page 2.)

BAL-004-WECC-1 requires Balancing Authorities in the Western Interconnection to use ATEC ACE for control. As proposed in the WECC Variance, Balancing Authorities in the Western Interconnection are required to operate synchronously to the Interconnection, using the ATEC ACE, which automatically corrects time error. The ATEC component in the ACE equation has been effective in mitigating two main issues in the Western Interconnection.

1. It has been used to reduce the number of hours of Manual Time Error Corrections, or the amount of manual adjustments of timing errors that accumulate on clocks, which make certain interconnection scheduled frequency deviations.
2. Since time error is directly related to Inadvertent Interchange, the procedure has been used to reduce accumulated Inadvertent Interchange, or the difference between the actual and scheduled interchange.

The ATEC procedure requires Balancing Authorities in the Western Interconnection to determine their contribution to the Interconnection time error. The Balancing Authority does this by calculating its PII. BAL-001-0.1a Requirement E.B.1 requires that each Balancing Authority calculate its PII_{accum} and I_{ATEC} from its hourly Inadvertent Interchange. When the resulting I_{ATEC} is entered into Balancing Authority's ACE equation, I_{ATEC} continuously corrects for its portion of the time error automatically, as opposed to manually, as specified in the continent-wide standard on Time Error Correction BAL-004-1 Requirement R2. Although the maximum payback is bounded between limits, the continuous correction enables equitable payback of Primary Inadvertent Interchange.

The drafting team is proposing the same Violation Severity Levels for Requirement R1 of the WECC Variance as those in Requirement R1 of BAL-001-01.a because it is a measurement of how well a Balancing Authority is controlling to its control performance target.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Project WECC-0068 Version 2 Comments due	12/05/2011
2. Meet to answer to comments, address impact statement, draft responses	12/06-16/2011
3. Post responses to comments	1/05/2012
4. Post draft standard for 45-day NERC comment period	1/05/2012
5. NERC comment period ends	02/20/2012
6. DT completes review and consideration of industry comments to NERC posting	02/20/2012
7. Post for comment and Operating Committee approval	02/24/2012
8. Operating Committee approves proposed standard	03/27/2012
9. Post draft standard for WECC Board approval	05/01/2012
10. WECC Board approval	06/21/2012
11. Post draft standard for 15-day NERC comment period	06/25/2012
12. NERC 15-day comment period ends	07/2012

Anticipated Actions	Anticipated Date
13. DT completes review and consideration of industry comments to NERC posting	07/2012
14. Submit NERC Board of Trustees approval request	08/2012
15. Receive NERC Board approval	08/2012

.

Implementation Plan

The proposed Implementation Plan is to make the WECC Regional Variance to BAL-001-0.1a and the proposed WECC Regional Reliability Standard BAL-004-WECC-2 effective on the first day of the second quarter, after regulatory approval. Since entities are already controlling with the ATEC ACE equation, but are using the NERC raw ACE equation for purposes of reporting CPS1, the transition to controlling and reporting using the ATEC ACE should be minimal. Additionally, it should not require much time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

Definitions of Terms Used in Regional Variance to a NERC 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 definitions will be removed from the standard and added to the NERC Glossary under WECC Regional Definitions.

Area Control Error: The instantaneous difference between a Balancing Authority's net actual and scheduled interchange, taking into account the effects of Frequency Bias, correction for meter error, and Automatic Time Error Correction.

A. Introduction

1. Title: **Real Power Balancing Control Performance**

2. Number: BAL-001-0.1a

3. Purpose: To maintain Interconnection steady-state frequency within defined limits by balancing real power demand and supply in real-time.

4. Applicability:

4.1. Balancing Authorities

5. Effective Date: The WECC Regional Variance to NERC Reliability Standard BAL-001-0.1a is to be effective on the first day of the second quarter, after regulatory approval.

B. Requirements

R1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit ε_1^2 is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \in_1^2 \ or \ \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\in_1^2} \le 1$$

The equation for ACE is:

$ACE = (NI_A - NI_S) - 10B\ (F_A - F_S) - I_{ME}$

where:

- NI_A is the algebraic sum of actual flows on all tie lines.
- NI_S is the algebraic sum of scheduled flows on all tie lines.
- B is the Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.
- F_A is the actual frequency.
- F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.
- I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

R2. Each Balancing Authority shall operate such that its average ACE for at least 90% of clock-ten-minute periods (6 non-overlapping periods per hour) during a calendar month is within a specific limit, referred to as L_{10}.

$$AVG_{10-minute}(ACE_i) \le L_{10}$$

where:

$L_{10} = 1.65 \in_{10} \sqrt{(-10B_i)(-10B_s)}$

ε_{10} is a constant derived from the targeted frequency bound. It is the targeted root-mean-square (RMS) value of ten-minute average Frequency Error based on frequency performance over a given year. The bound, ε_{10}, is the same for every Balancing Authority Area within an Interconnection, and B_s is the sum of the Frequency Bias Settings of the Balancing Authority Areas in the respective Interconnection. For Balancing Authority Areas with variable bias, this is equal to the sum of the minimum Frequency Bias Settings.

R3. Each Balancing Authority providing Overlap Regulation Service shall evaluate Requirement R1 (i.e., Control Performance Standard 1 or CPS1) and Requirement R2 (i.e., Control Performance Standard 2 or CPS2) using the characteristics of the combined ACE and combined Frequency Bias Settings.

R4. Any Balancing Authority receiving Overlap Regulation Service shall not have its control performance evaluated (i.e. from a control performance perspective, the Balancing Authority has shifted all control requirements to the Balancing Authority providing Overlap Regulation Service).

C. Measures

M1. Each Balancing Authority shall achieve, as a minimum, Requirement 1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-month}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement R1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{sampling cycles in clock-minute}}}{n_{\text{sampling cycles in clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B} \right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}} \right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error will be used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

The reporting Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}} [(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}} [n_{\text{one-minutesamplesin clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}} [(\text{CF}_{\text{clock-houraverage-month}})(n_{\text{one-minutesamplesin clock-houraverages}})]}{\sum_{\text{hours-in day}} [n_{\text{one-minutesamplesin clock-houraverages}}]}$$

The 12-month compliance factor becomes:

$$\text{CF}_{\text{12-month}} = \frac{\sum_{\text{i=1}}^{12} (CF_{\text{month-i}})(n_{(\text{one-minutesamplesin month})-\text{i}})]}{\sum_{\text{i=1}}^{12} [n_{(\text{one-minutesamplesin month})-\text{i}}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

M2. Each Balancing Authority shall achieve, as a minimum, Requirement R2 (CPS2) compliance of 90%. CPS2 relates to a bound on the ten-minute average of ACE. A compliance percentage is calculated as follows:

$$CPS2 = \left[1 - \frac{\text{Violations}_{\text{month}}}{\left(\text{Total Periods}_{\text{month}} - \text{Unavailabl e Periods}_{\text{month}}\right)}\right] * 100$$

The violations per month are a count of the number of periods that ACE clock-ten-minutes exceeded L_{10}. ACE clock-ten-minutes is the sum of valid ACE samples within a clock-ten-minute period divided by the number of valid samples.

Violation clock-ten-minutes

= 0 if

$$\left|\frac{\sum ACE}{n_{\text{samplesin10-minutes}}}\right| \leq L_{10}$$

= 1 if

$$\left|\frac{\sum ACE}{n_{\text{samplesin10-minutes}}}\right| > L_{10}$$

Each Balancing Authority shall report the total number of violations and unavailable periods for the month. L_{10} is defined in Requirement R2.

Since CPS2 requires that ACE be averaged over a discrete time period, the same factors that limit total periods per month will limit violations per month. The calculation of total periods per month and violations per month, therefore, must be discussed jointly.

A condition may arise which may impact the normal calculation of total periods per month and violations per month. This condition is a sustained interruption in the recording of ACE.

In order to ensure that the average ACE calculated for any ten-minute interval is representative of that ten-minute interval, it is necessary that at least half the ACE data samples are present for that interval. Should half or more of the ACE data be unavailable due to loss of telemetering or computer unavailability, that ten-minute interval shall be omitted from the calculation of CPS2.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Regional Reliability Organization

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar month.

1.3. Data Retention

The data that supports the calculation of CPS1 and CPS2 (Appendix 1-BAL-001-0) are to be retained in electronic form for at least a one-year period. If the CPS1 and CPS2 data for a Balancing Authority Area are undergoing a review to address a question that has been raised regarding the data, the data are to be saved beyond the normal retention period until the question is formally resolved. Each Balancing Authority shall retain for a rolling 12-month period the values of: one-minute average ACE (ACE_i), one-minute average Frequency Error, and, if using variable bias, one-minute average Frequency Bias.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance – CPS1

2.1. Level 1: The Balancing Authority Area's value of CPS1 is less than 100% but greater than or equal to 95%.

2.2. Level 2: The Balancing Authority Area's value of CPS1 is less than 95% but greater than or equal to 90%.

2.3. Level 3: The Balancing Authority Area's value of CPS1 is less than 90% but greater than or equal to 85%.

2.4. Level 4: The Balancing Authority Area's value of CPS1 is less than 85%.

3. Levels of Non-Compliance – CPS2

3.1. Level 1: The Balancing Authority Area's value of CPS2 is less than 90% but greater than or equal to 85%.

3.2. Level 2: The Balancing Authority Area's value of CPS2 is less than 85% but greater than or equal to 80%.

3.3. Level 3: The Balancing Authority Area's value of CPS2 is less than 80% but greater than or equal to 75%.

3.4. Level 4: The Balancing Authority Area's value of CPS2 is less than 75%.

E. Regional Variances

E.A. The ERCOT Control Performance Standard 2 Waiver approved November 21, 2002.

E.B. Regional Variance for the Western Electricity Coordinating Council

The following Interconnection-wide variance shall be applicable in the Western Interconnection and replaces, in their entirety, Requirement R1 and Section D.2. (i.e., under Compliance replace Levels of Non-Compliance – CPS1). Please note that the ACE equation is replaced in its entirety with the following equation identified in Requirement E.B.1.

Requirements and Measures

E.B.1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit $\in_1^2$ is a constant derived from a targeted frequency bound

(separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \in_1^2 \ or \ \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\in_1^2} \le 1$$

The equation for ACE in the Western Interconnection is:

$$ACE = (NI_A - NI_S) - 10B(F_A - F_S) - I_{ME} + I_{ATEC}$$

Where:

NI_A is the algebraic sum of actual flows on all tie lines.

NI_S is the algebraic sum of scheduled flows on all tie lines.

F_A is the actual frequency.

F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.

B = Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.

I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

Rationale for E.B.1

Premise: When a Balancing Authority Area uses the ACE equation with an ATEC correction component for both control and assessing performance, it provides a more accurate measurement of the Control Performance methodology while at the same time achieving the same reliability objective as the existing BAL-001-0.1a standard.

Justification: Adding the ***I_{ATEC}*** term to the ACE equation reduces the number of manual time error corrections and PII_{accum}.

Goal: To establish an ACE equation that permits the implementation of Automatic Time Error Correction.

$I_{ATEC} = \frac{PII_{accum}^{on/off\ peak}}{(-Y) * H}$ when operating in Automatic Time Error Correction control mode. I_{ATEC} shall be zero when operating in any other AGC mode.

Y = B / B_S.

H = Number of Hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3.

B_S = Frequency Bias for the Interconnection (MW / 0.1 Hz).

Primary **I**nadvertent **I**nterchange **(PII_{hourly})** is **$(1-Y) * (II_{actual} - B * \Delta TE/6)$**

II_{actual} is the hourly Inadvertent Interchange for the last hour.

ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where:

$$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE_{offset})$$

TD_{adj} is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks.

t is the number of minutes of Manual Time Error Correction that occurred during the hour.

TE_{offset} is 0.000 or +0.020 or -0.020.

PII_{accum} is the Balancing Authority's accumulated **PII_{hourly}** in MWh. An On-Peak and Off-Peak accumulation accounting is required.

Where:

$$PII_{accum}^{on/off\ peak} = \textbf{last period's } PII_{accum}^{on/off\ peak} + PII_{hourly}$$

[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]

M.E.B.1. Each Balancing Authority shall achieve, as a minimum, Requirement E.B.1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-month}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement E.B.1.

The rating index $CF_{12\text{-}month}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{clock\text{-}minute} = \frac{\left(\frac{\sum ACE_{sampling\ cycles\ in\ clock\text{-}minute}}{n_{sampling\ cycles\ in\ clock\text{-}minute}}\right)}{-10B}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B} \right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}} \right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error are used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

As part of its evidence each Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}} [(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}} [n_{\text{one-minutesamplesin clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}} [(\text{CF}_{\text{clock-houraverage-month}})(n_{\text{one-minutesamplesin clock-houraverages}})]}{\sum_{\text{hours-in day}} [n_{\text{one-minutesamplesin clock-houraverages}}]}$$

The 12-month compliance factor becomes:

$$\text{CF}_{\text{12-month}} = \frac{\sum_{\text{i=1}}^{12} (CF_{\text{month-i}})(n_{(\text{one-minutesamplesin month})-\text{i}})]}{\sum_{\text{i=1}}^{12} [n_{(\text{one-minutesamplesin month})-\text{i}}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

E.B.2. Each Balancing Authority shall limit the absolute value of I_{ATEC}, the Automatic Time Error Correction term as follows: *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*

$$\left| I_{ATEC} \right| \leq L_{max}.$$

M.E.B.2. Forms of acceptable evidence for Requirement E.B. 2 may include, but are not limited to:

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or
- Other archived data that demonstrates compliance.

Rationale for E.B.2

Premise: I_{ATEC} greater than L_{max} may result in a risk to reliability caused by large ATEC payback.

Justification: Balancing Authorities should not control their Balancing Authority Areas using an approach that puts system reliability at risk.

Goal: The goal of Requirement E.B.2 is to limit I_{ATEC} to L_{max} in order to reduce potential reliability risks to the interconnection caused by a large ATEC payback term.

E.B.3. Each Balancing Authority shall set L_{max} within the limits as follows:

$$0.20 * |B| \leq L_{max} \leq L_{10}.$$

[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]

M.E.B.3. Forms of acceptable evidence for Requirement E.B. 3 may include, but is not limited to:

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or
- Other archived data that demonstrates compliance.

Rationale for E.B.3

Premise: Operating within an L_{max} less than 0.20 * |B| may not provide sufficient correction for PII and operating with an L_{max} greater than L_{10} may result in potential reliability risks caused by a large ATEC payback term.

Justification: L_{max} should be limited to prevent Balancing Authorities from creating potential reliability risks caused by a large ATEC payback term.

Goal: The goal of Requirement E.B.3 is to develop a range for L_{max} where Balancing Authorities reduce potential reliability risks by limiting I_{ATEC} to L_{max}.

E.B. Compliance

1. Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the

Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of I_{ATEC} and L_{max} for the preceding calendar year (January – December), as well as the current calendar year.

Table of Compliance Elements

E #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
E.B.1	Real-time Operations	Medium	The Balancing Authority Area's value of CPS1 was less than 100% but greater than or equal to 95%.	The Balancing Authority Area's value of CPS1 was less than 95% but greater than or equal to 90%.	The Balancing Authority Area's value of CPS1 was less than 90% but greater than or equal to 85%.	The Balancing Authority Area's value of CPS1 was less than 85%.
E.B.2	Real-time Operations	Medium	N/A	N/A	N/A	The Balancing Authority Area's absolute value for I_{ATEC} was greater than L_{max}.
E.B.3	Operations Planning	Medium	N/A	N/A	N/A	The Balancing Authority did not set L_{max} to within the limits in E.B.3 (i.e., $0.20 * \|B\| \leq L_{max} \leq L_{10}$).

F. Associated Documents

Version History

Version	Date	Action	Change Tracking
0	February 8, 2005	BOT Approval	New
0	April 1, 2005	Effective Implementation Date	New
0	August 8, 2005	Removed "Proposed" from Effective Date	Errata
0	July 24, 2007	Corrected R3 to reference M1 and M2 instead of R1 and R2	Errata
0a	December 19, 2007	Added Appendix 2 – Interpretation of R1 approved by BOT on October 23, 2007	Revised
0a	January 16, 2008	In Section A.2., Added "a" to end of standard number In Section F, corrected automatic numbering from "2" to "1" and removed "approved" and added parenthesis to "(October 23, 2007)"	Errata
0	January 23, 2008	Reversed errata change from July 24, 2007	Errata
0.1a	October 29, 2008	Board approved errata changes; updated version number to "0.1a"	Errata
0.1a	May 13, 2009	Approved by FERC	
		WECC Regional Variance Retirement of Appendix 2 Interpretation of Requirement R1	

Standard BAL-001-0.1a
Real Power Balancing Control Performance
Modification of NERC BAL-001-0.1a to add WECC Regional Variance
Version 2
Open: 11/4/2011 Closed: 12/5/2011

Appendix 1-BAL-001-0
CPS1 and CPS2 Data

CPS1 DATA	Description	Retention Requirements
ε_1	A constant derived from the targeted frequency bound. This number is the same for each Balancing Authority Area in the Interconnection.	Retain the value of ε_1 used in CPS1 calculation.
ACE_i	The clock-minute average of ACE.	Retain the 1-minute average values of ACE (525,600 values).
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value(s) of B_i used in the CPS1 calculation.
F_A	The actual measured frequency.	Retain the 1-minute average frequency values (525,600 values).
F_S	Scheduled frequency for the Interconnection.	Retain the 1-minute average frequency values (525,600 values).

CPS2 DATA	Description	Retention Requirements
V	Number of incidents per hour in which the absolute value of ACE clock-ten-minutes is greater than L_{10}.	Retain the values of V used in CPS2 calculation.
ε_{10}	A constant derived from the frequency bound. It is the same for each Balancing Authority Area within an Interconnection.	Retain the value of ε_{10} used in CPS2 calculation.
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value of B_i used in the CPS2 calculation.
B_s	The sum of Frequency Bias of the Balancing Authority Areas in the respective Interconnection. For systems with variable bias, this is equal to the sum of the minimum Frequency Bias Setting.	Retain the value of B_s used in the CPS2 calculation. Retain the 1-minute minimum bias value (525,600 values).
U	Number of unavailable ten-minute periods per hour used in calculating CPS2.	Retain the number of 10-minute unavailable periods used in calculating CPS2 for the reporting period.

Document Title	WECC Regional Variance to NERC Standard BAL-001-0.1a
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1		Version 1 Posted 4/15/11-6/1/11	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Standing Committee Approval	
4		WECC Board Approval	

Regional Variance 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.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	~~9~~09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/~~6~~06/2009
3. Pre-SRRC ~~Announcement~~announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this ~~request~~Request was placed on hold until July 2010~~,~~ by Mr. Don Watkins, OC chair~~.~~	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair~~.~~	~~7~~07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	~~7~~07/16/2010
9. Notice of ~~Development / First~~development / first 30-day notice	~~9~~09/2/2010
10. New ~~OC~~committee chair orientation meeting	~~8~~08/18/2010
11. First DT meeting ~~(sequence may vary for items #6-9 depending on SC's DT assignment choice)~~	11/10/~~10~~2010
12. Notice of ~~concurrence~~Concurrence sent by DT (~~See Step~~see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 ~~1~~01/18/11 ~~2~~02/10/11 ~~3~~03/11~~–~~12/11 03/24/11 04/11/11
15. Complete first draft ~~of~~and Complete Quality Control Checklist	~~4~~04/13/2011
16. Post first draft for 45-day comment period	~~4~~04/15/2011
17. Meet to answer to comments, address impact statement and draft responses	06/2-3/2011 06/14/2011 06/23/2011

	06/29/2011
18. Post responses to comments received during 45-day comment period	06/29/2011
19. Meet to answer to comments, address impact statement and draft responses	08/8/2011 08/15/2011 08/30/2011 11/01/2011
20. Post the second draft for a 30-day comment period	11/04/2011

Description of Current Draft:

~~In FERC Order No.723 to Docket No. RM08-12-000, issued~~ On May ~~29~~21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1~~; FERC directed~~ – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard~~. FERC directed WECC to go through~~ using the FERC-approved Process for Developing and Approving WECC Standards ~~to make the clarifying modifications. In addition, WECC staff identified additional modifications that needed to be made to.~~[1] Since the ~~existing standard, to clarify~~approval of BAL-004-WECC-1 the ~~intent without changing the requirements. There~~industry has commented that there is ~~also~~ confusion ~~regarding the requirement~~concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as ~~the~~ that used during Automatic Generation Control (AGC ~~operating)~~ mode ~~in~~. The use~~. This seems to conflict with the NERC~~ of two ACE equations came as a result of NERC's comments in response to the ~~NOPR comments~~ Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a) [2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation ~~with automatic time error correction (ATEC ACE)~~ for control~~,~~ but should use ~~Raw~~raw ACE for CPS reporting.[3] The industry desires to use the same ACE equation for control and reporting because it provides better a measurement of control performance.

The purpose of this proposed WECC Regional Variance to BAL-001-01.a (WECC Variance) is to replace ~~requirements~~Requirements R1 and Section D. Compliance, Subsection 2 ~~in the existing NERC~~. of BAL-001-0.1a ~~standard~~ with three new requirements. In ~~requirement~~Requirement E.B.1 of the WECC Variance, the drafting team proposes to replace the NERC ACE equation with an ACE equation that includes the ATEC term. ~~By replacing~~Replacing the NERC ~~Raw ACE equation with the ATEC~~raw ACE equation with the ATEC ACE equation through a Regional Variance~~, it~~ will ~~permit~~require Balancing Authorities in the Western Interconnection to use the ATEC ACE for control and CPS reporting purposes.

---

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).

[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).

[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

Using the ATEC ACE equation for CPS reporting is more appropriate because, as discussed further below, it is a more accurate measure of how well a Balancing Authority is controlling to its control performance target.

The drafting team for Project WECC-0068 also requests withdrawal of the BAL-001-0.1a Appendix 2 Interpretation of Requirement R1and the BAL-003-0.1b Appendix 1 Interpretation of Requirement R3. By creating a Regional Variance that replaces Requirement R1, these interpretations are no longer needed. The drafting team revised the definition for Area Control Error (ACE) in the WECC Regional Definitions to closely align with NERC definition for ACE while at the same recognizing concept of ATEC.

In order to obtain a Regional Variance[4] to a NERC Reliability Standard, it must be demonstrated that:

- The variance is not inconsistent with or less stringent than the NERC reliability standard;
- Is necessitated by a physical difference; or
- Is an alternative methodology with the same reliability objective.

~~.~~

~~The drafting team for Project WECC-0068 also requests withdrawal of BAL-001-1.1a Appendix 2 Interpretation of requirement R1. By creating a Regional Variance that replaces requirement R1, the interpretation for requirement R1 is no longer needed.~~

Replacing the NERC ACE equation with an ATEC ACE equation is an alternative methodology with the same reliability objective as the existing BAL-001-0.1a standard~~, because it~~. It is a method of automatically scheduling Primary Inadvertent Interchange (PII) back to other Balancing Authorities. The inclusion of the Automatic Time Error Correction term in the ACE equation changes the Balancing Authority's ~~target~~ control ~~point~~performance target. The current NERC ACE equation requires that Balancing Authorities control the frequency and Interchange within their Balancing Authority Area to a target point of zero, but it allows the control to stay within a predefined range ~~of~~called L_{max} which is between 0.20 * |B| and $\pm L_{10}$. The proposed ACE equation, with an Automatic Time Error adjustment, works similarly to the NERC equation; however, the target point for control is adjusted by the ~~Automatic Time Error Control~~ATEC adjustment ~~(ATEC).~~ The ATEC component defines a new control point ~~that is limited by $L_{10,}$~~ and is equivalent to making an interchange schedule that would automatically payback ~~Primary Inadvertent Interchange.~~PII. The modification to the ACE equation is equivalent to ~~making an interchange schedule or~~ making an adjustment because of a metering error. Since the amount of the adjustment during any one hour is limited by ~~L_{10}~~L_{max}, Balancing Authorities automatically limit the risk to the interconnection and the amount of the transaction~~. If Balancing Authorities permit the ATEC component (I_{ATEC}) to exceed L_{10}, there is potential for CPS2 violations and poor frequency control~~.
~~The drafting team is proposing to keep the same violation severity levels in the Regional Variance to the NERC standard because it is a measurement of how well a Balancing Authority is measuring to its point of control. The addition of I_{ATEC} to the ACE equation adjusts the target point for controlling frequency and interchange. The risk to reliability is increased because limits are set in the magnitude of the I_{ATEC} adjustment. Therefore, the~~

[4] "Entity variance" means an aspect of a reliability standard that applies only within a particular entity or a subset of entities within a limited portion of a regional entity, such as a variance that would apply to a regional transmission organization or particular market or to a subset of bulk power system owners, operators or users. An entity variance may not be inconsistent with or less stringent than the reliability standards as it would otherwise exist without the entity variance. An entity variance shall be approved only through the NERC standards development procedure and shall be made part of the NERC reliability standards." (Rules of Procedure of the North American Electric Reliability Corporation, Section 200 — Definition of Terms, page 2.)

The addition of the I_{ATEC} component meets the standard of justification for a Regional Variance as an alternative methodology, with the same reliability objective as the NERC Reliability Standard. In addition, the proposed WECC variance to BAL-001-~~1~~0.1a is ~~not inconsistent~~consistent with — or ~~less~~more stringent than — the NERC BAL-001-0.1a Reliability Standard. The reasons the WECC Variance meets the standard of justification are:

1. ~~Balancing Authorities~~The addition of I_{ATEC} to the ACE equation and adjustment to the control performance target used for controlling frequency and interchange does not place any addition risk to reliability because limits are set in the ~~Western Interconnect are~~ magnitude of the I_{ATEC} adjustment.
2. The Regional Variance allows the use of the same control performance target for control and reporting providing a better methodology for measuring performance.
3. It is another control methodology that achieves the same reliability objective as BAL-001-0.1a.

BAL-004-WECC-1 requires Balancing Authorities in the Western Interconnection to use ATEC ACE for control. ~~In WECC's variance to NERC BAL-001-0.1a~~As proposed in the WECC Variance, Balancing Authorities in the Western Interconnection are ~~permitted~~required to operate synchronously to the Interconnection, ~~while~~using the ATEC ACE, which automatically ~~correcting~~corrects time error ~~thus mitigating Inadvertent Interchange~~. The ATEC component in the ACE equation has been effective in mitigating two main issues in the Western Interconnection. ~~First, it~~

1. It has been used to reduce ~~manual time error corrections~~the number of hours of Manual Time Error Corrections, or the amount of manual adjustments of timing errors that accumulate on clocks, which ~~mark~~make certain interconnection scheduled frequency deviations. ~~Second, since~~
2. Since time error is directly related to Inadvertent Interchange, the procedure has been used to reduce accumulated Inadvertent Interchange, or the difference between the actual and scheduled interchange. ~~The use of ATEC has reduced the number of hours of Manual Time Error Correction for the Western Interconnection.~~

The ATEC procedure ~~effectively reduces the Manual Time Error Corrections by requiring~~requires Balancing Authorities in the Western Interconnection to determine their contribution to the Interconnection time error. The Balancing Authority does this by calculating its ~~Primary Inadvertent Interchange (~~PII~~). The~~. BAL-~~004-WECC-01 standard~~001-0.1a Requirement E.B.1 requires that each Balancing Authority calculate its ~~PII~~PII_{accum} and I_{ATEC} from its hourly Inadvertent Interchange~~, and feed~~. When the resulting ~~PII~~I_{ATEC} is entered into ~~its Area Control Error or~~Balancing Authority's ACE equation ~~to~~, I_{ATEC} continuously ~~correct~~corrects for its portion of the time error automatically, as opposed to manually, as specified in the continent-wide standard on Time Error Correction BAL-004-1~~.~~ Requirement R2. Although the maximum payback is bounded between limits, the continuous correction enables equitable payback of Primary Inadvertent Interchange.

The drafting team is proposing the same Violation Severity Levels for Requirement R1 of the WECC Variance as those in Requirement R1 of BAL-001-01.a because it is a measurement of how well a Balancing Authority is controlling to its control performance target.

Future Development Plan:

Anticipated Actions	Anticipated Date
~~17.~~1. ~~Meet to answer to comments, address impact statement, draft responses~~Project WECC-0068 Version 2 Comments due	~~06/03~~12/05/2011

Anticipated Actions	Anticipated Date
~~18. Post responses to comments~~	~~06/30/2011~~
~~19. Post the second draft for 30-day comment period~~	~~06/30/2011~~
~~20.~~2.Meet to answer to comments, address impact statement, draft responses	~~08/13~~12/06-16/2011
~~21.~~3.Post responses to comments	~~08/02/2011~~1/05/2012
~~22.~~4.Post draft standard for 45-day NERC comment period	~~08/2011~~1/05/2012
~~23.~~5.NERC comment period ends	~~09/30/ 2011~~02/20/2012
6. DT completes review and consideration of industry comments to NERC posting	02/20/2012
~~24.~~7.Post for comment and Operating Committee approval	~~09/09/2011~~02/24/2012
~~25.~~8.Operating Committee approves proposed standard	~~10/13-15/ 2011~~03/27/2012
~~26.~~9.Post draft standard for WECC Board approval	~~10/2011~~05/01/2012
~~27.~~10. WECC Board ~~approves proposed standard~~approval	~~11-12/2011~~06/21/2012
~~28.~~11. Post draft standard for 15-day NERC comment period	~~12/2011~~06/25/2012
~~29.~~12. NERC 15-day comment period ends	~~01~~07/2012
~~30.~~13. DT completes review and consideration of industry comments to NERC posting	~~01~~07/2012
~~31.~~14. Submit NERC Board of Trustees approval request	~~01~~08/2012
~~32.~~15. Receive NERC Board approval	~~02~~08/2012

.

Implementation Plan

The proposed Implementation Plan is to make the WECC Regional Variance to ~~NERC Reliability Standard~~ BAL-001-0.1a and the proposed WECC Regional Reliability Standard BAL-004-WECC-2 effective on the first day of the second quarter, after ~~FERC~~regulatory approval. Since entities are already controlling with the ATEC ACE equation, but are ~~reporting~~ using the NERC ~~Raw~~raw ACE equation for purposes of reporting CPS1, the transition to controlling and reporting using the ATEC ACE should be minimal. ~~It~~Additionally, it should not require much time to implement the limits ~~and actions needed when~~to a ~~BA's~~Balancing Authority's Accumulated Primary Inadvertent Interchange ~~exceeds the defined limits~~.

Definitions of Terms Used in Regional Variance to a NERC 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 definitions will be removed from the standard and added to the NERC Glossary. under WECC Regional Definitions.

~~**None**~~

Area Control Error: The instantaneous difference between a Balancing Authority's net actual and scheduled interchange, taking into account the effects of Frequency Bias, correction for meter error, and Automatic Time Error Correction.

A. Introduction

1. **Title**: **Real Power Balancing Control Performance**

2. **Number**: BAL-001-0.1a

3. **Purpose**: To maintain Interconnection steady-state frequency within defined limits by balancing real power demand and supply in real-time.

4. **Applicability**:

   4.1. Balancing Authorities

5. **Effective Date:** The WECC Regional Variance to NERC Reliability Standard ~~to~~ BAL-001-0.1a is to be effective on the first day of the second quarter, after ~~FERC~~regulatory approval.

B. Requirements

R1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit ε_1^2 is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \epsilon_1^2 \quad or \quad \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\epsilon_1^2} \le 1$$

The equation for ACE is:

$ACE = (NI_A - NI_S) - 10B\,(F_A - F_S) - I_{ME}$

where:

- NI_A is the algebraic sum of actual flows on all tie lines.
- NI_S is the algebraic sum of scheduled flows on all tie lines.
- B is the Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.
- F_A is the actual frequency.
- F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.
- I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

R2. Each Balancing Authority shall operate such that its average ACE for at least 90% of clock-ten-minute periods (6 non-overlapping periods per hour) during a calendar month is within a specific limit, referred to as L_{10}.

$$AVG_{10-minute}(ACE_i) \le L_{10}$$

where:

$L_{10} = 1.65 \in_{10} \sqrt{(-10B_i)(-10B_s)}$

ε_{10} is a constant derived from the targeted frequency bound. It is the targeted root-mean-square (RMS) value of ten-minute average Frequency Error based on frequency performance over a given year. The bound, ε_{10}, is the same for every Balancing Authority Area within an Interconnection, and B_s is the sum of the Frequency Bias Settings of the Balancing Authority Areas in the respective Interconnection. For Balancing Authority Areas with variable bias, this is equal to the sum of the minimum Frequency Bias Settings.

R3. Each Balancing Authority providing Overlap Regulation Service shall evaluate Requirement R1 (i.e., Control Performance Standard 1 or CPS1) and Requirement R2 (i.e., Control Performance Standard 2 or CPS2) using the characteristics of the combined ACE and combined Frequency Bias Settings.

R4. Any Balancing Authority receiving Overlap Regulation Service shall not have its control performance evaluated (i.e. from a control performance perspective, the Balancing Authority has shifted all control requirements to the Balancing Authority providing Overlap Regulation Service).

C. Measures

M1. Each Balancing Authority shall achieve, as a minimum, Requirement 1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-month}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement R1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B} \right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}} \right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error will be used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

The reporting Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}} [(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}} [n_{\text{one-minutesamplesin clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}} [(\text{CF}_{\text{clock-houraverage-month}})(n_{\text{one-minutesamplesin clock-houraverages}})]}{\sum_{\text{hours-in day}} [n_{\text{one-minutesamplesin clock-houraverages}}]}$$

The 12-month compliance factor becomes:

$$\text{CF}_{\text{12-month}} = \frac{\sum_{i=1}^{12} (CF_{\text{month-i}})(n_{(\text{one-minutesamplesin month})-i})]}{\sum_{i=1}^{12} [n_{(\text{one-minutesamplesin month})-i}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

M2. Each Balancing Authority shall achieve, as a minimum, Requirement R2 (CPS2) compliance of 90%. CPS2 relates to a bound on the ten-minute average of ACE. A compliance percentage is calculated as follows:

$$CPS2 = \left[1 - \frac{\text{Violations}_{\text{month}}}{\text{Total Periods}_{\text{month}} - \text{Unavailabl e Periods}_{\text{month}}}\right] * 100$$

The violations per month are a count of the number of periods that ACE clock-ten-minutes exceeded L_{10}. ACE clock-ten-minutes is the sum of valid ACE samples within a clock-ten-minute period divided by the number of valid samples.

Violation clock-ten-minutes

= 0 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| \le L_{10}$$

= 1 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| > L_{10}$$

Each Balancing Authority shall report the total number of violations and unavailable periods for the month. L_{10} is defined in Requirement R2.

Since CPS2 requires that ACE be averaged over a discrete time period, the same factors that limit total periods per month will limit violations per month. The calculation of total periods per month and violations per month, therefore, must be discussed jointly.

A condition may arise which may impact the normal calculation of total periods per month and violations per month. This condition is a sustained interruption in the recording of ACE.

In order to ensure that the average ACE calculated for any ten-minute interval is representative of that ten-minute interval, it is necessary that at least half the ACE data samples are present for that interval. Should half or more of the ACE data be unavailable due to loss of telemetering or computer unavailability, that ten-minute interval shall be omitted from the calculation of CPS2.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Regional Reliability Organization

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar month.

1.3. Data Retention

The data that supports the calculation of CPS1 and CPS2 (Appendix 1-BAL-001-0) are to be retained in electronic form for at least a one-year period. If the CPS1 and CPS2 data for a Balancing Authority Area are undergoing a review to address a question that has been raised regarding the data, the data are to be saved beyond the normal retention period until the question is formally resolved. Each Balancing Authority shall retain for a rolling 12-month period the values of: one-minute average ACE (ACE_i), one-minute average Frequency Error, and, if using variable bias, one-minute average Frequency Bias.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance – CPS1

2.1. Level 1: The Balancing Authority Area's value of CPS1 is less than 100% but greater than or equal to 95%.

2.2. Level 2: The Balancing Authority Area's value of CPS1 is less than 95% but greater than or equal to 90%.

2.3. Level 3: The Balancing Authority Area's value of CPS1 is less than 90% but greater than or equal to 85%.

2.4. Level 4: The Balancing Authority Area's value of CPS1 is less than 85%.

3. Levels of Non-Compliance – CPS2

3.1. Level 1: The Balancing Authority Area's value of CPS2 is less than 90% but greater than or equal to 85%.

3.2. Level 2: The Balancing Authority Area's value of CPS2 is less than 85% but greater than or equal to 80%.

3.3. Level 3: The Balancing Authority Area's value of CPS2 is less than 80% but greater than or equal to 75%.

3.4. Level 4: The Balancing Authority Area's value of CPS2 is less than 75%.

E. Regional Variances

E.A. The ERCOT Control Performance Standard 2 Waiver approved November 21, 2002.

E.B. Regional Variance for the Western Electricity Coordinating Council

The following Interconnection-wide variance shall be applicable in the Western ~~Electricity Coordinating Council (WECC)~~Interconnection and replaces, in their entirety, Requirement R1 and Section D.2. (i.e., under Compliance ~~2.~~ replace Levels of Non-Compliance – CPS1). Please note that the ACE equation is replaced in its entirety with the following equation identified in Requirement E.B.1.

Requirements and Measures[1]

E.B.1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit $\in_1^2$ is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

[1] ~~The number for each measure corresponds with the number for each requirement, i.e. M.E.B.1 means the measure for requirement E.B.1.~~

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \epsilon_1^2 \; or \; \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\epsilon_1^2} \le 1$$

The equation for ACE in the Western Interconnection is:

$$ACE = (NI_A - NI_S) - 10B(F_A - F_S) - I_{ME} + I_{ATEC}$$

Where:

NI_A is the algebraic sum of actual flows on all tie lines.

NI_S is the algebraic sum of scheduled flows on all tie lines.

F_A is the actual frequency.

F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.

B = Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. –The constant factor 10 converts the frequency setting to MW/Hz.

~~I_{ME} = **Meter Error Correction (MW)** that~~ **I_{ME}** is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

Rationale for E.B.1

Premise: When a Balancing Authority Area uses the ACE equation with an ATEC correction component for both control and assessing performance, it provides a more accurate measurement of the Control Performance methodology while at the same time achieving the same reliability objective as the existing BAL-001-0.1a standard.

Justification: Adding the ***I_{ATEC}*** term to the ACE equation reduces the number of manual time er

Goal: T permits Time E

~~**Rationale for E.B.1**~~

~~**Assumption:** Controlling a Balancing Authority Area using the ACE equation with an ATEC correction component will not reduce reliability.~~

~~**Justification:** Adding the ***I_{ATEC}*** term to the ACE equation reduces number of manual time error corrections and PII_{accum}.~~

~~**Goal:** To establish an ACE equation that permits the implementation of automatic time error correction.~~

$I_{ATEC} = \frac{PII_{accum}^{on/off\ peak}}{(-Y) * H}$ when operating in Automatic Time Error Correction control mode. I_{ATEC} shall be zero when operating in any other AGC mode.

~~**NI_S** is the algebraic sum of scheduled flows on all tie lines.~~

Y = B / B_S.

H = Number of Hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3.

B_S = Frequency Bias for the Interconnection (MW / 0.1 Hz).

Primary **I**nadvertent **I**nterchange **(PII_{hourly})** is **(1-Y) * (II_{actual} - B * ΔTE/6)**

II_{actual} is the hourly Inadvertent Interchange for the last hour.

ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where:

$$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE_{offset})$$

TD_{adj} is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks.

t is the number of minutes of Manual Time Error Correction that occurred during the hour.

TE_{offset} is 0.000 or +0.020 or -0.020.

~~$PII_{accum}^{on/off\ peak}$~~ **$PII_{accum}$** is the Balancing Authority's accumulated **PII_{hourly}** in MWh. An On-Peak and Off-Peak accumulation accounting is required.

Where:

$$PII_{accum}^{on/off\ peak} = \textbf{last period's } PII_{accum}^{on/off\ peak} + PII_{hourly}$$

[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]

M.E.B.1. Each Balancing Authority shall ~~have and provide upon request evidence that it operated such that, on~~ achieve, as a ~~rolling~~minimum, Requirement E.B.1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-month}}{(\epsilon_1)^2}$$

where: ε_1 is defined in Requirement E.B.1.

The rating index $CF_{12\text{-month}}$ ~~basis, the average of the clock~~is derived from 12 months of data. The basic unit of data comes from one-minute averages of ~~the~~ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's ~~Area Control Error (ACE) divided by 10B (B is the~~valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute ~~average of the Balancing Authority Area's Frequency Bias) times the corresponding.~~

$$\left(\frac{ACE}{-10B}\right)_{clock\text{-}minute} = \frac{\left(\frac{\sum ACE_{sampling\ cycles\ in\ clock\text{-}minute}}{n_{sampling\ cycles\ in\ clock\text{-}minute}}\right)}{-10B}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B} \right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}} \right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error ~~is less than a specific limit~~ are used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

As part of its evidence each Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}} [(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}} [n_{\text{one-minutesamplesin clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}} [(\text{CF}_{\text{clock-houraverage-month}})(n_{\text{one-minutesamplesin clock-houraverages}})]}{\sum_{\text{hours-in day}} [n_{\text{one-minutesamplesin clock-houraverages}}]}$$

The 12-month compliance factor becomes:

$$\text{CF}_{\text{12-month}} = \frac{\sum_{i=1}^{12} (CF_{\text{month-i}})(n_{(\text{one-minutesamplesin month})-i})]}{\sum_{i=1}^{12} [n_{(\text{one-minutesamplesin month})-i}]}$$

~~**M.E.B.1.**~~ In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that ~~demonstrates compliance with requirement E.B.1. This limit is a constant derived from a targeted frequency bound (separately calculated for each Interconnection)~~at least 50% of both ACE and Frequency Deviation samples during that ~~is reviewed and set as necessary by the NERC Operating Committee~~one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and

Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

E.B.2. Each Balancing Authority shall limit the absolute value of I_{ATEC}, the Automatic Time Error Correction term as follows: *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*

$$\left| I_{ATEC} \right| \leq L_{max}.$$

M.E.B.2. ~~Each Balancing Authority shall have and provide upon request~~Forms of acceptable evidence ~~that its absolute value~~ for ~~I_{ATEC} is less than or equal~~Requirement E.B. 2 may include, but are not limited to ~~L_{max}. Acceptable evidence is dated~~:

- Dated Energy Management System (EMS) displays,
- WECC ~~Western~~ Interchange Tool, EMS application code, or ~~other~~
- ~~**M.E.B.2.**~~ Other archived data that demonstrates compliance ~~with requirement E.B.2.~~.

E.B.3. Each Balancing Authority shall set L_{max} within the limits as follows:

$$0.20 * |B| \leq L_{max} \leq L_{10}.$$

[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]

M.E.B.3. ~~A Balancing Authority shall have and provide upon request~~Forms of acceptable evidence ~~that demonstrates L_{max}~~ for Requirement E.B. 3 may include, but is ~~within the limits in requirement R3. Acceptable evidence is dated~~not limited to:

- Dated Energy Management System (EMS) displays,
- WECC ~~Western~~ Interchange Tool, EMS application code, or ~~other~~

Rationale for E.B.2

~~**Rationale for E.B.2**~~

~~**Assumption**: Large adjustments in I_{ATEC} may result in CPS2 violations.~~

~~**Justification**: Balancing Authorities should not violate CPS2.~~

~~**Goal**: The goal of requirement E.B.2 is to limit I_{ATEC} so that Balancing Authorities do not experience CPS2 violations.~~

by a large ATEC payback term.

Rationale for E.B.3

~~**Rationale for E.B.3**~~

~~**Assumption**: Operating within an L_{max} less than 0.02 * |B| may not provide sufficient correction for PII and operating with an L_{max} greater than L_{10} may result in CPS2 violations.~~

~~**Justification**: L_{max} should be limited to prevent Balancing Authorities from violating CPS2.~~

~~**Goal**: The goal of requirement E.B.3 is to develop a range for L_{max} where Balancing Authorities are less likely to experience CPS2 violations.~~

~~**M.E.B.3.**~~• Other archived data that demonstrates compliance ~~with requirement E.B.3.~~ .

E.B. Compliance

1. Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of I_{ATEC} and L_{max} for the preceding calendar year (January – December), as well as the current calendar year.

Table of Compliance Elements

E #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
E.B.1	Real-time Operations	Medium	The Balancing Authority Area's value of CPS1 ~~is~~was less than 100% but greater than or equal to 95%.	The Balancing Authority Area's value of CPS1 ~~is~~was less than 95% but greater than or equal to 90%.	The Balancing Authority Area's value of CPS1 ~~is~~was less than 90% but greater than or equal to 85%.	The Balancing Authority Area's value of CPS1 ~~is~~was less than 85%.
E.B.2	Real-time Operations	Medium	N/A	N/A	N/A	The Balancing Authority Area's absolute value for I_{ATEC} ~~is~~was greater than L_{max}.
E.B.3	Operations Planning	Medium	N/A	N/A	N/A	The Balancing Authority did not set L_{max} to within the limits in E.B.3 (i.e~~.~~., ~~(~~.0.20 * |B| ≤ L_{max} ≤ L_{10}~~)~~).

F. Associated Documents

~~E.A. Appendix 2 Interpretation of Requirement R1 (October 23, 2007).~~

Version History

Version	Date	Action	Change Tracking
0	February 8, 2005	BOT Approval	New
0	April 1, 2005	Effective Implementation Date	New
0	August 8, 2005	Removed "Proposed" from Effective Date	Errata
0	July 24, 2007	Corrected R3 to reference M1 and M2 instead of R1 and R2	Errata
0a	December 19, 2007	Added Appendix 2 – Interpretation of R1 approved by BOT on October 23, 2007	Revised
0a	January 16, 2008	In Section A.2., Added "a" to end of standard number In Section F, corrected automatic numbering from "2" to "1" and removed "approved" and added parenthesis to "(October 23, 2007)"	Errata
0	January 23, 2008	Reversed errata change from July 24, 2007	Errata
0.1a	October 29, 2008	Board approved errata changes; updated version number to "0.1a"	Errata
0.1a	May 13, 2009	Approved by FERC	
		WECC Regional Variance Retirement of Appendix 2 Interpretation of Requirement R1	

Appendix 1-BAL-001-0
CPS1 and CPS2 Data

CPS1 DATA	Description	Retention Requirements
ε_1	A constant derived from the targeted frequency bound. This number is the same for each Balancing Authority Area in the Interconnection.	Retain the value of ε_1 used in CPS1 calculation.
ACE_i	The clock-minute average of ACE.	Retain the 1-minute average values of ACE (525,600 values).
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value(s) of B_i used in the CPS1 calculation.
F_A	The actual measured frequency.	Retain the 1-minute average frequency values (525,600 values).
F_S	Scheduled frequency for the Interconnection.	Retain the 1-minute average frequency values (525,600 values).

CPS2 DATA	Description	Retention Requirements
V	Number of incidents per hour in which the absolute value of ACE clock-ten-minutes is greater than L_{10}.	Retain the values of V used in CPS2 calculation.
ε_{10}	A constant derived from the frequency bound. It is the same for each Balancing Authority Area within an Interconnection.	Retain the value of ε_{10} used in CPS2 calculation.
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value of B_i used in the CPS2 calculation.
B_s	The sum of Frequency Bias of the Balancing Authority Areas in the respective Interconnection. For systems with variable bias, this is equal to the sum of the minimum Frequency Bias Setting.	Retain the value of B_s used in the CPS2 calculation. Retain the 1-minute minimum bias value (525,600 values).
U	Number of unavailable ten-minute periods per hour used in calculating CPS2.	Retain the number of 10-minute unavailable periods used in calculating CPS2 for the reporting period.

Document Title	WECC Regional Variance to NERC Standard BAL-001-0.1a
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1		Version 1 Posted 4/15/11-6/1/11	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Standing Committee Approval	
4		WECC Board Approval	

Regional Variance 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.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	07/16/2010
9. Notice of development / first 30-day notice	09/2/2010
10. New committee chair orientation meeting	08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 01/18/11 02/10/11 03/11–12/11 03/24/11 04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
16. Post first draft for 45-day comment period	04/15/2011
17. Meet to answer to comments, address impact statement and draft responses	06/2-3/2011 06/14/2011 06/23/2011 06/29/2011

18. Post responses to comments received during 45-day comment period	06/29/2011
19. Meet to answer to comments, address impact statement and draft responses	08/8/2011 08/15/2011 08/30/2011 11/01/2011
20. Post the second draft for a 30-day comment period	11/04/2011

Description of Current Draft:

On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC Standards.[1] Since the approval of BAL-004-WECC-1 the industry has commented that there is confusion concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as that used during Automatic Generation Control (AGC) mode. The use of two ACE equations came as a result of NERC's comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a) [2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation for control but should use raw ACE for CPS reporting.[3] The industry desires to use the same ACE equation for control and reporting because it provides better a measurement of control performance.

The purpose of this proposed WECC Regional Variance to BAL-001-01.a (WECC Variance) is to replace Requirements R1 and Section D. Compliance, Subsection 2. of BAL-001-0.1a with three new requirements. In Requirement E.B.1 of the WECC Variance, the drafting team proposes to replace the NERC ACE equation with an ACE equation that includes the ATEC term. Replacing the NERC raw ACE equation with the ATEC ACE equation through a Regional Variance will require Balancing Authorities in the Western Interconnection to use the ATEC ACE for control and CPS reporting purposes. Using the ATEC ACE equation for CPS reporting is more appropriate because, as discussed further below, it is a more accurate measure of how well a Balancing Authority is controlling to its control performance target.

The drafting team for Project WECC-0068 also requests withdrawal of the BAL-001-0.1a Appendix 2 Interpretation of Requirement R1and the BAL-003-0.1b Appendix 1 Interpretation of Requirement R3. By creating a Regional Variance that replaces Requirement R1, these interpretations are no longer needed. The drafting team revised the definition for Area Control Error (ACE) in the WECC Regional

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).
[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).
[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

Definitions to closely align with NERC definition for ACE while at the same recognizing concept of ATEC.

In order to obtain a Regional Variance[4] to a NERC Reliability Standard, it must be demonstrated that:

- The variance is not inconsistent with or less stringent than the NERC reliability standard;
- Is necessitated by a physical difference; or
- Is an alternative methodology with the same reliability objective.

Replacing the NERC ACE equation with an ATEC ACE equation is an alternative methodology with the same reliability objective as the existing BAL-001-0.1a standard. It is a method of automatically scheduling Primary Inadvertent Interchange (PII) back to other Balancing Authorities. The inclusion of the Automatic Time Error Correction term in the ACE equation changes the Balancing Authority's control performance target. The current NERC ACE equation requires that Balancing Authorities control the frequency and Interchange within their Balancing Authority Area to a target point of zero, but it allows the control to stay within a predefined range called L_{max} which is between $0.20 * |B|$ and $\pm L_{10}$. The proposed ACE equation, with an Automatic Time Error adjustment, works similarly to the NERC equation; however, the target point for control is adjusted by the ATEC adjustment. The ATEC component defines a new control point and is equivalent to making an interchange schedule that would automatically payback PII. The modification to the ACE equation is equivalent to making an adjustment because of a metering error. Since the amount of the adjustment during any one hour is limited by L_{max}, Balancing Authorities automatically limit the risk to the interconnection and the amount of the transaction.

The addition of the $\boldsymbol{I_{ATEC}}$ component meets the standard of justification for a Regional Variance as an alternative methodology, with the same reliability objective as the NERC Reliability Standard. In addition, the proposed WECC variance to BAL-001-0.1a is consistent with — or more stringent than — the NERC BAL-001-0.1a Reliability Standard. The reasons the WECC Variance meets the standard of justification are:

1. The addition of $\boldsymbol{I_{ATEC}}$ to the ACE equation and adjustment to the control performance target used for controlling frequency and interchange does not place any addition risk to reliability because limits are set in the magnitude of the $\boldsymbol{I_{ATEC}}$ adjustment.
2. The Regional Variance allows the use of the same control performance target for control and reporting providing a better methodology for measuring performance.
3. It is another control methodology that achieves the same reliability objective as BAL-001-0.1a.

BAL-004-WECC-1 requires Balancing Authorities in the Western Interconnection to use ATEC ACE for control. As proposed in the WECC Variance, Balancing Authorities in the Western Interconnection are required to operate synchronously to the Interconnection, using the ATEC ACE, which automatically corrects time error. The ATEC component in the ACE equation has been effective in mitigating two main issues in the Western Interconnection.

[4] "Entity variance" means an aspect of a reliability standard that applies only within a particular entity or a subset of entities within a limited portion of a regional entity, such as a variance that would apply to a regional transmission organization or particular market or to a subset of bulk power system owners, operators or users. An entity variance may not be inconsistent with or less stringent than the reliability standards as it would otherwise exist without the entity variance. An entity variance shall be approved only through the NERC standards development procedure and shall be made part of the NERC reliability standards." (Rules of Procedure of the North American Electric Reliability Corporation, Section 200 — Definition of Terms, page 2.)

1. It has been used to reduce the number of hours of Manual Time Error Corrections, or the amount of manual adjustments of timing errors that accumulate on clocks, which make certain interconnection scheduled frequency deviations.
2. Since time error is directly related to Inadvertent Interchange, the procedure has been used to reduce accumulated Inadvertent Interchange, or the difference between the actual and scheduled interchange.

The ATEC procedure requires Balancing Authorities in the Western Interconnection to determine their contribution to the Interconnection time error. The Balancing Authority does this by calculating its PII. BAL-001-0.1a Requirement E.B.1 requires that each Balancing Authority calculate its PII_{accum} and I_{ATEC} from its hourly Inadvertent Interchange. When the resulting I_{ATEC} is entered into Balancing Authority's ACE equation, I_{ATEC} continuously corrects for its portion of the time error automatically, as opposed to manually, as specified in the continent-wide standard on Time Error Correction BAL-004-1 Requirement R2. Although the maximum payback is bounded between limits, the continuous correction enables equitable payback of Primary Inadvertent Interchange.

The drafting team is proposing the same Violation Severity Levels for Requirement R1 of the WECC Variance as those in Requirement R1 of BAL-001-01.a because it is a measurement of how well a Balancing Authority is controlling to its control performance target.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Project WECC-0068 Version 2 Comments due	12/05/2011
2. Meet to answer to comments, address impact statement, draft responses	12/06-16/2011
3. Post responses to comments	1/05/2012
4. Post draft standard for 45-day NERC comment period	1/05/2012
5. NERC comment period ends	02/20/2012
6. DT completes review and consideration of industry comments to NERC posting	02/20/2012
7. Post for comment and Operating Committee approval	02/24/2012
8. Operating Committee approves proposed standard	03/27/2012
9. Post draft standard for WECC Board approval	05/01/2012
10. WECC Board approval	06/21/2012
11. Post draft standard for 15-day NERC comment period	06/25/2012
12. NERC 15-day comment period ends	07/2012
13. DT completes review and consideration of industry comments to NERC posting	07/2012
14. Submit NERC Board of Trustees approval request	08/2012
15. Receive NERC Board approval	08/2012

.

Implementation Plan

The proposed Implementation Plan is to make the WECC Regional Variance to BAL-001-0.1a and the proposed WECC Regional Reliability Standard BAL-004-WECC-2 effective on the first day of the second quarter, after regulatory approval. Since entities are already controlling with the ATEC ACE equation, but are using the NERC raw ACE equation for purposes of reporting CPS1, the transition to controlling and reporting using the ATEC ACE should be minimal. Additionally, it should not require much time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

Definitions of Terms Used in Regional Variance to a NERC 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 definitions will be removed from the standard and added to the NERC Glossary under WECC Regional Definitions.

Area Control Error: The instantaneous difference between a Balancing Authority's net actual and scheduled interchange, taking into account the effects of Frequency Bias, correction for meter error, and Automatic Time Error Correction.

A. Introduction

1. Title: **Real Power Balancing Control Performance**

2. Number: BAL-001-0.1a

3. Purpose: To maintain Interconnection steady-state frequency within defined limits by balancing real power demand and supply in real-time.

4. Applicability:

4.1. Balancing Authorities

~~**5. Effective Date:** May 13, 2009~~

5. Effective Date: The WECC Regional Variance to NERC Reliability Standard BAL-001-0.1a is to be effective on the first day of the second quarter, after regulatory approval.

B. Requirements

R1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit ε_1^2 is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \epsilon_1^2 \text{ or } \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\epsilon_1^2} \le 1$$

The equation for ACE is:

$ACE = (NI_A - NI_S) - 10B\,(F_A - F_S) - I_{ME}$

where:

- NI_A is the algebraic sum of actual flows on all tie lines.
- NI_S is the algebraic sum of scheduled flows on all tie lines.
- B is the Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.
- F_A is the actual frequency.
- F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.
- I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

R2. Each Balancing Authority shall operate such that its average ACE for at least 90% of clock-ten-minute periods (6 non-overlapping periods per hour) during a calendar month is within a specific limit, referred to as L_{10}.

$$AVG_{10-\text{minute}}(ACE_i) \le L_{10}$$

where:

$L_{10} = 1.65 \in_{10} \sqrt{(-10B_i)(-10B_s)}$

ε_{10} is a constant derived from the targeted frequency bound. It is the targeted root-mean-square (RMS) value of ten-minute average Frequency Error based on frequency performance over a given year. The bound, ε_{10}, is the same for every Balancing Authority Area within an Interconnection, and B_s is the sum of the Frequency Bias Settings of the Balancing Authority Areas in the respective Interconnection. For Balancing Authority Areas with variable bias, this is equal to the sum of the minimum Frequency Bias Settings.

R3. Each Balancing Authority providing Overlap Regulation Service shall evaluate Requirement R1 (i.e., Control Performance Standard 1 or CPS1) and Requirement R2 (i.e., Control Performance Standard 2 or CPS2) using the characteristics of the combined ACE and combined Frequency Bias Settings.

R4. Any Balancing Authority receiving Overlap Regulation Service shall not have its control performance evaluated (i.e. from a control performance perspective, the Balancing Authority has shifted all control requirements to the Balancing Authority providing Overlap Regulation Service).

C. Measures

M1. Each Balancing Authority shall achieve, as a minimum, Requirement 1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-\text{month}}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement R1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B} \right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}} \right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error will be used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

The reporting Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}} [(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}} [n_{\text{one-minutesamplesin clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}} [(\text{CF}_{\text{clock-houraverage-month}})(n_{\text{one-minutesamplesin clock-houraverages}})]}{\sum_{\text{hours-in day}} [n_{\text{one-minutesamplesin clock-houraverages}}]}$$

The 12-month compliance factor becomes:

$$\text{CF}_{\text{12-month}} = \frac{\sum_{\text{i=1}}^{12} (CF_{\text{month-i}})(n_{(\text{one-minutesamplesin month})-\text{i}})]}{\sum_{\text{i=1}}^{12} [n_{(\text{one-minutesamplesin month})-\text{i}}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

M2. Each Balancing Authority shall achieve, as a minimum, Requirement R2 (CPS2) compliance of 90%. CPS2 relates to a bound on the ten-minute average of ACE. A compliance percentage is calculated as follows:

$$CPS2 = \left[1 - \frac{\text{Violations}_{\text{month}}}{\left(\text{Total Periods}_{\text{month}} - \text{Unavailabl e Periods}_{\text{month}}\right)}\right] * 100$$

The violations per month are a count of the number of periods that ACE clock-ten-minutes exceeded L_{10}. ACE clock-ten-minutes is the sum of valid ACE samples within a clock-ten-minute period divided by the number of valid samples.

Violation clock-ten-minutes

= 0 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| \leq L_{10}$$

= 1 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| > L_{10}$$

Each Balancing Authority shall report the total number of violations and unavailable periods for the month. L_{10} is defined in Requirement R2.

Since CPS2 requires that ACE be averaged over a discrete time period, the same factors that limit total periods per month will limit violations per month. The calculation of total periods per month and violations per month, therefore, must be discussed jointly.

A condition may arise which may impact the normal calculation of total periods per month and violations per month. This condition is a sustained interruption in the recording of ACE.

In order to ensure that the average ACE calculated for any ten-minute interval is representative of that ten-minute interval, it is necessary that at least half the ACE data samples are present for that interval. Should half or more of the ACE data be unavailable due to loss of telemetering or computer unavailability, that ten-minute interval shall be omitted from the calculation of CPS2.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Regional Reliability Organization

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar month.

1.3. Data Retention

The data that supports the calculation of CPS1 and CPS2 (Appendix 1-BAL-001-0) are to be retained in electronic form for at least a one-year period. If the CPS1 and CPS2 data for a Balancing Authority Area are undergoing a review to address a question that has been raised regarding the data, the data are to be saved beyond the normal retention period until the question is formally resolved. Each Balancing Authority shall retain for a rolling 12-month period the values of: one-minute average ACE (ACE_i), one-minute average Frequency Error, and, if using variable bias, one-minute average Frequency Bias.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance – CPS1

2.1. Level 1: The Balancing Authority Area's value of CPS1 is less than 100% but greater than or equal to 95%.

2.2. Level 2: The Balancing Authority Area's value of CPS1 is less than 95% but greater than or equal to 90%.

2.3. Level 3: The Balancing Authority Area's value of CPS1 is less than 90% but greater than or equal to 85%.

2.4. Level 4: The Balancing Authority Area's value of CPS1 is less than 85%.

3. Levels of Non-Compliance – CPS2

3.1. Level 1: The Balancing Authority Area's value of CPS2 is less than 90% but greater than or equal to 85%.

3.2. Level 2: The Balancing Authority Area's value of CPS2 is less than 85% but greater than or equal to 80%.

3.3. Level 3: The Balancing Authority Area's value of CPS2 is less than 80% but greater than or equal to 75%.

3.4. Level 4: The Balancing Authority Area's value of CPS2 is less than 75%.

E. Regional ~~Differences~~Variances

~~1.~~E.A. The ERCOT Control Performance Standard 2 Waiver approved November 21, 2002.

E.B. Regional Variance for the Western Electricity Coordinating Council

The following Interconnection-wide variance shall be applicable in the Western Interconnection and replaces, in their entirety, Requirement R1 and Section D.2. (i.e., under Compliance replace Levels of Non-Compliance – CPS1). Please note that the ACE equation is replaced in its entirety with the following equation identified in Requirement E.B.1.

Requirements and Measures

E.B.1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit $\in_1^2$ is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \epsilon_1^2 \; or \; \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\epsilon_1^2} \le 1$$

The equation for ACE in the Western Interconnection is:

$$ACE = (NI_A - NI_S) - 10B(F_A - F_S) - I_{ME} + I_{ATEC}$$

Where:

NI_A is the algebraic sum of actual flows on all tie lines.

NI_S is the algebraic sum of scheduled flows on all tie lines.

F_A is the actual frequency.

F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.

B = Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.

I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

Rationale for E.B.1

Premise: When a Balancing Authority Area uses the ACE equation with an ATEC correction component for both control and assessing performance, it provides a more accurate measurement of the Control Performance methodology while at the same time achieving the same reliability objective as the existing BAL-001-0.1a standard.

Justification: Adding the ***I_{ATEC}*** term to the ACE equation reduces the number of manual time error corrections and PII_{accum}.

Goal: To establish an ACE equation that permits the implementation of Automatic Time Error Correction.

$I_{ATEC} = \frac{PII_{accum}^{on/off\ peak}}{(-Y) * H}$ when operating in Automatic Time Error Correction control mode. I_{ATEC} shall be zero when operating in any other AGC mode.

Y = B / B_S

H = Number of Hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3.

B_S = Frequency Bias for the Interconnection (MW / 0.1 Hz).

Primary Inadvertent Interchange (PII_{hourly}) is (1-Y) * (II_{actual} - B * ΔTE/6)

II_{actual} is the hourly Inadvertent Interchange for the last hour.

ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where:

$$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE_{offset})$$

TD_{adj} is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks.

t is the number of minutes of Manual Time Error Correction that occurred during the hour.

TE_{offset} is 0.000 or +0.020 or -0.020.

PII_{accum} is the Balancing Authority's accumulated **PII_{hourly}** in MWh. An On-Peak and Off-Peak accumulation accounting is required.

Where:

$$PII_{accum}^{on/off\ peak} = \textbf{last period's}\ PII_{accum}^{on/off\ peak} + PII_{hourly}$$

[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]

M.E.B.1. Each Balancing Authority shall achieve, as a minimum, Requirement E.B.1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-month}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement E.B.1.

The rating index $CF_{12\text{-}month}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{clock\text{-}minute} = \frac{\left(\frac{\sum ACE_{sampling\ cycles\ in\ clock\text{-}minute}}{n_{sampling\ cycles\ in\ clock\text{-}minute}}\right)}{-10B}$$

$$\Delta F_{clock\text{-}minute} = \frac{\sum \Delta F_{sampling\ cycles\ in\ clock\text{-}minute}}{n_{sampling\ cycles\ in\ clock\text{-}minute}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B} \right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}} \right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error are used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

As part of its evidence each Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}} [(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}} [n_{\text{one-minutesamplesin clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}} [(\text{CF}_{\text{clock-houraverage-month}})(n_{\text{one-minutesamplesin clock-houraverages}})]}{\sum_{\text{hours-in day}} [n_{\text{one-minutesamplesin clock-houraverages}}]}$$

The 12-month compliance factor becomes:

$$\text{CF}_{\text{12-month}} = \frac{\sum_{\text{i=1}}^{12} (CF_{\text{month-i}})(n_{\text{(one-minutesamplesin month)-i}})]}{\sum_{\text{i=1}}^{12} [n_{\text{(one-minutesamplesin month)-i}}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

E.B.2. Each Balancing Authority shall limit the absolute value of I_{ATEC}, the Automatic Time Error Correction term as follows: *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*

Adopted by NERC Board of Trustees:
Mandatory Effective Date:
Developed as: **WECC-0068**

Rationale for E.B.2

Premise: I_{ATEC} greater than L_{max} may result in a risk to reliability caused by large ATEC payback.

Justification: Balancing Authorities should not control their Balancing Authority Areas using an approach that puts system reliability at risk.

Goal: The goal of Requirement E.B.2 is to limit I_{ATEC} to L_{max} in order to reduce potential reliability risks to the interconnection caused by a large ATEC payback term.

$|I_{ATEC}| \leq L_{max}$.

M.E.B.2. Forms of acceptable evidence for Requirement E.B. 2 may include, but are not limited to:

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or
- Other archived data that demonstrates compliance.

E.B.3. Each Balancing Authority shall set L_{max} within the limits as follows:

$$0.20 * |B| \leq L_{max} \leq L_{10}.$$

[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]

M.E.B.3. Forms of acceptable evidence for Requirement E.B. 3 may include, but is not limited to:

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or
- Other archived data that demonstrates compliance.

Rationale for E.B.3

Premise: Operating within an L_{max} less than 0.20 * |B| may not provide sufficient correction for PII and operating with an L_{max} greater than L_{10} may result in potential reliability risks caused by a large ATEC payback term.

Justification: L_{max} should be limited to prevent Balancing Authorities from creating potential reliability risks caused by a large ATEC payback term.

Goal: The goal of Requirement E.B.3 is to develop a range for L_{max} where Balancing Authorities reduce potential reliability risks by limiting I_{ATEC} to L_{max}.

E.B. Compliance

1. Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of I_{ATEC} and L_{max} for the preceding calendar year (January – December), as well as the current calendar year.

Table of Compliance Elements

E #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
E.B.1	Real-time Operations	Medium	The Balancing Authority Area's value of CPS1 was less than 100% but greater than or equal to 95%.	The Balancing Authority Area's value of CPS1 was less than 95% but greater than or equal to 90%.	The Balancing Authority Area's value of CPS1 was less than 90% but greater than or equal to 85%.	The Balancing Authority Area's value of CPS1 was less than 85%.
E.B.2	Real-time Operations	Medium	N/A	N/A	N/A	The Balancing Authority Area's absolute value for I_{ATEC} was greater than L_{max}.
E.B.3	Operations Planning	Medium	N/A	N/A	N/A	The Balancing Authority did not set L_{max} to within the limits in E.B.3 (i.e., $0.20 * \|B\| \leq L_{max} \leq L_{10}$).

F. Associated Documents

~~E.A. Appendix 2 Interpretation of Requirement R1 (October 23, 2007).~~

Version History

Version	Date	Action	Change Tracking
0	February 8, 2005	BOT Approval	New
0	April 1, 2005	Effective Implementation Date	New
0	August 8, 2005	Removed "Proposed" from Effective Date	Errata
0	July 24, 2007	Corrected R3 to reference M1 and M2 instead of R1 and R2	Errata
0a	December 19, 2007	Added Appendix 2 – Interpretation of R1 approved by BOT on October 23, 2007	Revised
0a	January 16, 2008	In Section A.2., Added "a" to end of standard number In Section F, corrected automatic numbering from "2" to "1" and removed "approved" and added parenthesis to "(October 23, 2007)"	Errata
0	January 23, 2008	Reversed errata change from July 24, 2007	Errata
0.1a	October 29, 2008	Board approved errata changes; updated version number to "0.1a"	Errata
0.1a	May 13, 2009	Approved by FERC	
		WECC Regional Variance Retirement of Appendix 2 Interpretation of Requirement R1	

Appendix 1-BAL-001-0
CPS1 and CPS2 Data

CPS1 DATA	Description	Retention Requirements
ε_1	A constant derived from the targeted frequency bound. This number is the same for each Balancing Authority Area in the Interconnection.	Retain the value of ε_1 used in CPS1 calculation.
ACE_i	The clock-minute average of ACE.	Retain the 1-minute average values of ACE (525,600 values).
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value(s) of B_i used in the CPS1 calculation.
F_A	The actual measured frequency.	Retain the 1-minute average frequency values (525,600 values).
F_S	Scheduled frequency for the Interconnection.	Retain the 1-minute average frequency values (525,600 values).

CPS2 DATA	Description	Retention Requirements
V	Number of incidents per hour in which the absolute value of ACE clock-ten-minutes is greater than L_{10}.	Retain the values of V used in CPS2 calculation.
ε_{10}	A constant derived from the frequency bound. It is the same for each Balancing Authority Area within an Interconnection.	Retain the value of ε_{10} used in CPS2 calculation.
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value of B_i used in the CPS2 calculation.
B_s	The sum of Frequency Bias of the Balancing Authority Areas in the respective Interconnection. For systems with variable bias, this is equal to the sum of the minimum Frequency Bias Setting.	Retain the value of B_s used in the CPS2 calculation. Retain the 1-minute minimum bias value (525,600 values).
U	Number of unavailable ten-minute periods per hour used in calculating CPS2.	Retain the number of 10-minute unavailable periods used in calculating CPS2 for the reporting period.

Appendix 2

Interpretation of Requirement 1

Request: *Does the WECC Automatic Time Error Control Procedure (WATEC) violate Requirement 1 of BAL-001-0?*

Interpretation:
Requirement 1 of BAL-001 — Real Power Balancing Control Performance, is the definition of the area control error (ACE) equation and the limits established for Control Performance Standard 1 (CPS1).

BAL-001-0

R1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit ε12 is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

- The WATEC procedural documents ask Balancing Authorities to maintain raw ACE for CPS reporting and to control via WATEC-adjusted ACE.
- As long as Balancing Authorities use raw (unadjusted for WATEC) ACE for CPS reporting purposes, the use of WATEC for control is not in violation of BAL-001 Requirement 1.

WECC Standard BAL-004-WECC-02
Automatic Time Error Correction
Version 2, Open: 11/4/2011 Closed: 12/5/2011

Document Title	WECC Standard BAL-004-WECC-02
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1	4/15/2011	Version 1 Posted	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Standing Committee Approval	
4		WECC Board Approval	

WECC 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.

.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	07/16/2010
9. Notice of development / first 30-day notice	09/2/2010
10. New committee chair orientation meeting	08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 01/18/11 02/10/11 03/11–12/11 03/24/11 04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
16. Post first draft for 45-day comment period	04/15/2011
17. Meet to answer to comments, address impact statement and draft responses	06/2-3/2011 06/14/2011 06/23/2011 06/29/2011
18. Post responses to comments received during 45-day comment period	06/29/2011
19. Meet to answer to comments, address impact statement and	08/8/2011 08/15/2011

Completed Actions	Completion Date
draft responses	08/30/2011 11/01/2011
20. Post the second draft for a 30-day comment period	11/04/2011

Description of Current Draft:

On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC Standards.[1] In addition, WECC staff identified additional modifications to BAL-004-WECC-1 that would clarify the intent without changing the requirements. Finally, the industry has commented that there is confusion concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as that used during Automatic Generation Control (AGC) mode. This seems to conflict with NERC's comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a)[2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation for control but should use raw ACE for CPS reporting.[3] As part of this filing WECC has submitted a proposed regional variance to BAL-001-0.1a to address this conflict.

The purpose of the refinements to BAL-004-WECC-1 as proposed in WECC Regional Reliability Standard BAL-004-WECC-2 – Automatic Time Error Correction (BAL-004-WECC-2) is to implement the directives in FERC Order 723 and to make other clarifications to BAL-004-WECC-1 as the industry deems necessary, while maintaining the Western Interconnection's reliability. The FERC Order 723 directives are as follows:

1. "The Commission is concerned that the phrases 'large accumulation' and 'in such a situation' as used in Requirement R1.2 leaves to individual interpretation when a 'large' amount of primary inadvertent has accumulated. The ERO and WECC agree that the provision could benefit from further clarity. Accordingly, the Commission adopts its NOPR proposal and directs WECC to develop revisions to the provision so that a balancing authority will know with specificity the circumstances that trigger the actions required by Requirement R1.2."[4]

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).

[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).

[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

[4] Order 723 at ¶ 30.

2. "Consistent with the NOPR, pursuant to section 215(d) (5) of the FPA, the Commission directs WECC to develop a modification to the regional Reliability Standard consistent with WECC's and NERC's explanation that the limit set forth in Requirement 2 of '24 hours per calendar quarter' is an accumulated total for the period, resulting from either a singular event or a cumulative time limit from a number of events."[5]
3. "[The Commission] direct[s] that the violation risk factors assigned to BAL-004-WECC-01, Requirements R1, R2, R3, and R4 be modified from 'lower' to 'medium.' The ERO and WECC must submit a filing within 60 days of the effective date of this Final Rule that includes the directed modifications."[6] These modifications were addressed in a compliance filing dated August 28, 2009. [7]
4. "The Commission adopts its NOPR proposal and directs the ERO and WECC to submit violation severity levels for each Requirement and sub-Requirement that has been assigned a violation risk factor. To allow adequate time for the development of the violation severity levels, the ERO and WECC must submit a filing within 120 days of the effective date of this Final Rule that includes the directed violation severity levels."[8] These modifications were addressed in a compliance filing date October 23, 2009.[9]
5. In response to Xcel comments, FERC referenced their approval, in Order No. 713, of an ERO interpretation stating that as long as Balancing Authorities use raw ACE for Control Performance Standard (CPS) reporting purposes and WECC ATEC (ATEC) ACE for control, it is not a violation of BAL-001-0.1a, Requirement 1.[10]. WECC Stakeholders believe it is more appropriate to use the ATEC ACE for control and CPS reporting. To clarify this difference, WECC has developed a regional variance BAL-001-0.1a.

The implementation of an ATEC ACE is part of a regional variance to BAL-001-0.1a associated with this posting. The purpose of this filing is to meet the directives of FERC Order 723 while refining for clarity the existing requirements of BAL-004-WECC-1. Refinements to BAL-004-WECC-1 include:

1. A requirement that defines the large accumulation at 150% of previous year's peak demand or peak generation for generation-only Balancing Authorities. The action required is that the Balancing Authority shall not permit the PII_{accum} to exceed the defined value, which is demonstrated at the end of each month.
2. A clarification in response to the FERC order that the accumulated time for ATEC out of service shall not exceed 24 hours during a calendar quarter.

BAL-004-WECC-2 retains the requirement for Balancing Authorities to compute the Automatic Time Error Correction and Primary Inadvertent Interchange by 50 minutes after the hour and

[5] *Id* at ¶ 34.

[6] *Id* at ¶ 51.

[7] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 51 of Order No. 723 – Directed Modification of Violation Risk Factors for Regional Reliability Standard BAL-004-WECC-1, Automatic Time Error Correction, Docket No. RM08-12-000, filed August 28, 2009

[8] Order 723 at ¶ 54.

[9] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 54 of Order No. 723, Docket No. RM08-12-000, filed October 23, 2009

[10] Order 723 at ¶ 44-45.

requires that Balancing Authorities have the ability to operate their Automatic Generation Control in other modes. In addition, Balancing Authorities are required to recalculate Primary Inadvertent Interchange when hourly and month-end adjustments are made.

The proposed BAL-004-WECC-2 will replace the Automatic Time Error Correction definition and retire the Secondary Inadvertent Interchange definition in the NERC Glossary of Terms in the WECC Regional Definitions section. The WECC definition for Primary Inadvertent Interchange will be retained under the WECC Regional Definitions in the NERC Glossary of Terms.

Development Plan:

Anticipated Actions	Anticipated Date
1. Project WECC-0068 Version 2 Comments due	12/05/2011
2. Meet to answer to comments, address impact statement, draft responses	12/06-16/2011
3. Post responses to comments	1/05/2012
4. Post draft standard for 45-day NERC comment period	1/05/2012
5. NERC comment period ends	02/20/2012
6. DT completes review and consideration of industry comments to NERC posting	02/20/2012
7. Post for comment and Operating Committee approval	02/24/2012
8. Operating Committee approves proposed standard	03/27/2012
9. Post draft standard for WECC Board approval	05/01/2012
10. WECC Board approval	06/21/2012
11. Post draft standard for 15-day NERC comment period	06/25/2012
12. NERC 15-day comment period ends	07/2012
13. DT completes review and consideration of industry comments to NERC posting	07/2012
14. Submit NERC Board of Trustees approval request	08/2012
15. Receive NERC Board approval	08/2012

.

Implementation Plan

The Implementation Plan is to make the WECC Regional Variance to BAL-001-0.1a and BAL-004-WECC-2 effective on the first day of the second quarter, after regulatory approval in areas where applicable. Since entities are already controlling their Balancing Authority Area with the ATEC ACE equation – but are reporting using the NERC raw ACE equation for reporting CPS1 – the transition to controlling and reporting using the ATEC ACE should be minimal. Additionally, it should not take much time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

Definitions of Terms Used in Regional 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 definitions will be removed from the standard and added to the NERC Glossary under WECC Regional Definitions. In addition the current definition for "**Secondary Inadvertent Interchange"** will be retired and removed from the NERC Glossary under WECC Regional Definitions,*

Automatic Time Error Correction: The addition of a component to the ACE equation that modifies the control point for the purpose of continuously paying back Primary Inadvertent Interchange to correct accumulated time error.

A. Introduction

1. Title: **Automatic Time Error Correction**

2. Number: BAL-004-WECC-02

3. Purpose: To maintain Interconnection frequency and to ensure that Time Error Corrections and Primary Inadvertent Interchange (PII) payback are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection.

4. Applicability

4.1. Functional Entities

4.1.1 Balancing Authorities that operate synchronously in the Western Interconnection.

5. Effective Date: On the first day of the second quarter, after applicable regulatory approval has been received (or the Reliability Standard otherwise becomes effective the first day of the fourth quarter following NERC Board adoption where regulatory approval is not required).

6. Background:

In February 2003, the WECC Automatic Time Error Correction (ATEC) Procedure (Procedure) became effective for all Balancing Authorities in the Western Interconnection. The original intent of the Procedure was to minimize the number of Manual Time Error Corrections in the Western Interconnection. ATEC provides the added benefit of a superior approach over the current NERC Reliability Standard BAL-004-0 – Time Error Correction for assigning costs and providing for the equitable payback of Inadvertent Interchange. In October 2006, the Procedure became a WECC Criterion. In May 2009, FERC issued Order No.723 that approved Regional Reliability Standard BAL-004-WECC-1 - Automatic Time Error Correction, as submitted by NERC. In addition, the Commission directed WECC to develop several clarifying modifications to BAL-004-WECC-1 using the FERC-approved Process for Developing and Approving WECC Standards. The Effective Date of the BAL-004-WECC-1 standard was July 1, 2009. BAL-004-WECC-1 required Balancing Authorities within the Western Interconnection to maintain Interconnection frequency within a predefined frequency profile and to ensure that Time Error Corrections were effectively conducted in a manner that did not adversely affect the reliability of the Interconnection. In September 2009, WECC received WECC Standards/Regional Criterion Request Form (Request) WECC-0068, which was a request for modification of BAL-004-WECC-1. In July 2010, the chair of the WECC Operating Committee assigned the Request to the Performance Work Group (PWG) for development.

B. Requirements and Measures

R1. Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PII_{accum}) for both the monthly On-Peak period and the monthly Off-Peak period are each individually less than or equal to:

1.1. For load-serving Balancing Authorities, 150% of the previous calendar year's integrated hourly Peak Demand,

1.2. For generation-only Balancing Authorities, 150% of the previous calendar year's integrated hourly peak generation.

[Violation Risk Factor Medium:] [Time Horizon: Operations Assessment]

M1. Forms of acceptable evidence of compliance with Requirement R1include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool (WIT),
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R2. Each Balancing Authority shall, upon discovery of an error in the calculation of PII_{hourly}, recalculate within 90 days, the value of PII_{hourly} and adjust the PII_{accum} from the time of the error. *[Violation Risk*

Rationale for R1:

Premise: Each Balancing Authority should ensure that the absolute value of its PII_{accum} for both the On-Peak period and the Off-Peak period each individually does not exceed 150% of the previous year's Peak Demand for load-serving Balancing Authorities and 150% of the previous year's peak generation for generation-only Balancing Authorities. The Balancing Authority is required to take action to keep each PII_{accum} period within the limit. For example, the Balancing Authorities actions may include:

- Identifying and correcting the source of any metering or accounting error(s) and recalculating the hourly Primary Inadvertent Interchange **(**PII_{hourly}) and the PII_{accum} from the time of the error;
- Validating the implementation of ATEC; or
- Setting L_{max} equal to $L_{10.}$until the PII_{accum} is below the limit in Requirement R1.

Justification: PII_{accum} may grow from month-end adjustments and metering errors, even with the inclusion of I_{ATEC} in the ACE equation.

Goal: To limit the amount of PII_{accum} that a Balancing Authority can have at the end of each month.

Rationale for R2:

Premise: When a Balancing Authority finds an error in the calculation of its PII, the Balancing Authority needs time to correct the error and recalculate PII and PII_{accum}.

Justification: The drafting team selected 90 days as a reasonable amount of time to correct an error and recalculate PII and $PII_{accum,}$ since recalculation of PII and PII_{accum} is not a real-time operations reliability issue.

Goal: To promote the timely correction of errors in the calculation of PII and PII_{accum}.

Factor: Medium] [Time Horizon: Operations Assessment]

M2. Forms of acceptable evidence of compliance with Requirement R2 include but are not limited to any one of the following:

- Data, screen shots from the WIT,
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R3. Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service. *[Violation Risk Factor: Medium] [Time Horizon: Same-day Operations]*

M3. Forms of acceptable evidence of compliance with Requirement R3 may include, but are not limited to:

- Dated archived files,
- Historical data,
- Other data that demonstrates the ATEC was out of service for less than 24 hours per calendar quarter.

Rationale for R3:

Premise: When a Balancing Authority is not participating in ATEC, payback of PII_{accum} is delayed.

Justification: The limit of 24 hours per quarter discourages a Balancing Authority from withdrawing ATEC participation, for example, for economic gain during selected hours. If the limits were increased to 60 hours, a Balancing Authority could technically withdraw ATEC participation for one hour from Monday to Friday.

Goal: To promote fair and timely payback of PII_{accum} balances.

R4. Each Balancing Authority shall compute the following by 50 minutes after each hour:

- **4.1.** $PII_{\mathbf{hourly}}$,
- **4.2.** PII_{accum},
- **4.3.** Automatic Time Error Correction term (I_{ATEC}).

Rationale for R4:

Premise: $PII_{\mathbf{hourly}}$, PII_{accum}, and I_{ATEC} should be determined before the next scheduling hour begins.

Justification: To promote timely calculations 50 minutes was selected because it is before the next hour ramp begins and permits time to collect the data and resolve interchange metering values.

Goal: To promote the timely calculation of $PII_{\mathbf{hourly}}$, PII_{accum}, and I_{ATEC}.

[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]

M4. Forms of acceptable evidence of compliance with Requirement R4 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from internal Balancing Authority tool that demonstrate compliance, or
- Data from any other databases, spreadsheets, displays that demonstrate compliance.

R5. Each Balancing Authority shall be able to change its Automatic Generation Control operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error Control (used in ATEC mode), to correspond to current operating conditions. *[Violation Risk Factor: Medium] [Time Horizon: Real-Time Operations]*

M5. Forms of acceptable evidence of compliance with Requirement R5 include but are not limited to any one of the following:

- Screen shots from Energy Management System,
- Demonstration using an off-line system.

Rationale for R5:

Premise: The ACE equation, and hence the AGC mode, will contain any number of parameters based on system operating conditions. Various AGC modes are identified corresponding to those operating conditions, as well as the specific sets of parameters included in the ACE equation.

Justification: Changing to the proper operating mode, corresponding to current operating conditions, affords proper movement of generating units in response to those conditions. The addition of the ATEC term results in an additional AGC mode and a different set of parameters. The inability to correctly calculate the ATEC term would dictate that AGC not be operated in the ATEC mode.

Goal: To set the AGC mode and calculate ACE in a manner that corresponds to the system operating conditions and to accommodate changes in those conditions.

R6. Each Balancing Authority shall recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly Inadvertent Interchange or ΔTE. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M6. Forms of acceptable evidence of compliance with Requirement R6 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from an internal Balancing Authority

Rationale for R6:

Premise: Hourly adjustments to hourly Inadvertent Interchange (II) require a recalculation of the corresponding hourly PII value, the corresponding PII_{accum}, and all subsequent PII_{accum} for every hour up to the current hour.

Justification: As $PII_{\mathbf{hourly}}$ is corrected, then PII_{accum} should be recalculated.

Goal: To promote accurate, fair and timely payback of accumulated PII balances.

tool that demonstrate compliance with, or

- Data from any other databases, spreadsheets, displays that demonstrate compliance.

R7. Each Balancing Authority shall make the same adjustment to the PII_{accum} as it did for any month-end meter reading adjustments to Inadvertent Interchange. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M7. Forms of acceptable evidence of compliance with Requirement R7 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from an internal Balancing Authority tool that demonstrate compliance,
- Production of data from any other databases, spreadsheets, displays that demonstrate compliance.

Rationale R7:

Premise: Month-end meter-reading adjustments are made, for example, when a Balancing Authority performs monthly comparisons of recorded month-end Net Actual Interchange (NI_A) values derived from hourly Actual Interchange Telemetered Values against month-end Actual Interchange Register Meter readings.

Justification: Month-end adjustments to II_{accum} are applied as 100% PII_{accum}. 100% was chosen for simplicity to bilaterally assign PII_{accum} to both Balancing Authorities, since the effect of this metering error on system frequency is not easily determined over the course of a month.

Goal: To provide a mechanism by which corresponding month-end II adjustments can be applied to PII_{accum}, when such adjustments cannot be attributed to any one particular hour or series of hours.

C. Compliance

1. Compliance Monitoring Process

1.1 Compliance Enforcement Authority

The Regional Entity shall serve as the Compliance Enforcement Authority.

For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

For responsible entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

1.2 Compliance Monitoring and Assessment Processes:

Compliance Audits

Self-Certifications

Spot Checking

Compliance Investigations

Self-Reporting

Complaints

1.3 Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of PII_{hourly}, PII_{accum} (On-Peak and Off-Peak), ΔTE and any month-end adjustments for the preceding calendar year (January – December), as well as the current calendar year.

Each Balancing Authority in the Western Interconnection shall retain the amount of time the Balancing Authority operated without ATEC for the preceding calendar year (January – December), as well as the current calendar year.

1.4 Additional Compliance Information

None

Table of Compliance Elements

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	Operations Assessment	Medium	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 150%, but was less than or equal to 160% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 160%, but was less than or equal to 170% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 170%, but was less than or equal to 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.
R2	Operations Assessment	Medium	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 90 days of the discovery of the error; but made the required recalculations and adjustments within 120 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 120 days of the discovery of the error; but made the required recalculations and adjustments within 150 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 150 days of the discovery of the error; but made the required recalculations and adjustments within 180 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust PII_{accum} within 180 days of the discovery of the error.

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R3	Real-Time Operations	Medium	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 24 hours, but less than or equal to 72 hours.	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 72 hours, but less than or equal to 120 hours.	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 120 hours, but less than or equal to 168 hours	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 168 hours.
R4	Operations Assessment	Medium	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within 50 minutes, but made the required calculations in less than or equal to two hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within two hours, but made the required calculations in less than or equal to four hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within four hours, but made the required calculations in less than or equal to six hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within six hours.
R5	Real-Time Operations	Medium	N/A	N/A	N/A	The Balancing Authority is not able to change its AGC operating mode between Flat Frequency (for blackout restoration; Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; or Tie Line Bias

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						plus Time Error control (used in ATEC mode).
R6	Operations Assessment	Medium	N/A	N/A	N/A	When making adjustments to hourly Inadvertent Interchange or ΔTE, the Balancing Authority did not recalculate the PII_{hourly} and the PII_{accum} for the On-Peak and Off-Peak periods.
R7	Operations Assessment	Medium	N/A	N/A	N/A	When making any month-end meter reading adjustments to Inadvertent Interchange, the Balancing Authority did not make the same adjustment to the PII_{accum}.

Guidelines and Technical Basis

Requirement R1:

Requirement R2:

Requirement R3:

Requirement R4:

Requirement R5:

Requirement R6:

Requirement R7:

WECC Standard BAL-004-WECC-02
Automatic Time Error Correction
Version 1, Open: 4/15/2011 Closed: 6/1/2011

Document Title	WECC Standard BAL-004-WECC-02
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1	4/15/2011	Version 1 Posted	Addressed FERC Order 723
2		~~(Insert completion steps as needed)~~Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Standing Committee Approval	
4		WECC Board Approval	

WECC 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.

.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	~~9~~09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/~~6~~06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	~~7~~07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	~~7~~07/16/2010
9. Notice of development / first 30-day notice	~~9~~09/2/2010
10. New committee chair orientation meeting	~~8~~08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 ~~1~~01/18/11 ~~2~~02/10/11 ~~3~~03/11–12/11 ~~3~~03/24/11 ~~4~~04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
16. Post first draft for 45-day comment period	04/15/2011
17. Meet to answer to comments, address impact statement and draft responses	06/2-3/2011 06/14/2011 06/23/2011 06/29/2011
18. Post responses to comments received during 45-day comment period	06/29/2011
19. Meet to answer to comments, address impact statement and	08/8/2011 08/15/2011

Completed Actions	Completion Date
draft responses	08/30/2011 11/01/2011
20. Post the second draft for a 30-day comment period	11/04/2011

Description of Current Draft:

~~In~~ On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC ~~Order No.723 to Docket No. RM08-12-000,~~) issued ~~May 29, 2009,~~ a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1~~; FERC directed~~ – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard~~. FERC directed WECC to go through~~ using the FERC-approved Process for Developing and Approving WECC Standards ~~and make clarifying modifications.~~.[1] In addition, WECC staff identified additional modifications to ~~the existing standard~~ BAL-004-WECC-1 that ~~were required to~~would clarify the intent without changing the requirements. ~~There~~Finally, the industry has commented that there is ~~also~~ confusion ~~over the requirement~~concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as ~~the~~ that used during Automatic Generation Control (AGC ~~operating~~) mode ~~in use~~. This seems to conflict with ~~the NERC~~ NERC's comments in response to ~~NOPR comments~~ the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a)[2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation~~, with automatic time error correction (ATEC ACE)~~ for control~~,~~ but should use ~~Raw~~raw ACE for CPS reporting.~~-~~[3] As part of this filing WECC has submitted a proposed regional variance to BAL-001-0.1a to address this conflict.

The ~~primary~~ purpose of the ~~following~~ refinements ~~is WECC's~~to BAL-004-WECC-1 as proposed in WECC Regional Reliability Standard ~~(~~BAL-004-WECC-2~~)~~ – Automatic Time Error Correction (BAL-004-WECC-2) is to implement the directives in FERC Order 723~~,~~[4] and to make other clarifications to BAL-004-WECC-1 as the industry deems necessary, ~~without reducing~~while maintaining the Western Interconnection's reliability~~:~~. The FERC Order 723 directives are as follows:

---

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).

[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).

[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

[4] ~~127 FERC ¶ 61,176 UNITED STATES OF AMERICA FEDERAL ENERGY REGULATORY COMMISSION, 18 CFR Part 40, Docket No. RM08-12-000; Order No.723, Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction (Issued May 21, 2009)~~

1. "The Commission is concerned that the phrases ~~"large accumulation"~~'large accumulation' and ~~"in~~'in such a ~~situation"~~situation' as used in Requirement R1.2 ~~leave~~leaves to individual interpretation when a ~~"large"~~'large' amount of primary inadvertent has accumulated ~~up to individual interpretation~~. The ERO and WECC agree that the provision could ~~be~~benefit from further ~~clarified~~clarity. Accordingly, the Commission adopts its NOPR proposal and directs WECC to develop revisions to the provision so that a balancing authority will know ~~specifically~~with specificity the circumstances that trigger the actions required by Requirement R1.2~~.~~."[5]
2. "Consistent with the NOPR, pursuant to section 215(d~~)~~() (5) of the FPA, the Commission directs WECC to develop a modification to the ~~Regional~~regional Reliability Standard consistent with WECC's and NERC's explanation that the limit set forth in Requirement 2 of ~~"24~~'24 hours per calendar ~~quarter"~~quarter' is an accumulated total for the period~~—~~, resulting from either a singular event or a cumulative time limit from a number of events~~.~~."[6]
3. ~~FERC requires that Balancing Authorities use Raw ACE for CPS reporting and WATEC ACE for control. "[The Interconnection prefers to use the WATEC ACE for control and CPS reporting. Develop a regional variance to BAL-001-0.1a to resolve the issue.~~
4.3. ~~FERC adopts its NOPR proposal and directs~~Commission] direct[s] that the violation risk factors assigned to BAL-004-WECC-01, Requirements R1, R2, R3, and R4~~,~~ be modified from ~~"lower"~~'lower' to ~~"medium."~~'medium.' The ERO and WECC must submit a filing within 60 days of the effective date of this Final Rule that includes the directed modifications~~.~~."[7] These modifications were addressed in a compliance filing dated August 28, 2009. [8]
5.4. "The Commission adopts its NOPR proposal and directs the ERO and WECC to submit violation severity levels for each Requirement and sub-Requirement that has been assigned a violation risk factor. To allow adequate time for the development of the violation severity levels, the ERO and WECC must submit a filing within 120 days of the effective date of this Final Rule that includes the directed violation severity levels~~.~~."[9] These modifications were addressed in a compliance filing date October 23, 2009.[10]
5. In response to Xcel comments, FERC referenced their approval, in Order No. 713, of an ERO interpretation stating that as long as Balancing Authorities use raw ACE for Control Performance Standard (CPS) reporting purposes and WECC ATEC (ATEC) ACE for control, it is not a violation of BAL-001-0.1a, Requirement 1.[11]. WECC Stakeholders believe it is more appropriate to use the ATEC ACE for control and CPS reporting. To clarify this difference, WECC has developed a regional variance BAL-001-0.1a.

[5] Order 723 at ¶ 30.

[6] *Id* at ¶ 34.

[7] *Id* at ¶ 51.

[8] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 51 of Order No. 723 – Directed Modification of Violation Risk Factors for Regional Reliability Standard BAL-004-WECC-1, Automatic Time Error Correction, Docket No. RM08-12-000, filed August 28, 2009

[9] Order 723 at ¶ 54.

[10] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 54 of Order No. 723, Docket No. RM08-12-000, filed October 23, 2009

[11] Order 723 at ¶ 44-45.

The implementation of an ATEC ACE is part of a regional variance to ~~the NERC~~ BAL-001-0.1a ~~Standard~~ associated with this posting. The purpose of this ~~BAL-004-WECC-2 Regional Standard~~filing is to ~~include~~meet the ~~other~~ directives of FERC Order 723 while refining for clarity the existing requirements ~~in~~of BAL-004-WECC-1 ~~with the additional refinements directed by FERC~~. Refinements ~~from the existing~~ to BAL-004-WECC-1 include:

1. A requirement ~~Balancing Authorities to set L_{max} equal to L_{10} when an Accumulated Primary Inadvertent Interchange exceeds 24 times L_{10}.~~ that defines the large accumulation at 150% of previous year's peak demand or peak generation for generation-only Balancing Authorities. The action required is that the Balancing Authority shall not permit the PII_{accum} to exceed the defined value, which is demonstrated at the end of each month.
2. ~~A requirement that limits a Balancing Authority's Primary Inadvertent to 200% of the previous calendar year's Peak Demand.~~
3. ~~3.~~2. A clarification in response to the FERC order that the accumulated time for ATEC out of service shall not exceed 24 hours during a calendar quarter.

~~The proposed standard~~BAL-004-WECC-2 retains the requirement for Balancing Authorities to compute the Automatic Time Error Correction and Primary Inadvertent Interchange by 50 minutes after the hour~~,~~ and requires that Balancing Authorities have the ability to operate their Automatic Generation Control in other modes. In addition, Balancing Authorities are required to recalculate Primary Inadvertent Interchange when hourly and month-end adjustments are made.

The proposed BAL-004-WECC-2 will replace the Automatic Time Error Correction definition and retire the Secondary Inadvertent Interchange definition in the NERC Glossary of Terms in the WECC Regional Definitions section. The WECC definition for Primary Inadvertent Interchange will be retained under the WECC Regional Definitions in the NERC Glossary of Terms.

Development Plan:

Anticipated Actions	Anticipated Date
~~17.~~1. ~~Meet to answer to comments, address impact statement and draft responses~~Project WECC-0068 Version 2 Comments due	~~06/03~~12/05/2011
~~18. Post responses to comments~~	~~06/30/2011~~
~~19. Post the second draft for a 30-day comment period~~	~~06/30/2011~~
~~20.~~2. Meet to answer to comments, address impact statement ~~and~~, draft responses	~~08/13~~12/06-16/2011
~~21.~~3. Post responses to comments	~~08/02/2011~~1/05/2012
~~22.~~4. Post draft standard for ~~a~~ 45-day NERC comment period	~~08/2011~~1/05/2012
~~23.~~5. NERC comment period ends	~~09/30/2011~~02/20/2012
6. DT completes review and consideration of industry comments to NERC posting	02/20/2012

Developed as: **WECC-0068**
Adopted by NERC Board of Trustees:
Mandatory Effective Date:

~~24.~~7. Post for comment and Operating Committee approval	~~09/9/2011~~02/24/2012
~~25.~~8. Operating Committee approves proposed standard	~~10/13-15/2011~~03/27/2012
~~26.~~9. Post draft standard for WECC Board approval	~~10/2011~~05/01/2012
~~27.~~10. WECC Board ~~approves proposed standard~~approval	~~11-12/2011~~06/21/2012
~~28.~~11. Post draft standard for 15-day NERC comment period	~~12/2011~~06/25/2012
~~29.~~12. NERC 15-day comment period ends	~~01~~07/2012
~~30.~~13. DT completes review and consideration of industry comments to NERC posting	~~01~~07/2012
~~31.~~14. Submit NERC Board of Trustees approval request	~~01~~08/2012
~~32.~~15. Receive NERC Board approval	~~02~~08/2012
~~33. Request FERC approval~~	~~02/2012~~

.

Implementation Plan

The Implementation Plan is to make the ~~regional variance~~WECC Regional Variance to ~~NERC Reliability Standard~~ BAL-001-0.1a and ~~WECC Regional Reliability Standard~~ BAL-004-WECC-2 effective on the first day of the second quarter, after ~~FERC~~regulatory approval in areas where applicable. Since entities are already controlling their Balancing Authority Area with the ATEC ACE equation – but are reporting using the NERC ~~Raw~~raw ACE equation for reporting CPS1 – the transition to controlling and reporting using the ATEC ACE should be minimal. ~~It~~Additionally, it should not take much time to implement the limits ~~and actions required when~~to a Balancing Authority's Accumulated Primary Inadvertent Interchange ~~exceeds the defined limits~~.

Definitions of Terms Used in Regional 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 definitions will be removed from the standard and added to the NERC Glossary~~.~~ under WECC Regional Definitions. In addition the current definition for "**Secondary Inadvertent Interchange"** will be retired and removed from the NERC Glossary under WECC Regional Definitions,*

~~Insert any new definitions. The DT is encouraged NOT to create new definitions; however, if a capitalized term is used in the body of document, it must have corresponding definition. New definitions are not needed where the capitalized terms are proper nouns. Usually, a new term is only added to define a technical term not otherwise understood without the definition.~~

Automatic Time Error Correction: ~~A frequency~~ The addition of a component to the ACE equation that modifies the control ~~automatic action that a Balancing Authority uses to offset its frequency contribution to support the Interconnection's scheduled frequency.~~

point for the purpose of continuously paying back Primary Inadvertent Interchange ~~**(PII):** The component of area (n) inadvertent interchange caused by the regulating deficiencies of the area (n).~~to correct accumulated time error.

WECC Standard BAL-004-WECC-02
Automatic Time Error Correction

Version 1, Open: 4/15/2011 Closed: 6/1/2011

A. Introduction

1. Title: ~~———~~**Automatic Time Error Correction**

2. Number: ~~———~~BAL-004-WECC-02

3. Purpose:~~——~~ To maintain Interconnection frequency and to ensure that Time Error Corrections and Primary Inadvertent Interchange (PII) payback are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection.

4. Applicability

4.1. Functional Entities

4.1.1 Balancing Authorities that operate synchronously ~~to~~in the Western Interconnection.

5. Effective Date: On the first day of the second quarter, after ~~FERC approval.~~applicable regulatory approval has been received (or the Reliability Standard otherwise becomes effective the first day of the fourth quarter following NERC Board adoption where regulatory approval is not required).

6. Background:

In February 2003, the WECC Automatic Time Error Correction (ATEC) Procedure (Procedure) became effective for all Balancing Authorities in the Western Interconnection. The original intent of the Procedure was ~~to try~~ to minimize the number of Manual Time Error Corrections in the Western Interconnection. ATEC provides the added benefit of a superior approach over the current NERC ~~Manual~~Reliability Standard BAL-004-0 – Time Error Correction ~~(BAL-004-0)~~ for assigning costs and providing for the equitable payback of ~~inadvertent interchange.~~Inadvertent Interchange. In October 2006, the ~~WECC~~ Procedure became a WECC ~~Standard~~Criterion. In May 2009, FERC issued Order No.723 that approved Regional Reliability Standard BAL-004-WECC-1 ~~(~~- Automatic Time Error Correction~~),~~ as submitted by NERC. ~~The effective date of the BAL-004-WECC-1 standard was July 1, 2009.~~ In addition, the Commission directed WECC to develop several clarifying modifications to ~~the Regional Reliability Standard BAL-004-WECC-1. The Regional Reliability Standard~~BAL-004-WECC-1 using the FERC-approved Process for Developing and Approving WECC Standards. The Effective Date of the BAL-004-WECC-1 standard was July 1, 2009. BAL-004-WECC-1 ~~requires~~required Balancing Authorities within the Western Interconnection to maintain Interconnection frequency within a predefined frequency profile~~,~~ and to ensure that Time Error Corrections ~~are~~were effectively conducted in a manner that ~~does~~did not adversely affect the reliability of the Interconnection. ~~FERC directed WECC to make several clarifying modifications to the standard through the FERC-approved Process for Developing and Approving WECC Standards.~~ In September 2009, WECC received WECC Standards/Regional Criterion Request Form (Request) WECC-0068, which ~~is~~was a request for modification of BAL-004-WECC-1. In July 2010, the chair of the WECC Operating Committee assigned the Request to the Performance Work Group (PWG) for development.

B. Requirements and Measures

~~When a Balancing Authority's~~

~~R1.~~ Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PII_{accum}) for ~~either~~both the monthly On-Peak ~~or Off-Peak periods exceeds 24 times (L_{10}),[12] plus the absolute value of the previous month's On-Peak or Off-Peak month-end adjustments for meter readings, the Balancing Authority shall:~~

~~**1.1** Identify~~period and ~~correct the source of any metering or accounting error(s);~~

~~**1.2** Recalculate the hourly Primary Inadvertent Interchange **(**PII_{hourly}) and the PII_{accum} from the time of the error;~~

~~**1.3** Validate the implementation of ATEC; and~~

R1. ~~Set L_{max}~~ the monthly Off-Peak period are each individually less than or equal to ~~L_{10} until the PII_{accum} for either the On-Peak or an Off-Peak period is below 24 times L_{10}, plus the absolute value of the previous month's On-Peak or Off-Peak month-end adjustments for meter readings.~~ :

Rationale for R1:

Premise: Each Balancing Authority should ensure that the absolute value of its PII_{accum} for both the On-Peak period and the Off-Peak period each individually does not exceed 150% of the previous year's Peak Demand for load-serving Balancing Authorities and 150% of the previous year's peak generation for generation-only Balancing Authorities. The Balancing Aut... PII... Bal...

~~**Rationale for R1:**~~

~~**Assumption**: The 24 times L_{10} is the value for PII_{accum} where Balancing Authorities should take predefined additional actions to reduce PII_{accum}.~~
~~**Justification**: Balancing Authorities should take predefined actions to minimize PII_{accum} once an activation point is exceeded.~~
~~**Goal**: To establish a PII_{accum} limit that requires a Balancing Authority to take predefined actions to reduce its PII_{accum} in a manner that does not adversely affect the reliability of the Interconnection.~~

Jus... enc... the...

Goal: To limit the amount of PII_{accum} that a Balancing Authority can have at the end of each month.

1.1. For load-serving Balancing Authorities, 150% of the previous calendar year's integrated hourly Peak Demand,

1.2. For generation-only Balancing Authorities, 150% of the previous calendar year's integrated hourly peak generation.

~~1.4~~ *[Violation Risk Factor~~:~~ Medium~~]~~:] [Time Horizon: Operations Assessment]*

M1. Forms of acceptable evidence of compliance with Requirement R1include but are not limited to any one of the following:

[12] ~~In requirement R1, the L_{10} for each Balancing Authority Area with a variable bias is calculated using the average bias for the previous calendar year; and, for Generation Only Balancing Authority Areas, the value for L_{10} is calculated by using 1% of installed capacity as published by NERC.~~

- Data, screen shots from the WECC Interchange Tool (WIT),
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

- Each Balancing Authority shall ~~have, and provide upon request, evidence that demonstrates that when its PII_{accum} exceeded 24 times L_{10}, plus the absolute value of the previous month's month-end On-Peak or Off-Peak period adjustments for meter readings, it performed the following:~~

Rationale for R2:

Premise: When a Balancing Authority finds an error in the calculation of its PII, the Balancing Authority needs time to correct the error and recalculate PII and PII_{accum}.

Justification: The drafting team selected 90 days as a reasonable amount of time to correct an error and recalculate PII and PII_{accum}, since recalculation of PII and PII_{accum} is not a real-time operations reliability issue.

Goal: To promote the timely correction of errors in the calculation of PII and PII_{accum}.

~~1.1~~ ~~Identified and corrected the source of any metering or accounting error(s);~~

~~1.2~~ ~~Recalculated the~~, upon discovery of an error in the calculation of PII_{hourly}, recalculate within 90 days, the value of PII_{hourly} and adjust the PII_{accum} from the time of the error~~;~~

~~1.3~~ ~~Validated the implementation of ATEC; and~~

~~1.4~~ ~~Set L_{max} equal to L_{10}.~~ until the ~~PII_{accum} for either the On-Peak or Off Peak periods is below 24 times L_{10} plus the absolute value of the previous month's On-Peak or Off-Peak month end adjustments for meter readings.~~

~~Acceptable evidence of the above is one of the following:~~

- ~~Data, screen shots, etc., from the WIT Tool that demonstrate compliance with requirement R1;~~
- ~~Data, screen shots, etc., from the internal Balancing Authority tool that demonstrate compliance with requirement R1; or~~
- ~~Any other databases, spreadsheets, displays, etc., that demonstrate compliance with requirement R1.~~

R2. ~~Each Balancing Authority's PII_{accum} shall not exceed 200% of the previous calendar year's Peak Demand~~. *[Violation Risk Factor: Medium~~~~]~~ [Time Horizon: Operations Assessment]*

~~M2.Each Balancing Authority has, and provides upon request, evidence that demonstrates that the Balancing Authority's PII_{accum} did not exceeded 200%~~**M2**. Forms of ~~the previous calendar year's Peak Demand.~~

Developed as: **WECC-0068**
Adopted by NERC Board of Trustees:
Mandatory Effective Date:

~~Rationale for R2:~~

~~Assumption~~: ~~Balancing Authority should make sure that PII_{accum} does not exceed 200% of the previous year's Peak Demand.~~
~~Justification~~: ~~PII_{accum} may grow from month-end adjustments and metering errors, even with the inclusion of I_{ATEC} in the ACE equation.~~
~~Goal~~: ~~To limit the amount of PII_{accum} that a Balancing Authority can have at one time.~~

~~Acceptable~~acceptable evidence of ~~the above is~~compliance with Requirement R2 include but are not limited to any one of the following:

- Data, screen shots~~, etc.,~~ from the WIT ~~Tool that demonstrate compliance with requirement R2;~~,
- Data, screen shots~~, etc.,~~ from the internal Balancing Authority tool ~~that demonstrate compliance with requirement R2;~~, or
- ~~Any~~Production of data from any other databases, spreadsheets, displays~~, etc., that demonstrate compliance with requirement R2~~.

Rationale for R3:

Premise: When a Balancing Authority is not participating in ATEC, payback of PII_{accum} is delayed.

Justification: The limit of 24 hours per quarter discourages a Balancing Authority from withdrawing ATEC participation, for example, for economic gain during selected hours. If the limits were increased to 60 hours, a Balancing Authority could technically withdraw ATEC participation for one hour from

~~**R3.** If an error in the calculation of PII is discovered, each Balancing Authority shall recalculate PII and adjust the PII_{accum} from the time of the error, within 90 days of the discovery. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*~~

~~- A Balancing Authority shall provide upon request evidence and that it recalculated the PII and adjusted the PII_{accum} within 90 days of the discovery. Acceptable evidence of the above is one of the following:~~
  ~~- Data, screen shots, etc., from the WIT Tool that demonstrate compliance with requirement R3;~~
  ~~- Data, screen shots, etc., from the internal Balancing Authority tool that demonstrate compliance with requirement R3; or~~
  ~~- Any other databases, spreadsheets, displays, etc., that demonstrate compliance with requirement R3.~~

~~**Rationale for R3:**~~

~~**Assumption**: When a Balancing Authority finds an error in the calculation of PII, Balancing Authorities need time to correct the error and recalculate PII and PII_{accum}.~~
~~**Justification**: The drafting team selected 90 days as a reasonable amount of time to correct an error and recalculate PII and PII_{accum}, since recalculation of PII and PII_{accum} is not a real-time operations reliability issue.~~
~~**Goal**: To promote the timely correction of errors in the calculation of PII and PII_{accum}.~~

~~**R4.**~~**R3.** Each Balancing Authority shall ~~not have~~ keep its Automatic Time Error Correction (ATEC ~~out of~~) in service ~~for more~~, with an allowable exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service. *[Violation Risk Factor: Medium] [Time Horizon: Same-day Operations]*

~~**Rationale for R4:**~~

~~**Assumption**: When a Balancing Authority does not participating in ATEC, payback of PII_{accum} is delayed.~~
~~**Justification**: The limit of 24 hours per quarter discourages a Balancing Authority from withdrawing ATEC participation, for example, for economic gain during selected hours. If the limits were increased to 60 hours, a Balancing Authority could technically withdraw ATEC participation for one hour from Monday to Friday.~~
~~**Goal**: To promote fair and timely payback of PII_{accum} balances.~~

Developed as: **WECC-0068**
Adopted by NERC Board of Trustees:
Mandatory Effective Date:

~~Each Balancing Authority shall have and provide upon request, evidence~~ **M3**. Forms of acceptable evidence of compliance with Requirement R3 may include, but are not limited to:

- Dated archived files,
- Historical data,
- Other data that demonstrates the ATEC was ~~not~~ out of service for ~~more~~less than 24 hours per calendar quarter. ~~Acceptable evidence is dated achieved files, historian data, and other data that demonstrates the ATEC was in service as required~~

Rationale for R4:

Premise: PII_{hourly}, PII_{accum}, and I_{ATEC} should be determined before the next scheduling hour begins.

Justification: To promote timely calculations 50 minutes was selected because it is before the next hour ramp begins and permits time to collect the data and resolve interchange metering values.

Goal: To promote the timely calculation of PII_{hourly}, PII_{accum}, and I_{ATEC}.

- Each Balancing Authority shall compute the following by ~~requirement R4.~~

~~R5.~~R4. ~~By~~ 50 minutes after each hour~~, each Balancing Authority shall compute the following~~:

~~5.1.~~4.1. PII_{hourly},

~~**4.2.** On peak PII_{accum};~~

~~5.3.~~4.2. ~~Off peak~~ PII_{accum},

~~5.4.~~4.3. Automatic Time Error Correction term (I_{ATEC}).

[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]

~~Rationale for R5:~~

~~Assumption~~: ~~PII_{hourly}, PII_{accum}, and I_{ATEC} should be determined before the next scheduling hour begins.~~
~~Justification~~: ~~To promote timely calculations 50 minutes was selected because it is before the next hour ramp begins and permits time to collect the data and resolve interchange metering values.~~
~~Goal~~: ~~To promote the timely calculation of PII_{hourly}, PII_{accum}, and I_{ATEC}.~~

- ~~The Balancing Authority shall have and shall produce upon request the following on an hourly basis:~~

~~**4.1.** PII_{hourly};~~

~~**4.2.** On peak PII_{accum};~~

~~**4.3.** Off peak PII_{accum};~~

~~**4.4.** I_{ATEC}.~~

~~Acceptable~~**M4**. Forms of acceptable evidence of ~~the above is~~compliance with Requirement R4 include but are not limited to any one of the following:

- Data, screen shots~~, etc.,~~ from the ~~WIT~~WECC Interchange Tool that demonstrate compliance ~~with requirement R5;~~,
- Data, screen shots~~, etc.,~~ from internal Balancing Authority tool that demonstrate compliance ~~with requirement R5;~~, or
- ~~Any~~Data from any other databases, spreadsheets, displays~~, etc.~~ that demonstrate compliance ~~with requirement R5~~.

~~**R6.**~~**R5.** Each Balancing Authority shall be able to change its ~~AGC~~Automatic Generation Control operating mode between Flat Frequency (for blackout restoration~~;~~); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error Control (used in ATEC mode~~).~~), to correspond to current operating conditions. *[Violation Risk Factor: Medium] [Time Horizon: Real-Time Operations]*

M5. Forms of acceptable evidence of compliance with Requirement R5 include but are not limited to any one of the following:

- Screen shots from Energy Management System,
- Demonstration using an off-line system.

- Each Balancing Authority ~~demonstrates upon request that it has the ability to operate as required by requirement R6 in Flat Frequency (~~shall recalculate the PII_{hourly} and PII_{accum} for ~~blackout restoration; Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error Control.~~

Rationale for R5:

Premise: The ACE equation, and hence the AGC mode, will contain any number of parameters based on system operating conditions. Various AGC modes are identified corresponding to those operating conditions, as well as the specific sets of parameters included in the ACE equation.

Justification: Changing to the proper operating mode, corresponding to current operating conditions, affords proper mo
tho
ter
diff
cor
dic
mo

Go
AC
sys
acc

~~**Rationale for R6:**~~

~~**Assumptions:** The ACE equation, and hence the AGC mode, will contain any number of parameters based on system operating conditions. Various AGC modes are identified corresponding to those operating conditions, as well as the specific sets of parameters included in the ACE equation.~~
~~**Justification**: Changing to the proper operating mode, corresponding to current operating conditions, affords proper movement of generating units in response to those conditions. The addition of the ATEC term results in an additional AGC mode and a different set of parameters. The inability to correctly calculate the ATEC term would dictate that AGC not be operated in the ATEC mode.~~
~~**Goal**: To set the AGC mode and calculate ACE in a manner that corresponds to the system operating conditions and to accommodate changes in those conditions.~~

Rationale for R6:

Premise: Hourly adjustments to hourly Inadvertent Interchange (II) require a recalculation of the corresponding hourly PII value, the corresponding PII_{accum}, and all subsequent PII_{accum} for every hour up to the current hour.

Justification: As PII_{hourly} is corrected, then PII_{accum} should be recalculated.

Goal: To promote accurate, fair and timely payback of accumulated PII balances.

Developed as: **WECC-0068**
Adopted by NERC Board of Trustees:
Mandatory Effective Date:

~~Acceptable demonstration shall include use of a test system.~~

~~R7.~~R6. ~~When making~~the On-Peak and Off-Peak periods whenever adjustments are made to hourly Inadvertent Interchange or ΔTE~~, each Balancing Authority shall recalculate the PII_{hourly} and On- or Off-Peak PII_{accum}~~. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

~~M7.For each hour requested, each Balancing Authority shall provide the calculated PII_{hourly} and On-Peak or Off-Peak PII_{accum} for each hour of the request. Acceptable evidence of the above shall~~ **M6.** Forms of acceptable evidence of compliance with Requirement R6 include but are not limited to any one of the following:

- Data, screen shots~~, etc.,~~ from the ~~WIT~~WECC Interchange Tool that demonstrate compliance ~~with requirement R7:~~,
- Data, screen shots~~, etc.,~~ from an internal Balancing Authority tool that demonstrate compliance with ~~requirement R7:~~, or
- ~~Any~~Data from any other databases, spreadsheets, displays~~, etc.,~~ that demonstrate compliance ~~with requirement R7.~~.

~~**Rationale for R7:**~~

~~**Assumptions:** Hourly adjustments to hourly II requires a recalculation of the corresponding hourly PII value, the corresponding PII_{accum}, and all subsequent PII_{accum} for every hour up to the current hour.~~
~~**Justification**: As hourly PII is corrected, then PII_{accum} should be recalculated.~~
~~**Goal**: To promote accurate, fair and timely payback of accumulated PII balances.~~

~~R8.~~R7. ~~For~~ Each Balancing Authority shall make the same adjustment to the PII_{accum} as it did for any month~~-~~end meter reading adjustments ~~for meter readings~~ to Inadvertent Interchange~~, each Balancing Authority shall make the same adjustment to the PII_{accum}~~. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

~~M8.Each Balancing Authority shall have, and provide upon request, all month-end adjustments and On-Peak or Off-Peak PII_{accum} adjustments. Acceptable evidence of the above shall~~ **M7**. Forms of acceptable evidence of compliance with Requirement R7 include but are not limited to any one of the following:

- Data, screen shots~~, etc.,~~

Rationale R7:

Premi
adjust
Balan
compa
Actua
hourly
Value
Interc

Justif
II_{accum}
was c
assign
since
syster
over t

Goal:
corres
can be applied to PII_{accum}, when such adjustments cannot be attributed to any one particular hour or series of hours.

~~**Rationale R8:**~~

~~**Assumptions:** Month-end adjustments are required, for example, when a Balancing Authority performs monthly comparisons of recorded PII_{hourly} against actual revenue-grade meter readings.~~
~~**Justification**: Month-end adjustments to II are applied as 100% PII. 100% was chosen for simplicity to bilaterally assign PII to both Balancing Authorities, since the effect of this metering error on system frequency is not easily determined over the course of a month.~~
~~**Goal**: To provide a mechanism by which corresponding month-end II adjustments can be applied to PII_{accum}, when such adjustments cannot be attributed to any one particular hour or series of hours.~~

from the ~~WIT~~WECC Interchange Tool ~~,~~ that demonstrate compliance ~~with requirement R8;~~

- Data, screen shots~~, etc~~ from an internal Balancing Authority tool that demonstrate compliance ~~with requirement R8;~~
- ~~Any~~Production of data from any other databases, spreadsheets, displays~~, etc.,~~ that demonstrate compliance ~~with requirement R8~~.

C. Compliance

1. Compliance Monitoring Process

1.1 Compliance Enforcement Authority

The Regional Entity

~~**Evidence Retention**~~

~~**Each Balancing**~~ shall serve as the Compliance Enforcement Authority ~~**in the Western Interconnection shall retain its hourly calculation of total PII_{accum} and PII_{hourly}; as well as the amount of PII paid back hourly for the preceding calendar year (January – December), plus the current year**~~.

~~Each Balancing Authority in the Western Interconnection shall retain its PII_{hourly} and total On-Peak and Off-Peak PII_{accum} for the preceding calendar year (January – December), plus the current year.~~

~~Each Balancing Authority in the Western Interconnection shall retain in its records the amount of time it operated without ATEC; and the notification to the Interconnection of those times for the preceding calendar year (January – December), plus the current year.~~

For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

For responsible entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

1.2 Compliance Monitoring and Assessment Processes:

~~34.~~ Compliance Audits

~~35.~~ Self-Certifications

~~36.~~ Spot Checking

~~37.~~ Compliance ~~Violation~~ Investigations

~~38.~~ Self-Reporting

~~39.~~ Complaints

1.3 Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of PII_{hourly}, PII_{accum} (On-Peak and Off-Peak), ΔTE and any month-end adjustments for the preceding calendar year (January – December), as well as the current calendar year.

Each Balancing Authority in the Western Interconnection shall retain the amount of time the Balancing Authority operated without ATEC for the preceding calendar year (January – December), as well as the current calendar year.

1.4 Additional Compliance Information

None

Table of Compliance Elements

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
~~erations Assessment~~		~~edium~~	~~lancing Authority did not validate the implementation of ATEC.~~	~~lancing Authority did not recalculate the PII_{hourly} and the PII_{accum} from the time of the error.~~	~~lancing Authority did not identify and correct the source of any metering or accounting error(s).~~	~~lancing Authority did not set L_{max} equal to L_{10}, until the PII_{accum} is below 24 times L_{10} of the previous calendar year's peak demand (or peak generation for generation-only Balancing Authorities).~~
~~R2~~R1	Operations Assessment	Medium	~~The~~Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded ~~200% for any hour,~~150%, but was less than or equal to ~~250~~160% of the previous calendar year's Peak Demand or peak generation for generation-only	~~The~~Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded ~~for any hour 250~~160%, but was less than or equal to ~~300~~170% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	~~The~~Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded ~~for any hour 300~~170%, but was less than or equal to ~~350~~180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	~~The~~Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded ~~for any hour 350~~180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
			Balancing Authorities.			
~~R3~~R2	Operations Assessment	Medium	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} ~~I from the time of the error~~ within 90 days of the discovery of the error; but ~~did make~~made the required recalculations and adjustments within 120 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} ~~from the time of the error~~ within 120 days of the discovery of the error; but ~~did make~~made the required recalculations and adjustments within 150 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} ~~from the time of the error~~ within 150 days of the discovery of the error; but ~~did make~~made the required recalculations and adjustments within 180 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust ~~the~~ PII_{accum} ~~from the time of the error~~ within 180 days of the discovery of the error.
~~R4~~R3	Real-Time Operations	Medium	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 24 hours, but less than or equal to 72 hours ~~during a calendar quarter~~.	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 72 hours, but less than or equal to 120 hours ~~during a calendar quarter~~.	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 120 hours, but less than or equal to 168 hours ~~during a calendar quarter.~~	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 168 hours ~~during a calendar quarter~~.
~~R5~~R4	Operations Assessment	Medium	The Balancing Authority did not compute ~~all of the PII terms~~PII_{hourly}, PII_{accum}.	The Balancing Authority did not compute ~~all of the PII terms or~~PII_{hourly}.	The Balancing Authority did not compute ~~all of the PII terms~~PII_{hourly}, PII_{accum}.	The Balancing Authority did not compute ~~all of the PII terms~~PII_{hourly}, PII_{accum}.

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
			and I_{ATEC} within 50 minutes, but made the required calculations in less than or equal to two hours.	PII_{accum}, and I_{ATEC} within two hours, but made the required calculations in less than or equal to four hours.	and I_{ATEC} within four hours, but made the required calculations in less than or equal to six hours.	and I_{ATEC} within six hours.
~~R6~~R5	Real-Time Operations	Medium	N/A	N/A	N/A	The Balancing Authority is not able to change its AGC operating mode between Flat Frequency (for blackout restoration; Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; or Tie Line Bias plus Time Error control (used in ATEC mode).
~~R7~~R6	Operations Assessment	Medium	N/A	N/A	N/A	When making adjustments to hourly Inadvertent Interchange or ΔTE, the Balancing Authority did not recalculate the PII_{hourly} and the PII_{accum} for the On-Peak ~~or~~and Off-

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						Peak ~~PII~~$_{accum}$periods.
~~R8~~R7	Operations Assessment	Medium	N/A	N/A	N/A	When making any month-~~-~~end meter reading adjustments ~~for meter readings~~ to Inadvertent Interchange, the Balancing Authority did not make the same adjustment to the PII_{accum}.

~~**D. Interpretations**~~

~~None.~~

~~**E. Associated Documents**~~

~~None.~~

Guidelines and Technical Basis

Requirement R1:

Requirement R2:

Requirement R3:

Requirement R4:

Requirement R5:

Requirement R6:

Requirement R7:

~~**Requirement R8:**~~

Consolidation of NERC and Control ACEs –
Using the Same ACE for Control and NERC Reporting
November 3, 2011

The use of two Area Control Error (ACE) equations came as a result of North American Electric Reliability Corporation's (NERC) comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a)[1] wherein NERC stated that entities:

1. May use an Automatic Time Error Correction (ATEC) term in the ACE equation for control (Control ACE), but
2. Should use NERC Area Control Error (NERC ACE[2]) for CPS reporting.[3]

The industry desires to use the same ACE equation for control and reporting because it provides a better measurement of control performance. In Project WECC-0068, WECC proposes to create a WECC Regional Variance to BAL-001-0.1a — modifying the ACE equation to include the ATEC term.

The purpose of the NERC Control Performance Standard (CPS) is to evaluate how well a Balancing Authority operates to its intended control performance target, taking into account interconnection frequency deviations. The NERC evaluation of control performance requires Balancing Authorities in the Western Interconnection to use the NERC ACE to measure how well a Balancing Authority controls to the control performance target rather than using the Western Interconnection ACE (i.e., ATEC ACE). Since the CPS measurement is an assessment of the control performance within the bounds indentified for CPS1 and CPS2, it is essential to include the ATEC term in the ACE equation used in the calculation of CPS in order to evaluate the true control performance that was accomplished for each hour. To exclude ATEC by using NERC ACE to calculate CPS distorts the evaluation results and complicates operations. It also requires having to retain NERC ACE as well as ATEC ACE.

[1] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).

[2] NERC ACE is also called "raw ACE."

[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

The primary reliability objectives of Project WECC-0068, which contains the WECC Variance to BAL-001-0.1a and the WECC BAL-004-WECC-2 Standard, are to:

1. Provide a more accurate measure of how well a Balancing Authority is actually controlling to its control performance target,
2. Manage Inadvertent Interchange through a timely and equitable process.

These objectives are achieved through managing the Primary portion of Inadvertent Interchange. In the Western Interconnection, the Primary Inadvertent Interchange (PII) is defined as: "The component of area (n) inadvertent interchange caused by the regulating deficiencies of the area (n)." This is opposed to Secondary Inadvertent Interchange which is: "The component of area (n) inadvertent interchange caused by the regulating deficiencies of area (i)."[4]

Balancing Authorities in the Western Interconnection developed a process for controlling frequency that includes payback of PII. When a Balancing Authority includes the ATEC term in its ACE equation, it provides for automatic payback of its PII. The automatic payback of PII affects automatic payback of the corresponding Secondary Inadvertent Interchange of other Balancing Authorities through the frequency component of their ACE. This process allows inadvertent payback to occur equitably to all Balancing Authorities that are owed energy. The energy repayment also occurs during like hours (i.e., On-Peak energy is returned during On-Peak hours and Off-Peak Energy is returned during Off-Peak hours). The payback of energy occurs over a three-hour period reducing the likelihood of aggravating or causing a frequency excursion following a large accumulation of Inadvertent Interchange. If the PII unexpectedly increases significantly, there are additional processes in place where a Balancing Authority can take actions to reduce the amount of payback to avoid these conditions.

The computation of the amount of PII payback, also known as the ATEC term (I_{ATEC}), is as follows:

$I_{ATEC} = \frac{\mathrm{PII}_{\mathrm{accum}}^{\mathrm{on/off\ peak}}}{(-Y) * H}$ when operating in Automatic Time Error Correction control mode. I_{ATEC} shall be zero when operating in any other Automatic Generation Control (AGC) mode.

H is the number of hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3.

$\mathrm{PII}_{\mathrm{accum}}$ is the Balancing Authority's accumulated $\mathrm{PII}_{\mathrm{hourly}}$ in MWh. An On-Peak and Off-Peak accumulation accounting is required.

Where:

[4] Definitions from WECC Regional Definitions in Glossary of Terms Used in NERC Reliability Standards, May 24, 2011.

$$PII_{accum}^{on/off\ peak} = \text{last period's } PII_{accum}^{on/off\ peak} + PII_{hourly}$$

In the equation above, Primary Inadvertent Interchange (PII_{hourly}) is (1-Y) * (II_{actual} - B * ΔTE/6) where Y = B / B_S and ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where:

$$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE_{offset})$$

$II_{\mathbf{actual}}$ is the hourly Inadvertent Interchange for the last hour.

$B_{\mathbf{S}}$ = Frequency Bias for the Interconnection (MW / 0.1 Hz).

B = Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority.

t is the number of minutes of Manual Time Error Correction that occurred during the hour.

$TE_{\mathbf{offset}}$ is 0.000 or +0.020 or -0.020.

TD_{adj} is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks.

Balancing Authorities in the Western Interconnection believe that using NERC ACE for Control Performance reporting while using Control ACE for controlling is not a true measure of a Balancing Authority's Control Performance and is therefore not an accurate representation of their contribution to Interconnection reliability.

The numbered list that follows presents reasons for:

a) incorporating the ATEC term in the ACE equation and utilizing that ACE equation for Control Performance reporting;

b) creating a regional variance to NERC BAL-001-0.1a to define ACE in the Western Interconnection to include the ATEC term;

c) creating BAL-004-WECC-02, the WECC Regional Reliability Standard; and

d) using the CPS measurement metrics.

1. Consolidation of two ACE equations improves reliability by enhancing control.

   The current NERC ACE equation in NERC BAL-001-0.1a – Real Power Balancing Control Performance requires that each Balancing Authority controls frequency and Interchange within the bounds indentified for CPS1 and CPS2 for its Balancing Authority Area. In other words the Balancing Authority controls its ACE close to zero in support of Interconnection scheduled frequency, over a 12-month period, such that the interconnection frequency error profile for epsilon 1 ($\in_1$) and epsilon 10 ($\in_{10}$) are maintained in a manner that approaches the WECC frequency error profile design (see Attachment 1). The proposed ATEC ACE equation, with an Automatic Time Error adjustment, works similarly to the NERC equation. The addition of the ATEC component is equivalent to making an Interchange Transaction that would

automatically pay back PII (as described below), or is similar to making an adjustment because of a metering error. The payback amount is managed by requiring that the ATEC component stay within a predefined range of L_{max} where L_{max} is between 0.20*|B| and L_{10}. Since the amount of the payback during any one hour is limited by L_{max}, Balancing Authorities automatically limit any burden caused by ATEC on the transmission system. L_{10} is also the range for the CPS2 measurement. By limiting L_{max} to L_{10} the impact of ATEC alone will not cause a Balancing Authority's ACE to go beyond the CPS2 bounds.

2. In the ACE equation there is a frequency component (i.e., $-10B(F_A - F_S)$ where F_A is the actual frequency and F_S is the scheduled frequency; F_S is normally 60 Hz but may be offset during manual time error corrections). During steady state conditions when a Balancing Authority's ATEC term results in an increase in generation to pay back its PII, it raises Interconnection frequency to a value larger than 60 Hz.

   The ATEC component causes an otherwise balanced Balancing Authority to push or pull energy from the grid, which may cause frequency to shift away from 60 Hz. Through the frequency bias term of their ACE equation, every other Balancing Authority reacts to this frequency shift in the opposite direction, moving to keep frequency at or near 60 Hz. This exchange has an effect similar to the first Balancing Authority exchanging multiple Interchange Transactions with all other Balancing Authorities. The collection of equitably-allocated ATEC adjustments or offsets for all Balancing Authorities, in aggregate, correct for Interconnection-accumulated energy imbalance manifested as accumulated Time Error.

3. To place a maximum (absolute value) ceiling for Accumulated Primary Inadvertent Interchange.

   During its review of Accumulated Primary Inadvertent Interchange (PII_{accum}), the Project WECC-0068 Drafting Team found that some Balancing Authorities may have large adjustments to PII_{accum} as a result of month-end meter-reading adjustments. In addition, it was discovered that small Balancing Authorities could have large PII_{accum} relative to their size even though they are following good utility operating practices.

   As a result of this review, for each On-Peak and Off-Peak period it is reasonable to establish the following limits:

   - the magnitude of PII_{accum} to 150 percent of the previous calendar year's integrated hourly Peak Demand; or
   - for generation-only Balancing Authorities, 150 percent of the previous calendar year's integrated hourly peak generation.

   This maximum value for PII_{accum} sets a requirement for Balancing Authorities to take action to reduce PII_{accum} while allowing flexibility in a Balancing Authority's operation and control. The magnitude is not so limiting that it becomes onerous to comply with Requirement R1 of BAL-004-WECC-02. By instituting accepted industry practices, each Balancing Authority should be able to stay within the limit.

4. Using the Control ACE rather than NERC ACE will not reduce Interconnection reliability during frequency events.

   The design of the Primary Inadvertent Interchange payback process permits the proper governor response when the system experiences large frequency excursions. The ATEC component in the ACE equation is implemented as part of a Balancing Authority's secondary control (i.e., AGC control). When a frequency event occurs (e.g., frequency dips below 59.9 Hz) the frequency component in the ACE equation for medium and large Balancing Authorities becomes large in magnitude compared to the maximum allowed ATEC component. The frequency component then remains the primary driving force behind both primary (i.e., governor response) and secondary (i.e., AGC) control for arresting the frequency decline and restoring frequency to 60 Hz. This is shown in the Frequency vs. Frequency Component of ACE Plots (see Attachment 2) because the range for L_{max} in the plots becomes relatively small when compared to the Frequency Component of ACE. The graph of L_{10}, bias, and frequency deviation shows that the ATEC influence is minimal during a disturbance.

   For small Balancing Authorities the response to a frequency event depends on the sign and magnitude of the ATEC component at the time of the event compared to L_{10}. The graphs in Attachment 2 containing each Balancing Authority's L_{10}, bias, and (0.20*|B|) against the frequency component in the ACE equation suggest that ATEC influence is minimal for small Balancing Authorities during disturbances.

5. Maintain or improve the interconnection frequency error profile.

   The WECC frequency error profile contained in Attachment 1 improved with the implementation of the ATEC term in the ACE equation. The ATEC term was added to the ACE equation in February of 2003. As shown in the three figures in Attachment 1, the frequency error profile before 2003 was higher than in the years after 2003 until the Reliability-based Control (RBC) field trial began in 2010.

6. Maintain the $\in_1$ and $\in_{10}$ bands near historical performance.

   The targeted frequency bounds, epsilon 1 ($\in_1$) and epsilon 10 ($\in_{10}$), are based on historic measured frequency error. These bounds, typically in millihertz (mHz), are the targeted frequency ranges used when developing the Control Performance Standard contained in BAL-001-0.1a. The Western Interconnection was assigned its own frequency bounds of 22.8 mHz for $\in_1$ and 7.3 mHz for $\in_{10}$. Prior to the introduction of the ATEC term into the ACE equation the annual valuations of frequency errors were drifting upward, away from the targeted frequency bound.

   When the ATEC term was implemented as part of the ACE equation, these annual valuations came back down and were closer to the targeted frequency bound. Each frequency bound is a constraint developed and placed into the control performance measurement.

The control performance target for an ACE equation with an ATEC term measures the average ACE error range from zero. CPS1 and CPS2 are measuring performance against the control performance target. Therefore, the frequency bounds and acceptable error ranges measured by CPS1 and CPS2 are still valid. As a result, WECC intends to continue measuring how close the Balancing Authority performs to the control performance target (i.e., average control error against an ACE equals zero including the ATEC component), and proposes to use the same measure for control as are used for the control performance target in BAL-001-0.1a (see Attachment 1 – Figure 1-3 – for frequency error profile against $\in_1$ and $\in_{10}$).

It should be noted that the change in the ACE equation does not have an impact on the Disturbance Control Standard (BAL-002-0). Balancing Authorities and Reserve Sharing Groups will still need to return their ACE to zero or its pre-disturbance value within 15 minutes.

7. Reduce the number and duration of manual time error corrections.

   The number of manual time error corrections performed in the Western Interconnection was 538 in 2000 prior to adopting ATEC as a procedure. After implementing ATEC in 2003 the number of manual time error corrections performed in WECC was significantly reduced. In 2010, the number of time error corrections performed by WECC was 106 (see History of Manual Time Error Corrections: Table 1).

History of Manual Time Error Corrections

The table below contains the number of manual time error corrections conducted each year in the Western Interconnection.

Table 1

Year	Number of Manual Time Corrections
1998	315
1999	530
2000	538
2001	453
2002	427
2003	216
2004	79
2005	80
2006	100
2007	106
2008	113
2009	74
2010	106

ATTACHMENT 1

Frequency Error Profiles

Figure 1

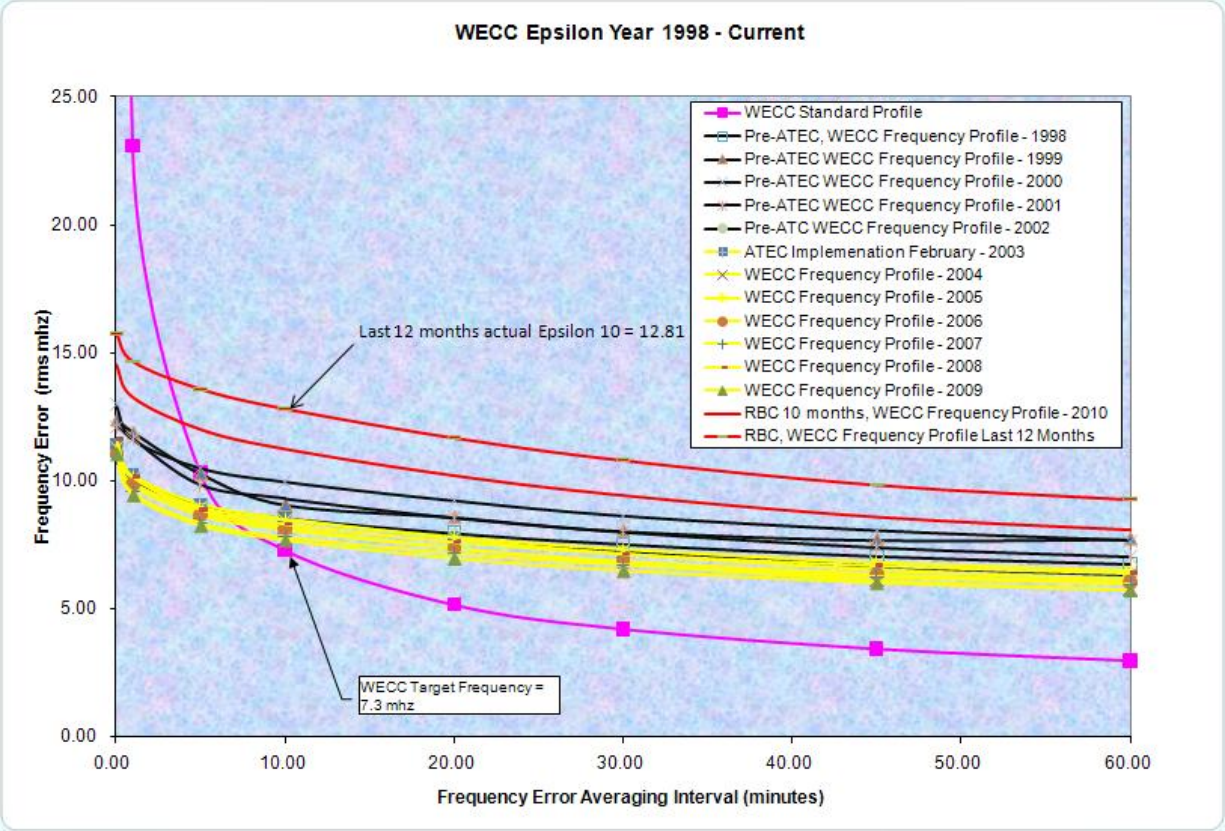


Figure 2

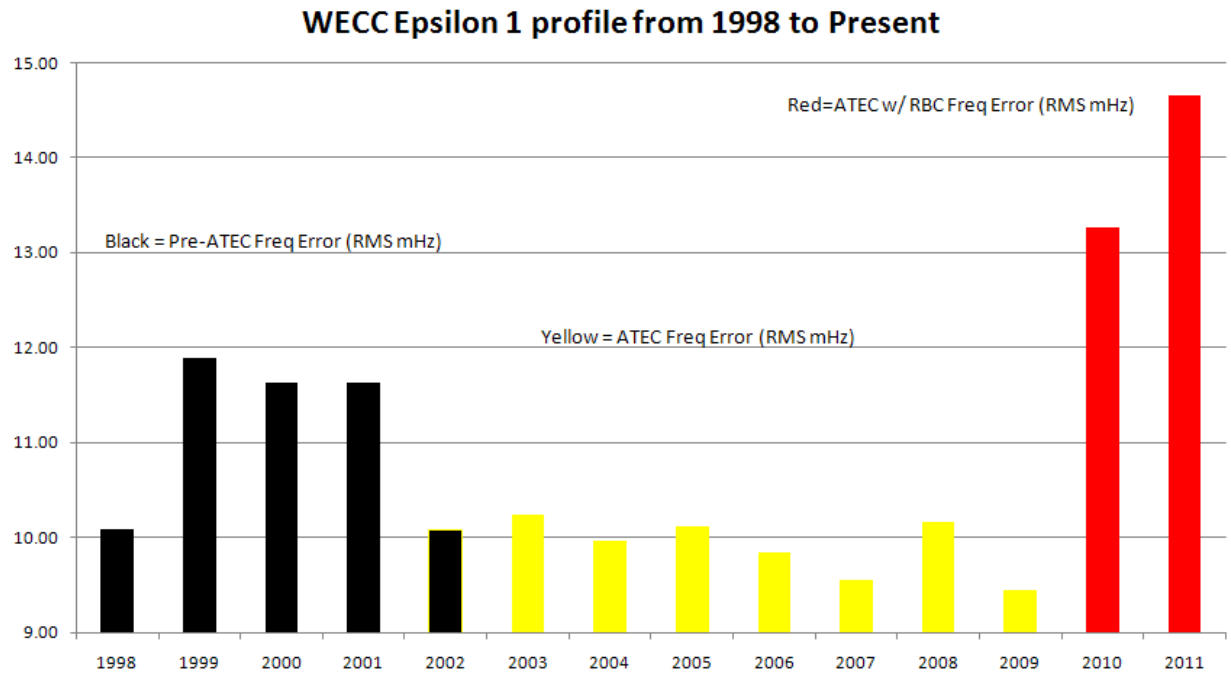
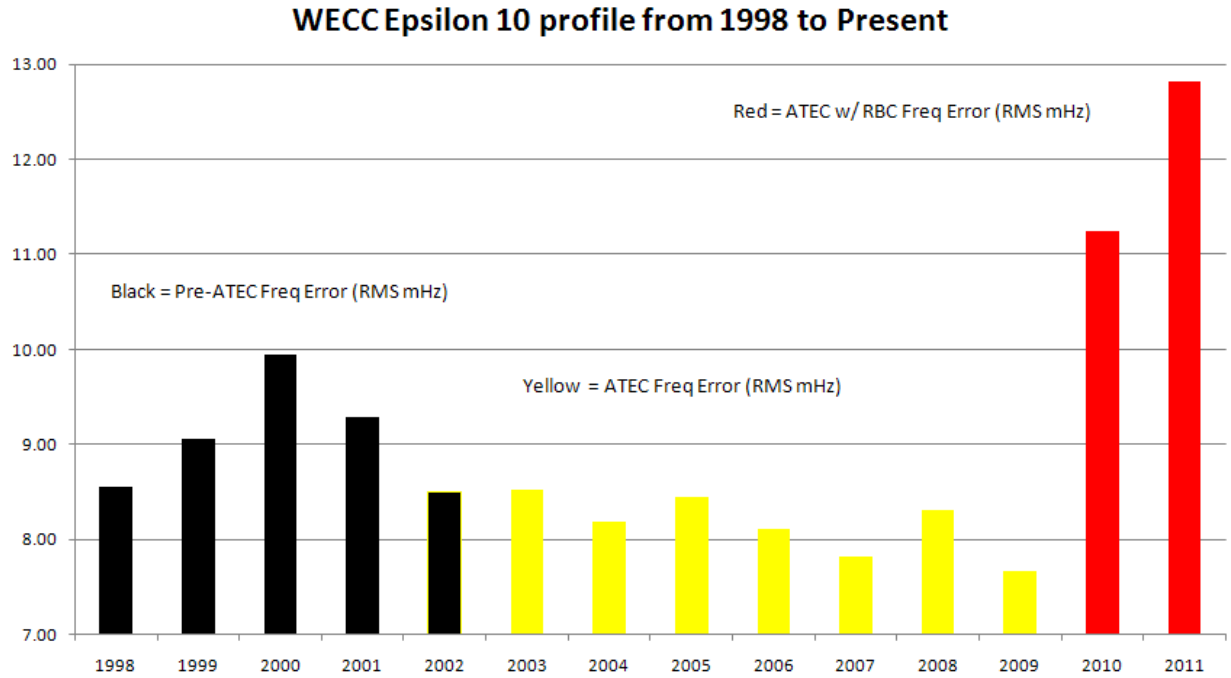


Figure 3



FERC Directives for BAL-004-WECC-1 Automatic Time Error Correction
November 3, 2011

Received From	FERC Order 723[1] Snapshot WECC-0068 Mod. To BAL-004-WECC-1	The BAL-004-WECC-2 and Variance to BAL-001-0.1a Completed Actions
FERC	P 30. As explained in the NOPR, the Commission is concerned that the phrases "large accumulation" and "in such a situation," as used in Requirement R1.2, leaves to individual interpretation when a "large" amount of primary inadvertent has accumulated. The ERO and WECC agree that the provision should be clarified. Accordingly, the Commission adopts its NOPR proposal and directs WECC to develop revisions to the provision so that a Balancing Authority will know specifically which circumstances trigger the actions required by Requirement R1.2.	See BAL-004-WECC-2 in Requirement R1 where the term "large accumulation is eliminated and replaced with a quantifiable maximum limit for each Balancing Authority to be within by the end of each month.
FERC	P 34. Consistent with the NOPR, pursuant to Section 215(d) (5) of the FPA, the Commission directs WECC to develop a modification to the Regional Reliability Standard consistent with WECC's and NERC's explanation that the limit set forth in Requirement 2 of "24 hours per calendar quarter" is an accumulated total for the period – resulting from either a singular event or a cumulative time limit from a number of events.	See BAL-004-WECC-2 Requirement R3, which has been revised to specify an accumulation over the period.
FERC	P 44. FERC requires that Balancing Authorities use Raw ACE for CPS	See BAL-001-0.1a. Section E.B is a Regional Variance for WECC that

[1] 127 FERC ¶ 61,176 UNITED STATES OF AMERICA FEDERAL ENERGY REGULATORY COMMISSION, 18 CFR Part 40, Docket No. RM08-12-000; Order No.723, Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction (Issued May 21, 2009)

Received From	FERC Order 723[1] Snapshot WECC-0068 Mod. To BAL-004-WECC-1	The BAL-004-WECC-2 and Variance to BAL-001-0.1a Completed Actions
	reporting and WATEC ACE for control. The Interconnect prefers to use the WATEC ACE for control and CPS reporting. Develop a Regional Variance to BAL-001-0.1a to resolve the issue.	replaces Requirement R1 and Section D Compliance 2. This Regional Variance establishes a single ACE equation for use in WECC for all NERC standards referencing ACE. Furthermore, the Drafting Team for WECC-0068 requests withdrawal of BAL-001-0.1a Appendix 2 Interpretation of Requirement 1 and BAL-003-0.1b Appendix 1 Interpretation of Requirement R3.
FERC	P 51. FERC adopts its NOPR proposal and directs that the violation risk factors assigned to BAL-004-WECC-01, Requirements R1, R2, R3, and R4, be modified from "lower" to "medium." The ERO and WECC must submit a filing that includes the directed modifications within 60 days of the effective date of this Final Rule.	NERC and WECC, in their compliance filing of August 28, 2009,[2] adjusted the Violation Risk Factors to medium as directed. Likewise, the corresponding requirements in BAL-001-0.1a E.B.1, BAL-004-WECC-2 Requirements R3, R4, and R5 have been assigned Violation Risk Factors of Medium.
FERC	P 54. The Commission adopts its NOPR proposal and directs the ERO and WECC to submit violation severity levels for each Requirement and sub-Requirement that has been assigned a violation risk factor. To allow adequate time for the development of the violation severity levels, the ERO and WECC must submit a filing that includes the directed violation severity levels within 120 days of the effective date of this Final Rule.	NERC and WECC in its compliance filing of October 23, 2009[3] adjusted the violation severity levels as directed. The drafting team has established similar violation severity levels for each requirement in both BAL-001-01.1a E.B and BAL-004-WECC-2.

[2] *Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 51 of Order No. 723 – Directed Modification of Violation Risk Factors for Regional Reliability Standard BAL-004-WECC-1, Automatic Time Error Correction*, Docket No. RM08-12-000, filed August 28, 2009.

[3] *Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 54 of Order No. 723*, Docket No. RM08-12-000, filed October 23, 2009.

The Project WECC-0068 (BAL-004-WECC-2 and Regional Variance to BAL-001-0.1a)
Drafting Team Completed Actions
November 3, 2011

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
R1. Each BA that operates synchronously to the Western Interconnection shall continuously operate utilizing Automatic Time Error Correction (ATEC) in its Automatic Generation Control (AGC) system. [Risk Factor: Lower] $ACE_{ATEC} = (NI_A - NI'_S) - 10B_i (F_A - F_S) - T_{0b} + I_{ME}$ **Where:** **NI_A =** Net Interchange Actual (MW). **F_A =** Frequency Actual (Hz). **F_S** = Frequency Scheduled (Normally 60 Hz). **B_i =** Frequency Bias for the Balancing Authority's Area (MW / 0.1 Hz). **T_{0b} =** Remaining Bilateral Payback for Inadvertent Interchange created prior to implementing automatic payback (MW). **I_{ME} =** Meter Error Correction (MW).	**E.B.1.** Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit $\in_1^2$ is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee. $AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \in_1^2$ *or* $\frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\in_1^2} \le 1$ The equation for ACE in the Western Interconnection is:	Establishing a Regional Variance in BAL-001-01.1a in which an ACE equation for WECC is specified provides the following benefits from a Standards perspective: a) Locates in a single standard the definition of ACE for all Interconnections; b) Identifies a single ACE formula for all Interconnections with common terminology and uncommon	Reducing the NERC ACE and "control" ACE to a single ACE, allows Operations to "control to the target." This means that control actions will directly affect the monitored, measured objective function. Since the amount of the adjustment during any one hour is limited by L_{10}, Balancing Authorities automatically limit the risk and the amount of the transaction.

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
$NI'_S = NI_S - \frac{II^{on/off\ peak}_{Primary}}{(-Y)*H}$ **NI_S =** Net Interchange Scheduled (MW). **Y** = B_i / B_S. **H** = Number of Hours used to payback Inadvertent Interchange Energy. The WECC Performance Work Group has set the value of H to 3. **B_S** = Frequency Bias for the Interconnection (MW / 0.1 Hz). $II^{on/off\ peak}_{primary}$ = is the Balancing Authority's accumulated primary inadvertent interchange in MWh. An On-Peak and Off-Peak accumulation accounting is required. Where: $II^{on/off\ peak}_{primary}$ **= last period's** $II^{on/off\ peak}_{primary}$ **+ (1-Y) * (II_{actual} - B_i * ΔTE/6)** **II_{actual}** is the hourly Inadvertent Interchange for the last hour.	$ACE = (NI_A - NI_S) - 10B(F_A - F_S) - I_{ME} + I_{ATEC}$ **Where:** **NI_A** is the algebraic sum of actual flows on all tie lines. **F_A** is the actual frequency. **F_S** is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections. **B** = Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz. I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero. $I_{ATEC} = \frac{PII^{on/off\ peak}_{accum}}{(-Y)*H}$ when operating in Automatic Time Error Correction control mode. I_{ATEC} shall be zero when operating in any other AGC mode. **NI_S** is the algebraic sum of scheduled flows on all tie lines. **Y** = B / B_S.	differences (i.e., there is no longer a NERC ACE and a "control" ACE); and c) Eliminates consideration of exceptional circumstances governing multiple ACEs.	

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where: **$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE\ offset)$** **$TD_{adj}$** is any operator adjustment to the control center Time Error to correct for differences with the time monitor. **t** is the number of minutes of Manual Time Error Correction that occurred during the hour. **TE offset** is 0.000 or +0.020 or -0.020.	**H =** Number of Hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3. **B_S =** Frequency Bias for the Interconnection (MW / 0.1 Hz). **P**rimary **I**nadvertent **I**nterchange **(PII_{hourly})** is **$(1-Y) * (II_{actual} - B * \Delta TE/6)$** **$II_{actual}$** is the hourly Inadvertent Interchange for the last hour. **ΔTE** is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where: **$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE_{offset})$** **$TD_{adj}$** is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks. **t** is the number of minutes of Manual Time Error Correction that occurred during the hour. **TE_{offset}** is 0.000 or +0.020 or -0.020. **PII_{accum}** is the Balancing Authority's accumulated **PII_{hourly}** in MWh. An On-Peak and Off-Peak accumulation accounting is required. Where:		

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
	$PII_{accum}^{on/off\ peak}$ **= last period's** $PII_{accum}^{on/off\ peak}$ **+** $PII_{\textbf{hourly}}$		
R1.1. The absolute value of the WECC Automatic Time Error Correction term is limited as follows: $\left\| \frac{II_{primary}^{on/off\ peak}}{(1\text{-}Y)\cdot H} \right\| \le L_{max}$ Where L_{max} is chosen by the BA and is bounded as follows: $0.20 * \|B_i\| \le L_{max} \le L_{10}$ L_{10} is the Balancing Authority CPS2 limit in MW. If the WECC Automatic Time Error Correction term is less than the upper limit, use the calculated WECC Automatic Time Error Correction term.	**E.B.2.** Each Balancing Authority shall limit the absolute value of I_{ATEC}, the Automatic Time Error Correction term as follows: $\left\| I_{ATEC} \right\| \le L_{max}$. **E.B.3.** Each Balancing Authority shall set L_{max} within the limits as follows: $0.20 * \|B\| \le L_{max} \le L_{10}$.	Provides clarity in requirements and actions to be taken by the Balancing Authorities. Relocating this requirement to BAL-001-0.1a consolidates all requirements affecting calculation of terms in the ACE equation.	Eliminates potential confusion regarding limitation of the ATEC term, which could affect the final ACE value, subsequent control of units, and associated impact on system frequency.
R1.2 Large accumulations of primary inadvertent point to an invalid implementation of ATEC, loose control, metering or accounting errors. A BA [Balancing Authority] in such a situation should identify the source of the error(s)	**R1.** Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PII_{accum}) for both the monthly On-Peak period and the monthly Off-Peak period are each individually less than or equal to: **1.1** For load-serving Balancing Authorities, 150% of the	FERC directed WECC to define large accumulations for PII_{accum}. As a result in Requirement R1 the large accumulation	The drafting team reviewed historical data to identify an appropriate amount to limit PII_{accum} and accommodate

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
and make the corrections, recalculate the primary inadvertent from the time of the error, adjust the accumulated primary inadvertent caused by the error(s), validate the implementation of ATEC, set L_{max} equal to $L_{10,}$ and continue to operate with ATEC reducing the accumulation as system parameters allow.	previous calendar year's integrated hourly Peak Demand, **1.2** For generation-only Balancing Authorities, 150% of the previous calendar year's integrated hourly peak generation.	limit was set to 150% of previous year's peak demand or peak generation for generation only Balancing Authorities. The action required is that the Balancing Authority shall not permit the PII_{accum} to exceed the defined value, which is demonstrated at the end of each month. Requirement R2 contains the provision to recalculate. Since an upper limit is now defined, the list of possible actions to be taken was moved to the premise for Requirement R1.	month end adjustments.
R2. Each BA [Balancing Authority] that is synchronously connected to the Western	**R3.** Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable	Resolve that the "out of service" duration is	Ninety 90 days was selected as a

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
Interconnection, and operates in any AGC operating mode other than ATEC, shall notify all other BAs of its operating mode through the designated Interconnection communication system. Each BA, while synchronously connected to the Western Interconnection, will be allowed to have ATEC out of service for a maximum of 24 hours per calendar quarter, for reasons including maintenance and testing. [Risk Factor: Lower]	exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service.	an accumulation over the specified period. Also recognizes that extremely short interruptions in ATEC need not be communicated to the Interconnection. For example, computer maintenance processes could result in momentary interruptions (e.g., system upgrades) that do not require notifying neighboring Balancing Authorities.	reasonable amount of time to correct an error and recalculate PII and $PII_{accum,}$ since recalculation of PII and PII_{accum} is not a real-time operations reliability issue.
R3. BAs in the Western Interconnection shall be able to change their AGC operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error control (used in ATEC mode). The ACE used for NERC reports shall be the same ACE as the AGC	**R5.** Each Balancing Authority shall be able to change its Automatic Generation Control operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error Control (used in ATEC mode), to correspond to current operating conditions.	Removed reference to NERC report because with the adoption of a WECC regional variance to BAL-001-0.1a such a requirement is not necessary.	Changing to the proper operating mode, corresponding to current operating conditions, affords proper movement of generating units in

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
operating mode in use. [Risk Factor: Lower]			response to those conditions. The addition of the ATEC term results in an additional AGC mode and a different set of parameters. The inability to correctly calculate the ATEC term would dictate that AGC not be operated in the ATEC mode.
R4. Regardless of the AGC operating mode, each BA in the Western Interconnection shall compute its hourly Primary Inadvertent Interchange when hourly checkout is complete. If hourly checkout is not complete by 50 minutes after the hour, compute Primary Inadvertent Interchange with best available data. This hourly value shall be added to the appropriate accumulated Primary Inadvertent Interchange balance for either On-Peak or Off-Peak periods. [Risk Factor: Lower]	**R4.** Each Balancing Authority shall compute the following by 50 minutes after each hour: **4.1.** $PII_{\mathbf{hourly}}$, **4.2.** PII_{accum}, **4.3.** Automatic Time Error Correction term (I_{ATEC}). **R6.** Each Balancing Authority shall recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly Inadvertent Interchange or ΔTE.	The drafting team clarified the previous requirement and adopted the NERC requirement format.	To promote timely calculations 50 minutes was selected because it is before the next hour ramp begins and permits time to collect the data and resolve interchange metering values. As hourly PII is

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
			corrected, then PII_{accum} should be recalculated.
R4.1 Each BA in the Western Interconnection shall use the change in Time Error distributed by the Interconnection Time Monitor.		This adjustment is included as part of equation in Requirement E.B.1. as ΔTE.	
R4.2 All corrections to any previous hour Primary Inadvertent Interchange shall be added to the appropriate On-Peak or Off-Peak accumulated Primary Inadvertent Interchange.	**R2**. Each Balancing Authority shall, upon discovery of an error in the calculation of PII_{hourly}, recalculate within 90 days, the value of PII_{hourly} and adjust the PII_{accum} from the time of the error. **R6.** Each Balancing Authority shall recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly Inadvertent Interchange or ΔTE.	The drafting team clarified the previous requirement and adopted the NERC requirement format.	The drafting team selected 90 days as a reasonable amount of time to correct an error and recalculate PII_{hourly} and $PII_{accum,}$ since recalculation of PII_{hourly} and PII_{accum} is not a real-time operations reliability issue.
R4.3 Month-end Inadvertent Adjustments are 100% Primary Inadvertent Interchange and shall be added to the appropriate On-Peak or Off-Peak accumulated Primary Inadvertent Interchange, unless such adjustments can be pinpointed to specific hours in which case	**R7.** Each Balancing Authority shall make the same adjustment to the PII_{accum} as it did for any month-end meter reading adjustments to Inadvertent Interchange.	The drafting team clarified the previous requirement and adopted the NERC requirement format.	Month-end adjustments to II are applied as 100% PII_{accum}. 100% was chosen for simplicity to

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
R4.2 applies.			bilaterally assign PII to both Balancing Authorities, since the effect of this metering error on system frequency is not easily determined over the course of a month.
R4.4 Each BA in the Western Interconnection shall synchronize its Time Error to the nearest 0.001 seconds of the system Time Error by comparing its reading at the designated time each day to the reading broadcast by the Interconnection Time Monitor. Any difference shall be applied as an adjustment to its current Time Error.		The requirement was deleted because the Interconnection Time Monitor is responsible for monitoring and calculating Time Error. Balancing Authorities are no longer responsible for Time Error monitoring, so the requirement was removed.	
Definitions of Terms Used in Regional Standard **Automatic Time Error Correction:** A	**Definitions of Terms Used in Regional Standard**	The definition for Secondary Inadvertent Interchange was	

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
frequency control automatic action that a BA uses to offset its frequency contribution, to support the Interconnection's scheduled frequency. **Primary Inadvertent Interchange:** The component of area (n) inadvertent interchange caused by the regulating deficiencies of the area (n). **Secondary Inadvertent Interchange:** The component of area (n) inadvertent interchange caused by the regulating deficiencies of area (i).	**Area Control Error**: The instantaneous difference between a Balancing Authority's net actual and scheduled interchange, taking into account the effects of Frequency Bias, correction for meter error, and Automatic Time Error Correction. **Automatic Time Error Correction:** The addition of a component to the ACE equation that modifies the control point for the purpose of continuously paying back Primary Inadvertent Interchange to correct accumulated time error.	removed because it is not used in the proposed standard. The Automatic Time Error Correction definition was modified to more accurately define Automatic Time Error Correction. The current definition for Primary Inadvertent Interchange was retained.	

Comment Report Form for Project WECC-0068 Modification of BAL-004-WECC-1 Posting 2

The Project WECC-0068 (Regional Variance to BAL-001-0.1a — Real Power Balancing Control Performance and refinements to BAL-004-WECC-2 — Automatic Time Error Correction) Drafting Team thanks everyone who submitted comments on the WECC Regional Variance to the NERC BAL-001- 0.1a — Real Power Balancing Control Performance and to BAL-004-WECC-2 — Automatic Time Error Correction. These standards were posted for a 30-day public comment period from November 4, 2011 through December 5, 2011. WECC distributed the notice for the posting on November 4, 2011. The Standard Drafting Team asked stakeholders to provide feedback on the variance to the NERC Reliability Standard through a special Standard Comment Form. WECC received comments from five companies representing four of the 10 Industry Segments, as shown in the table on the following page.

In this "Consideration of Comments" document, stakeholder's comments have been organized so that it is easier to see the responses associated with each stakeholder. All comments received on the standard can be viewed in their original format at:

http://www.wecc.biz/Standards/Development/WECC-0068/Lists/WECC0068%20Modification%20of%20BAL004WECC1%20Version%202/AllItems.aspx

If you feel that your comment has been overlooked, please let WECC know immediately. WECC's goal is to give every comment serious consideration in this process. If you feel there has been an error or omission, please contact the Director of Standards, Steve Rueckert, at steve@wecc.biz. In addition, there is a WECC Reliability Standards Appeals Process.[1]

[1] The appeals process is described in the Process for Developing and Approving WECC Standards: http://www.wecc.biz/Standards/Documents/WECC%20Standards%20Development%20Process.pdf

Comment Report Form for Project WECC-0068 Modification of BAL-004-WECC-1

The Industry Segments are:

1 — Transmission Owners
2 — Regional Transmission Organizations, Independent System Operators
3 — Load-Serving Entities
4 — Transmission-dependent Utilities
5 — Electric Generators
6 — Electricity Brokers, Aggregators, and Marketers
7 — Large Electricity End Users
8 — Small Electricity End Users
9 — Federal, State, Provincial Regulatory or other Government Entities
10 – Regional Reliability Organizations, Regional Entities

	Commenter	Organization	Industry Segment									
			1	2	3	4	5	6	7	8	9	10
1.	Cynthia Oder (submitting for Mike Gentry)	Salt River Project	✓		✓		✓	✓				
2.	Robert Bean robert.bean@aps.com	Arizona Public Service Company	✓				✓					
3.	Annie Lauterbach Submitting on behalf of the following Subject Matter Experts: James Murphy, BPA - Technical Operations	Bonneville Power Administration	✓		✓		✓	✓				
4.	Rich Hydzik and Craig Figart	Avista	✓		✓		✓					
5.	Mike Goodenough	Powerex						✓				
6.												

Index to Questions, Comments, and Responses

Comment Report Form for Project WECC-0068 Modification of BAL-004-WECC-1

1. **Do you agree with removing the requirement that required Balancing Authorities to take specific actions to reduce a Balancing Authority's Accumulated Primary Inadvertent Interchange (PII_{accum}) and placing the various options in the premise of Requirement R1? If you answered 'Yes' to the previous question, please indicate why you support removal. If you answered 'No' to the previous question, please explain why you do not support the removal.**

Summary Consideration:

Commenter	Yes	No	Comment
Cynthia Oder (submitting for Mike Gentry) Salt River Project cindy.oder@srpnet.com	Yes		I believe that it is necessary To limit the amount of PII_{accum} that a Balancing Authority can have at the end of each month.
Response: The Drafting Team agrees with your comment. Thank you for your comment.			
Robert Bean Arizona Public Service Company robert.bean@aps.com	Yes		The updated requirement clarifies the definition of "large accumulations" and provides a reasonable range to allow taking action for reducing accumulations.
Response: The Drafting Team agrees with your comment. Thank you for your comment.			
Annie Lauterbach Bonneville Power Administration ajlauterbach@bpa.gov Submitting on behalf of the following Subject Matter Experts: James Murphy, BPA - Technical Operations	Yes		Each BA should be allowed to balance their inadvertent within the 150% using any tools they have.
Response: The Drafting Team agrees with your comment. Thank you for your comment.			
Rich Hydzik - Avista rich.hydzik@avistacorp.com Craig Figart - Avista craig.figart@avistacorp.com		No	Large accumulations of PII indicate that a BA is not controlling to its schedule number. A lack of control in such a BA requires all other BA's to operate in a non-optimal state in order to maintain system frequency. Large accumulations of PII indicate that a BA is "leaning on the system," which by definition is a reliability issue. The requirement to set ATEC payback to L10 (BAL-004-WECC-01 R1.2) encourages rapid payback of PII and promotes effective frequency control. Allowing a BA to minimize or delay PII payback will create an environment where it is economically advantageous for a BA to accumulate PII during certain hours and delay payback to a time where it is economically advantageous for the BA. This is a reliability issue in that poor control on the part of this BA results in other BA's utilizing their regulating reserve due to frequency bias to compensate for the poorly performing BA. Thus, the other BA's have less available regulating reserve to manage their load variations due to the frequency bias term in the ACE equation being driven by the poorly performing BA.

Commenter	Yes	No	Comment
Response: The Drafting Team appreciates the comment and the issues expressed. While it addressed the FERC order, the Drafting Team recognized that identifying specific actions would require Balancing Authorities to follow those actions irrespective of which action might be most appropriate. Although the proposed actions in the comments would tighten controls further, the Drafting Team believes the Balancing Authority should have flexibility in selecting actions that are appropriate for the circumstance such as those specified in the Rationale for Requirement R1. The Drafting Team believes that excessive accumulations of PII can lead to reliability issues. The proposed upper limit provides enhanced reliability while allow flexibility in operation.			
Mike Goodenough Powerex mike.goodenough@powerex.com	Yes		We feel the standard is improved by defining the upper limit for accumulated inadvertent. It will give a clear indication to a BA that it needs to take actions and make corrections, such as those mentioned in R1.2 of the current standard. However it is not necessary to exhaustively list the actions required of the BA to reduce their inadvertent, as these are implicit.
Response: The Drafting Team agrees with your comment. Thank you for your comment.			

2. Do you agree with setting the maximum PII_{accum} limit for a Balancing Authority at 150% of last year's peak demand, except for generation-only Balancing Authorities, in which case the maximum limit is 150% of peak generation? If you answered 'Yes' to the previous question, please indicate why you support the upper limit. If you answered 'No' to the previous question, please recommend an upper limit that is more appropriate and explain why.

Summary Consideration:

Commenter	Yes	No	Comment
Cynthia Oder (submitting for Mike Gentry) Salt River Project cindy.oder@srpnet.com	Yes		I believe that it is necessary To limit the amount of PII_{accum} that a Balancing Authority can have at the end of each month.
Response: The Drafting Team agrees with your comment. Thank you for your comment.			
Robert Bean Arizona Public Service Company robert.bean@aps.com	Yes		The upper limit is reasonable and will prompt BAs to take action to reduce the accumulations.
Response: The Drafting Team agrees with your comment. Thank you for your comment.			
Annie Lauterbach Bonneville Power Administration ajlauterbach@bpa.gov Submitting on behalf of the following Subject Matter Experts: James Murphy, BPA - Technical Operations			BPA agrees with the 150% because each BA needs reasonable room to operate and deal with meter error, monthly adjustments, etc. BPA believes it should be at a minimum 150%, 200% would be better.
Response: Thank you for your comment.			

Comment Report Form for Project WECC-0068 Modification of BAL-004-WECC-1

Commenter	Yes	No	Comment
Rich Hydzik - Avista rich.hydzik@avistacorp.com Craig Figart - Avista craig.figart@avistacorp.com		No	150% of Peak Load seems to be extremely high. If a BA is properly operating in "Tie Line Bias Plus Time Error Control," PII payback should be occurring on a continuous basis. In order to get a PII balance that is so large, the BA either 1) is not operating in "Tie Line Bias Plus Time Error Control," 2) is not properly calculating PII, 3) made a month-end PII adjustment or suffered a meter failure at some location, or 4) is controlling too loosely driving large differences in Net Actual Interchange and Net Scheduled Interchange. With the exception of 3) and 4), large balances should not be occurring. For 1) and 2), an appropriate PII_{accum} should be more on the order of a multiple of L10. If an hourly accumulation greater than L10 occurs more than a couple times per day, the BA is likely failing CPS2. Since, notwithstanding the RBC Field Trial, CPS2 must be met, it stands to reason that the PII_{accum} limit should be a multiple of L10. We would suggest a value such as 5 or 10 times L10, accounting for 5 to 10 hours of poor control. If PII_{accum} exceeds this limit, the PII payback term should be L10 to ensure rapid payback of PII_{accum}. If 3) causes the high PII_{accum}, the PII payback term should be set to L10 to ensure rapid payback of PII_{accum}. If 4) causes the high PII_{accum}, not only should the PII payback term should be set to L10, but AGC control should be tightened up or modified to ensure rapid payback of PII_{accum}. This limit, 150% of BA load, is an open invitation for a BA to take advantage of the economic and system conditions and push control obligations onto neighboring BA's in the interconnection. Stated another way, a large PII_{accum} value indicates that a BA is "leaning on the system."
Response: The Drafting Team has reviewed your comments and believes the limit set forth in Requirement R1 is a reasonable value taking into consideration the size and the current operating practices of Balancing Authorities. As noted in the technical paper, controlling with an ACE equation containing the ATEC term reduces the average frequency deviation error. The proposed ATEC and PII limits are well within the design parameters for control.			
Mike Goodenough Powerex mike.goodenough@powerex.com	Yes		We feel that the upper limit as described adequately limits the amount of accumulated inadvertent that a Balancing Authority can carry, while at the same time giving the Balancing Authority sufficient flexibility in its operation and control.
Response: The Drafting Team agrees. Thank you for your comment.			

3. The drafting team believes the technical paper titled, Consolidation of NERC and ATEC ACEs, provided with this posting, adequately explains both the reasons for adopting ATEC ACE and why the current level of reliability is still maintained. If you disagree, please explain why you disagree and suggest a remedy.

Summary Consideration:

Commenter	Yes	No	Comment
Cynthia Oder (submitting for Mike Gentry) Salt River Project			I agree that the paper adequately explains this premise.

Comment Report Form for Project WECC-0068 Modification of BAL-004-WECC-1

Commenter	Yes	No	Comment
cindy.oder@srpnet.com			
Response: Thank you for your comment.			
Robert Bean Arizona Public Service Company robert.bean@aps.com			APS agrees with the conclusions of the technical paper.
Response: Thank you for your comment.			
Annie Lauterbach Bonneville Power Administration ajlauterbach@bpa.gov Submitting on behalf of the following Subject Matter Experts: James Murphy, BPA - Technical Operations			BPA agrees with the paper.
Response: Thank you for your comment.			
Rich Hydzik - Avista rich.hydzik@avistacorp.com Craig Figart - Avista craig.figart@avistacorp.com			We agree with the regional ACE variance.
Response: Thank you for your comment.			
Mike Goodenough Powerex mike.goodenough@powerex.com			Agree.
Response: Thank you for your comment.			

4. The WECC-0068 (Modification of BAL-004-WECC-1) drafting team welcomes additional comments on any and all aspects of the proposed Regional Variance to BAL-001-0.1a, Regional Reliability Standard BAL-004-WECC-2, and addressing the directives of FERC Order 723.

Summary Consideration:

Commenter	Yes	No	Comment
Cynthia Oder (submitting for Mike Gentry) Salt River Project			

Comment Report Form for Project WECC-0068 Modification of BAL-004-WECC-1

Commenter	Yes	No	Comment
cindy.oder@srpnet.com			
Response:			
Robert Bean Arizona Public Service Company robert.bean@aps.com			APS has no additional comments.
Response: Thank you			
Annie Lauterbach Bonneville Power Administration ajlauterbach@bpa.gov Submitting on behalf of the following Subject Matter Experts: James Murphy, BPA - Technical Operations			BPA agrees with and supports this standard.
Response: Thank you			
Rich Hydzik - Avista rich.hydzik@avistacorp.com Craig Figart - Avista craig.figart@avistacorp.com			BAL-004-WECC-02 provides more clarity than -01. It is well written. No concerns with this standard other than R1.1 and R1.2.
Response: Thank you			
Mike Goodenough Powerex mike.goodenough@powerex.com			Powerex feels that it would be useful for WECC to publish inadvertent flow data so WECC members can gain a clearer picture of inadvertent flow patterns on the grid as a whole. Initiatives underway in WECC that have a direct impact on inadvertent flow, such as the ACE Diversity Initiative and The Reliability Based Control Field Trial, can have substantial impact on inadvertent flows on the grid. To ensure Balancing Authorities and regulating bodies have all pertinent information when developing inadvertent interchange reliability standards, inadvertent flow data should be made publicly available.
Response: This comment is outside the scope of the standard request and not within the authority of the Drafting Team. The comment would have to be addressed in other forums.			

Posting 3

Standard BAL-001-0.1a
Real Power Balancing Control Performance
Modification of NERC BAL-001-0.1a to add WECC Regional Variance
Version 3
Open: 12/15/2011 Closed: 1/16/2012

Document Title	WECC Regional Variance to NERC Standard BAL-001-0.1a
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1		Version 1 Posted 4/15/11-6/1/11	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Version 3 Posted 12/15/11	Addressed comments from Version 2 posting
4		Standing Committee Approval	
5		WECC Board Approval	

Regional Variance 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.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	07/16/2010
9. Notice of development / first 30-day notice	09/2/2010
10. New committee chair orientation meeting	08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 01/18/11 02/10/11 03/11–12/11 03/24/11 04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
16. Post first draft for 45-day comment period	04/15/2011
17. Meet to answer to comments, address impact statement and draft responses	06/2-3/2011 06/14/2011

	06/23/2011 06/29/2011
18. Post responses to comments received during 45-day comment period	06/29/2011
19. Meet to answer to comments, address impact statement and draft responses	08/8/2011 08/15/2011 08/30/2011 11/01/2011
20. Post Version 2 for a 30-day comment period	11/04/2011
21. Post consideration of comments of Version 2	12/15/2011
22. Post Version 3 for 30-day comment period	12/15/2011

Description of Current Draft:

On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC Standards.[1] Since the approval of BAL-004-WECC-1 the industry has commented that there is confusion concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as that used during Automatic Generation Control (AGC) mode. The use of two ACE equations came as a result of NERC's comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a)[2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation for control but should use raw ACE for CPS reporting.[3] The industry desires to use the same ACE equation for control and reporting because it provides better a measurement of control performance.

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).
[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).
[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

The purpose of this proposed WECC Regional Variance to BAL-001-01.a (WECC Variance) is to replace Requirements R1 and Section D. Compliance, Subsection 2. of BAL-001-0.1a with three new requirements. In Requirement E.B.1 of the WECC Variance, the drafting team proposes to replace the NERC ACE equation with an ACE equation that includes the ATEC term. Replacing the NERC raw ACE equation with the ATEC ACE equation through a Regional Variance will require Balancing Authorities in the Western Interconnection to use the ATEC ACE for control and CPS reporting purposes. Using the ATEC ACE equation for CPS reporting is more appropriate because, as discussed further below, it is a more accurate measure of how well a Balancing Authority is controlling to its control performance target.

The drafting team for Project WECC-0068 also requests withdrawal of the BAL-001-0.1a Appendix 2 Interpretation of Requirement R1and the BAL-003-0.1b Appendix 1 Interpretation of Requirement R3. By creating a Regional Variance that replaces Requirement R1, these interpretations are no longer needed. The drafting team revised the definition for Area Control Error (ACE) in the WECC Regional Definitions to closely align with NERC definition for ACE while at the same recognizing concept of ATEC.

In order to obtain a Regional Variance[4] to a NERC Reliability Standard, it must be demonstrated that:

- The variance is not inconsistent with or less stringent than the NERC reliability standard;
- Is necessitated by a physical difference; or
- Is an alternative methodology with the same reliability objective.

Replacing the NERC ACE equation with an ATEC ACE equation is an alternative methodology with the same reliability objective as the existing BAL-001-0.1a standard. It is a method of automatically scheduling Primary Inadvertent Interchange (PII) back to other Balancing Authorities. The inclusion of the Automatic Time Error Correction term in the ACE equation changes the Balancing Authority's control performance target. The current NERC ACE equation requires that Balancing Authorities control the frequency and Interchange within their Balancing Authority Area to a target point of zero, but it allows the control to stay within a predefined range called L_{max} which is between 0.20 * |B| and $\pm L_{10}$. The proposed ACE equation, with an Automatic Time Error adjustment, works similarly to the NERC equation; however, the target point for control is adjusted by the ATEC adjustment. The ATEC component defines a new control point and is equivalent to making an interchange schedule that would automatically payback PII. The modification to the ACE equation is equivalent to making an adjustment because of a metering error. Since the amount of the adjustment during any one hour is limited by L_{max}, Balancing Authorities automatically limit the risk to the interconnection and the amount of the transaction.

[4] "Entity variance" means an aspect of a reliability standard that applies only within a particular entity or a subset of entities within a limited portion of a regional entity, such as a variance that would apply to a regional transmission organization or particular market or to a subset of bulk power system owners, operators or users. An entity variance may not be inconsistent with or less stringent than the reliability standards as it would otherwise exist without the entity variance. An entity variance shall be approved only through the NERC standards development procedure and shall be made part of the NERC reliability standards." (Rules of Procedure of the North American Electric Reliability Corporation, Section 200 — Definition of Terms, page 2.)

The addition of the I_{ATEC} component meets the standard of justification for a Regional Variance as an alternative methodology, with the same reliability objective as the NERC Reliability Standard. In addition, the proposed WECC variance to BAL-001-0.1a is consistent with — or more stringent than — the NERC BAL-001-0.1a Reliability Standard. The reasons the WECC Variance meets the standard of justification are:

1. The addition of I_{ATEC} to the ACE equation and adjustment to the control performance target used for controlling frequency and interchange does not place any addition risk to reliability because limits are set in the magnitude of the I_{ATEC} adjustment.
2. The Regional Variance allows the use of the same control performance target for control and reporting providing a better methodology for measuring performance.
3. It is another control methodology that achieves the same reliability objective as BAL-001-0.1a.

BAL-004-WECC-1 requires Balancing Authorities in the Western Interconnection to use ATEC ACE for control. As proposed in the WECC Variance, Balancing Authorities in the Western Interconnection are required to operate synchronously to the Interconnection, using the ATEC ACE, which automatically corrects time error. The ATEC component in the ACE equation has been effective in mitigating two main issues in the Western Interconnection.

1. It has been used to reduce the number of hours of Manual Time Error Corrections, or the amount of manual adjustments of timing errors that accumulate on clocks, which make certain interconnection scheduled frequency deviations.
2. Since time error is directly related to Inadvertent Interchange, the procedure has been used to reduce accumulated Inadvertent Interchange, or the difference between the actual and scheduled interchange.

The ATEC procedure requires Balancing Authorities in the Western Interconnection to determine their contribution to the Interconnection time error. The Balancing Authority does this by calculating its PII. BAL-001-0.1a Requirement E.B.1 requires that each Balancing Authority calculate its PII_{accum} and I_{ATEC} from its hourly Inadvertent Interchange. When the resulting I_{ATEC} is entered into Balancing Authority's ACE equation, I_{ATEC} continuously corrects for its portion of the time error automatically, as opposed to manually, as specified in the continent-wide standard on Time Error Correction BAL-004-1 Requirement R2. Although the maximum payback is bounded between limits, the continuous correction enables equitable payback of Primary Inadvertent Interchange.

The drafting team is proposing the same Violation Severity Levels for Requirement R1 of the WECC Variance as those in Requirement R1 of BAL-001-01.a because it is a measurement of how well a Balancing Authority is controlling to its control performance target.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Project WECC-0068 Version 3 Comments due	01/16/2012
2. Meet to answer to comments, address impact statement, draft responses	01/18/2012

Anticipated Actions	Anticipated Date
3. Post responses to comments	02/13/2012
4. Post for comment and Operating Committee approval	02/24/2012
5. Operating Committee approves proposed standard	03/27/2012
6. Post draft standard for 45-day NERC comment period	04/02/2012
7. NERC comment period ends	05/16/2012
8. DT completes review and consideration of industry comments to NERC posting	06/15/2012
9. Post draft standard for WECC Board approval	05/01/2012
10. WECC Board approval	06/21/2012
11. Post draft standard for 15-day NERC comment period	06/25/2012
12. NERC 15-day comment period ends	07/2012
13. DT completes review and consideration of industry comments to NERC posting	07/2012
14. Submit NERC Board of Trustees approval request	08/2012
15. Receive NERC Board approval	08/2012

.

Implementation Plan

The proposed Implementation Plan is to make the WECC Regional Variance to BAL-001-0.1a and the proposed WECC Regional Reliability Standard BAL-004-WECC-2 effective on the first day of the second quarter, after regulatory approval. Since entities are already controlling with the ATEC ACE equation, but are using the NERC raw ACE equation for purposes of reporting CPS1, the transition to controlling and reporting using the ATEC ACE should be minimal. Additionally, it should not require much time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

Definitions of Terms Used in Regional Variance to a NERC 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 definitions will be removed from the standard and added to the NERC Glossary under WECC Regional Definitions.

Area Control Error: The instantaneous difference between a Balancing Authority's net actual and scheduled interchange, taking into account the effects of Frequency Bias, correction for meter error, and Automatic Time Error Correction (ATEC), if operating in the ATEC mode. ATEC is only applicable to Balancing Authorities in the Western Interconnection.

A. Introduction

1. **Title**: **Real Power Balancing Control Performance**

2. **Number**: BAL-001-0.1a

3. **Purpose**: To maintain Interconnection steady-state frequency within defined limits by balancing real power demand and supply in real-time.

4. **Applicability**:

   4.1. Balancing Authorities

5. **Effective Date:** The WECC Regional Variance to NERC Reliability Standard BAL-001-0.1a is to be effective on the first day of the second quarter, after regulatory approval.

B. Requirements

R1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit ε_1^2 is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \epsilon_1^2 \ or \ \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\epsilon_1^2} \le 1$$

Committee.

The equation for ACE is:

$ACE = (NI_A - NI_S) - 10B\ (F_A - F_S) - I_{ME}$

where:

- NI_A is the algebraic sum of actual flows on all tie lines.
- NI_S is the algebraic sum of scheduled flows on all tie lines.
- B is the Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.
- F_A is the actual frequency.
- F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.
- I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

R2. Each Balancing Authority shall operate such that its average ACE for at least 90% of clock-ten-minute periods (6 non-overlapping periods per hour) during a calendar

month is within a specific limit, referred to as L_{10}.

$$AVG_{10-\text{minute}}(ACE_i) \le L_{10}$$

where:

$L_{10}=1.65 \in_{10} \sqrt{(-10B_i)(-10B_s)}$

ε_{10} is a constant derived from the targeted frequency bound. It is the targeted root-mean-square (RMS) value of ten-minute average Frequency Error based on frequency performance over a given year. The bound, ε_{10}, is the same for every Balancing Authority Area within an Interconnection, and B_s is the sum of the Frequency Bias Settings of the Balancing Authority Areas in the respective Interconnection. For Balancing Authority Areas with variable bias, this is equal to the sum of the minimum Frequency Bias Settings.

R3. Each Balancing Authority providing Overlap Regulation Service shall evaluate Requirement R1 (i.e., Control Performance Standard 1 or CPS1) and Requirement R2 (i.e., Control Performance Standard 2 or CPS2) using the characteristics of the combined ACE and combined Frequency Bias Settings.

R4. Any Balancing Authority receiving Overlap Regulation Service shall not have its control performance evaluated (i.e. from a control performance perspective, the Balancing Authority has shifted all control requirements to the Balancing Authority providing Overlap Regulation Service).

C. Measures

M1. Each Balancing Authority shall achieve, as a minimum, Requirement 1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-\text{month}}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement R1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}}\right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error will be used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

The reporting Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}}[(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}}[n_{\text{one-minutesamplesin clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}}[(\text{CF}_{\text{clock-houraverage-month}})(n_{\text{one-minutesamplesin clock-houraverages}})]}{\sum_{\text{hours-in day}}[n_{\text{one-minutesamplesin clock-houraverages}}]}$$

The 12-month compliance factor becomes:

$$\text{CF}_{\text{12-month}} = \frac{\sum_{\text{i=1}}^{12}(CF_{\text{month-i}})(n_{\text{(one-minutesamplesin month)-i}})]}{\sum_{\text{i=1}}^{12}[n_{\text{(one-minutesamplesin month)-i}}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at

least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

M2. Each Balancing Authority shall achieve, as a minimum, Requirement R2 (CPS2) compliance of 90%. CPS2 relates to a bound on the ten-minute average of ACE. A compliance percentage is calculated as follows:

$$CPS2 = \left[1 - \frac{\text{Violations}_{\text{month}}}{\left(\text{Total Periods}_{\text{month}} - \text{Unavailable Periods}_{\text{month}}\right)}\right] * 100$$

The violations per month are a count of the number of periods that ACE clock-ten-minutes exceeded L_{10}. ACE clock-ten-minutes is the sum of valid ACE samples within a clock-ten-minute period divided by the number of valid samples.

Violation clock-ten-minutes

= 0 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| \leq L_{10}$$

= 1 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| > L_{10}$$

Each Balancing Authority shall report the total number of violations and unavailable periods for the month. L_{10} is defined in Requirement R2.

Since CPS2 requires that ACE be averaged over a discrete time period, the same factors that limit total periods per month will limit violations per month. The calculation of total periods per month and violations per month, therefore, must be discussed jointly.

A condition may arise which may impact the normal calculation of total periods per month and violations per month. This condition is a sustained interruption in the recording of ACE.

In order to ensure that the average ACE calculated for any ten-minute interval is representative of that ten-minute interval, it is necessary that at least half the ACE data samples are present for that interval. Should half or more of the ACE data be unavailable due to loss of telemetering or computer unavailability, that ten-minute interval shall be omitted from the calculation of CPS2.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Regional Reliability Organization

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar month.

1.3. Data Retention

The data that supports the calculation of CPS1 and CPS2 (Appendix 1-BAL-001-0) are to be retained in electronic form for at least a one-year period. If the CPS1 and CPS2 data for a Balancing Authority Area are undergoing a review to address a question that has been raised regarding the data, the data are to be saved beyond the normal retention period until the question is formally resolved. Each Balancing Authority shall retain for a rolling 12-month period the values of: one-minute average ACE (ACE_i), one-minute average Frequency Error, and, if using variable bias, one-minute average Frequency Bias.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance – CPS1

2.1. Level 1: The Balancing Authority Area's value of CPS1 is less than 100% but greater than or equal to 95%.

2.2. Level 2: The Balancing Authority Area's value of CPS1 is less than 95% but greater than or equal to 90%.

2.3. Level 3: The Balancing Authority Area's value of CPS1 is less than 90% but greater than or equal to 85%.

2.4. Level 4: The Balancing Authority Area's value of CPS1 is less than 85%.

3. Levels of Non-Compliance – CPS2

3.1. Level 1: The Balancing Authority Area's value of CPS2 is less than 90% but greater than or equal to 85%.

3.2. Level 2: The Balancing Authority Area's value of CPS2 is less than 85% but greater than or equal to 80%.

3.3. Level 3: The Balancing Authority Area's value of CPS2 is less than 80% but greater than or equal to 75%.

3.4. Level 4: The Balancing Authority Area's value of CPS2 is less than 75%.

E. Regional Variances

E.A. The ERCOT Control Performance Standard 2 Waiver approved November 21, 2002.

E.B. Regional Variance for the Western Electricity Coordinating Council

The following Interconnection-wide variance shall be applicable in the Western Interconnection and replaces, in their entirety, Requirement R1 and Section D.2. (i.e., under Compliance replace Levels of Non-Compliance – CPS1). Please note that the ACE equation is replaced in its entirety with the following equation identified in Requirement E.B.1.

Requirements and Measures

E.B.1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit $\in_1^2$ is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \in_1^2 \; or \; \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\in_1^2} \le 1$$

The equation for ACE in the Western Interconnection is:

$$ACE = (NI_A - NI_S) - 10B(F_A - F_S) - I_{ME} + I_{ATEC}$$

Where:

NI_A is the algebraic sum of actual flows on all tie lines.

NI_S is the algebraic sum of scheduled flows on all tie lines.

F_A is the actual frequency.

F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.

B = Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.

I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

Rationale for E.B.1

Premise: When a Balancing Authority Area uses the ACE equation with an ATEC correction component for both control and assessing performance, it provides a more accurate measurement of the Control Performance methodology while at the same time achieving the same reliability objective as the existing BAL-001-0.1a standard.

Justification: Adding the ***I_{ATEC}*** term to the ACE equation reduces the number of manual time error corrections and PII_{accum}.

Goal: To establish an ACE equation that permits the implementation of Automatic Time Error Correction.

$I_{ATEC} = \frac{PII_{accum}^{on/off\ peak}}{(-Y) * H}$ when operating in Automatic Time Error Correction control mode.

I_{ATEC} shall be zero when operating in any other AGC mode.

Y = B / B_S.

H = Number of Hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3.

B_S = Frequency Bias for the Interconnection (MW / 0.1 Hz).

Primary **I**nadvertent **I**nterchange **(PII_{hourly})** is **(1-Y) * (II_{actual} - B * ΔTE/6)**

II_{actual} is the hourly Inadvertent Interchange for the last hour.

ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where:

$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE_{offset})$

TD_{adj} is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks.

t is the number of minutes of Manual Time Error Correction that occurred during the hour.

TE_{offset} is 0.000 or +0.020 or -0.020.

PII_{accum} is the Balancing Authority's accumulated **PII_{hourly}** in MWh. An On-Peak and Off-Peak accumulation accounting is required.

Where:

$PII_{accum}^{on/off\ peak}$ **= last period's** $PII_{accum}^{on/off\ peak}$ **+** PII_{hourly}

[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]

M.E.B.1. Each Balancing Authority shall achieve, as a minimum, Requirement E.B.1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-month}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement E.B.1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}}\right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error are used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

As part of its evidence each Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}}[(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}}[n_{\text{one-minutesamplesin clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}}[(\text{CF}_{\text{clock-houraverage-month}})(n_{\text{one-minutesamplesin clock-houraverages}})]}{\sum_{\text{hours-in day}}[n_{\text{one-minutesamplesin clock-houraverages}}]}$$

The 12-month compliance factor becomes:

$$CF_{12\text{-month}} = \frac{\sum_{i=1}^{12}(CF_{\text{month-i}})(n_{(\text{one-minute samples in month})-i})]}{\sum_{i=1}^{12}[n_{(\text{one-minute samples in month})-i}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

E.B.2. Each Balancing Authority shall limit the absolute value of I_{ATEC}, the Automatic Time Error Correction term as follows: *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*

$$|I_{ATEC}| \leq L_{max}.$$

M.E.B.2. Forms of acceptable evidence for Requirement E.B. 2 may include, but are not limited to:

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or
- Other archived data that demonstrates compliance.

Rationale for E.B.2

Premise: I_{ATEC} greater than L_{max} may result in a risk to reliability caused by large ATEC payback.

Justification: Balancing Authorities should not control their Balancing Authority Areas using an approach that puts system reliability at risk.

Goal: The goal of Requirement E.B.2 is to limit I_{ATEC} to L_{max} in order to reduce potential reliability risks to the interconnection caused by a large ATEC payback term.

E.B.3. Each Balancing Authority shall set L_{max} within the limits as follows:

$$0.20 * |B| \leq L_{max} \leq L_{10}.$$

[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]

M.E.B.3. Forms of acceptable evidence for Requirement E.B. 3 may include, but is not limited to:

Rationale for E.B.3

Premise: Operating within an L_{max} less than 0.20 * |B| may not provide sufficient correction for PII and operating with an L_{max} greater than L_{10} may result in potential reliability risks caused by a large ATEC payback term.

Justification: L_{max} should be limited to prevent Balancing Authorities from creating potential reliability risks caused by a large ATEC payback term.

Goal: The goal of Requirement E.B.3 is to develop a range for L_{max} where Balancing Authorities reduce potential reliability risks by limiting I_{ATEC} to L_{max}.

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or
- Other archived data that demonstrates compliance.

E.B. Compliance

1. Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of I_{ATEC} and L_{max} for the preceding calendar year (January – December), as well as the current calendar year.

Table of Compliance Elements

E #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
E.B.1	Real-time Operations	Medium	The Balancing Authority Area's value of CPS1 was less than 100% but greater than or equal to 95%.	The Balancing Authority Area's value of CPS1 was less than 95% but greater than or equal to 90%.	The Balancing Authority Area's value of CPS1 was less than 90% but greater than or equal to 85%.	The Balancing Authority Area's value of CPS1 was less than 85%.
E.B.2	Real-time Operations	Medium	N/A	N/A	N/A	The Balancing Authority Area's absolute value for I_{ATEC} was greater than L_{max}.
E.B.3	Operations Planning	Medium	N/A	N/A	N/A	The Balancing Authority did not set L_{max} to within the limits in E.B.3 (i.e., $0.20 * \|B\| \leq L_{max} \leq L_{10}$).

F. Associated Documents

Version History

Version	Date	Action	Change Tracking
0	February 8, 2005	BOT Approval	New
0	April 1, 2005	Effective Implementation Date	New
0	August 8, 2005	Removed "Proposed" from Effective Date	Errata
0	July 24, 2007	Corrected R3 to reference M1 and M2 instead of R1 and R2	Errata
0a	December 19, 2007	Added Appendix 2 – Interpretation of R1 approved by BOT on October 23, 2007	Revised
0a	January 16, 2008	In Section A.2., Added "a" to end of standard number In Section F, corrected automatic numbering from "2" to "1" and removed "approved" and added parenthesis to "(October 23, 2007)"	Errata
0	January 23, 2008	Reversed errata change from July 24, 2007	Errata
0.1a	October 29, 2008	Board approved errata changes; updated version number to "0.1a"	Errata
0.1a	May 13, 2009	Approved by FERC	
		WECC Regional Variance Retirement of Appendix 2 Interpretation of Requirement R1	

Standard BAL-001-0.1a
Real Power Balancing Control Performance
Modification of NERC BAL-001-0.1a to add WECC Regional Variance
Version 3
Open: 12/15/2011 Closed: 1/16/2012

Appendix 1-BAL-001-0
CPS1 and CPS2 Data

CPS1 DATA	Description	Retention Requirements
ε_1	A constant derived from the targeted frequency bound. This number is the same for each Balancing Authority Area in the Interconnection.	Retain the value of ε_1 used in CPS1 calculation.
ACE_i	The clock-minute average of ACE.	Retain the 1-minute average values of ACE (525,600 values).
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value(s) of B_i used in the CPS1 calculation.
F_A	The actual measured frequency.	Retain the 1-minute average frequency values (525,600 values).
F_S	Scheduled frequency for the Interconnection.	Retain the 1-minute average frequency values (525,600 values).

CPS2 DATA	Description	Retention Requirements
V	Number of incidents per hour in which the absolute value of ACE clock-ten-minutes is greater than L_{10}.	Retain the values of V used in CPS2 calculation.
ε_{10}	A constant derived from the frequency bound. It is the same for each Balancing Authority Area within an Interconnection.	Retain the value of ε_{10} used in CPS2 calculation.
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value of B_i used in the CPS2 calculation.
B_s	The sum of Frequency Bias of the Balancing Authority Areas in the respective Interconnection. For systems with variable bias, this is equal to the sum of the minimum Frequency Bias Setting.	Retain the value of B_s used in the CPS2 calculation. Retain the 1-minute minimum bias value (525,600 values).
U	Number of unavailable ten-minute periods per hour used in calculating CPS2.	Retain the number of 10-minute unavailable periods used in calculating CPS2 for the reporting period.

Standard BAL-001-0.1a
Real Power Balancing Control Performance
Modification of NERC BAL-001-0.1a to add WECC Regional Variance
Version ~~2.~~3
Open: ~~10/1~~12/15/2011 Closed: ~~11/~~1/~~2011~~16/2012

Document Title	WECC Regional Variance to NERC Standard BAL-001-0.1a
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1		Version 1 Posted 4/15/11-6/1/11	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Version 3 Posted 12/15/11	Addressed comments from Version 2 posting
~~3~~4		Standing Committee Approval	
~~4~~5		WECC Board Approval	

Regional Variance 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.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	07/16/2010
9. Notice of development / first 30-day notice	09/2/2010
10. New committee chair orientation meeting	08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 01/18/11 02/10/11 03/11–12/11 03/24/11 04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
16. Post first draft for 45-day comment period	04/15/2011
17. Meet to answer to comments, address impact statement and draft responses	06/2-3/2011 06/14/2011

	06/23/2011 06/29/2011
18. Post responses to comments received during 45-day comment period	06/29/2011
19. Meet to answer to comments, address impact statement and draft responses	08/8/2011 08/15/2011 08/30/2011 11/01/2011
20. Post ~~the second draft~~Version 2 for a 30-day comment period	11/04/2011
21. Post consideration of comments of Version 2	12/15/2011
22. Post Version 3 for 30-day comment period	12/15/2011

Description of Current Draft:

On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC Standards.[1] Since the approval of BAL-004-WECC-1 the industry has commented that there is confusion concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as that used during Automatic Generation Control (AGC) mode. The use of two ACE equations came as a result of NERC's comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a)[2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation for control but should use raw ACE for CPS reporting.[3] The industry desires to use the same ACE equation for control and reporting because it provides better a measurement of control performance.

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).
[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).
[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

The purpose of this proposed WECC Regional Variance to BAL-001-01.a (WECC Variance) is to replace Requirements R1 and Section D. Compliance, Subsection 2. of BAL-001-0.1a with three new requirements. In Requirement E.B.1 of the WECC Variance, the drafting team proposes to replace the NERC ACE equation with an ACE equation that includes the ATEC term. Replacing the NERC raw ACE equation with the ATEC ACE equation through a Regional Variance will require Balancing Authorities in the Western Interconnection to use the ATEC ACE for control and CPS reporting purposes. Using the ATEC ACE equation for CPS reporting is more appropriate because, as discussed further below, it is a more accurate measure of how well a Balancing Authority is controlling to its control performance target.

The drafting team for Project WECC-0068 also requests withdrawal of the BAL-001-0.1a Appendix 2 Interpretation of Requirement R1and the BAL-003-0.1b Appendix 1 Interpretation of Requirement R3. By creating a Regional Variance that replaces Requirement R1, these interpretations are no longer needed. The drafting team revised the definition for Area Control Error (ACE) in the WECC Regional Definitions to closely align with NERC definition for ACE while at the same recognizing concept of ATEC.

In order to obtain a Regional Variance[4] to a NERC Reliability Standard, it must be demonstrated that:

- The variance is not inconsistent with or less stringent than the NERC reliability standard;
- Is necessitated by a physical difference; or
- Is an alternative methodology with the same reliability objective.

Replacing the NERC ACE equation with an ATEC ACE equation is an alternative methodology with the same reliability objective as the existing BAL-001-0.1a standard. It is a method of automatically scheduling Primary Inadvertent Interchange (PII) back to other Balancing Authorities. The inclusion of the Automatic Time Error Correction term in the ACE equation changes the Balancing Authority's control performance target. The current NERC ACE equation requires that Balancing Authorities control the frequency and Interchange within their Balancing Authority Area to a target point of zero, but it allows the control to stay within a predefined range called L_{max} which is between 0.20 * |B| and $\pm L_{10}$. The proposed ACE equation, with an Automatic Time Error adjustment, works similarly to the NERC equation; however, the target point for control is adjusted by the ATEC adjustment. The ATEC component defines a new control point and is equivalent to making an interchange schedule that would automatically payback PII. The modification to the ACE equation is equivalent to making an adjustment because of a metering error. Since the amount of the adjustment during any one hour is limited by L_{max}, Balancing Authorities automatically limit the risk to the interconnection and the amount of the transaction.

[4] "Entity variance" means an aspect of a reliability standard that applies only within a particular entity or a subset of entities within a limited portion of a regional entity, such as a variance that would apply to a regional transmission organization or particular market or to a subset of bulk power system owners, operators or users. An entity variance may not be inconsistent with or less stringent than the reliability standards as it would otherwise exist without the entity variance. An entity variance shall be approved only through the NERC standards development procedure and shall be made part of the NERC reliability standards." (Rules of Procedure of the North American Electric Reliability Corporation, Section 200 — Definition of Terms, page 2.)

The addition of the I_{ATEC} component meets the standard of justification for a Regional Variance as an alternative methodology, with the same reliability objective as the NERC Reliability Standard. In addition, the proposed WECC variance to BAL-001-0.1a is consistent with — or more stringent than — the NERC BAL-001-0.1a Reliability Standard. The reasons the WECC Variance meets the standard of justification are:

1. The addition of I_{ATEC} to the ACE equation and adjustment to the control performance target used for controlling frequency and interchange does not place any addition risk to reliability because limits are set in the magnitude of the I_{ATEC} adjustment.
2. The Regional Variance allows the use of the same control performance target for control and reporting providing a better methodology for measuring performance.
3. It is another control methodology that achieves the same reliability objective as BAL-001-0.1a.

BAL-004-WECC-1 requires Balancing Authorities in the Western Interconnection to use ATEC ACE for control. As proposed in the WECC Variance, Balancing Authorities in the Western Interconnection are required to operate synchronously to the Interconnection, using the ATEC ACE, which automatically corrects time error. The ATEC component in the ACE equation has been effective in mitigating two main issues in the Western Interconnection.

1. It has been used to reduce the number of hours of Manual Time Error Corrections, or the amount of manual adjustments of timing errors that accumulate on clocks, which make certain interconnection scheduled frequency deviations.
2. Since time error is directly related to Inadvertent Interchange, the procedure has been used to reduce accumulated Inadvertent Interchange, or the difference between the actual and scheduled interchange.

The ATEC procedure requires Balancing Authorities in the Western Interconnection to determine their contribution to the Interconnection time error. The Balancing Authority does this by calculating its PII. BAL-001-0.1a Requirement E.B.1 requires that each Balancing Authority calculate its PII_{accum} and I_{ATEC} from its hourly Inadvertent Interchange. When the resulting I_{ATEC} is entered into Balancing Authority's ACE equation, I_{ATEC} continuously corrects for its portion of the time error automatically, as opposed to manually, as specified in the continent-wide standard on Time Error Correction BAL-004-1 Requirement R2. Although the maximum payback is bounded between limits, the continuous correction enables equitable payback of Primary Inadvertent Interchange.

The drafting team is proposing the same Violation Severity Levels for Requirement R1 of the WECC Variance as those in Requirement R1 of BAL-001-01.a because it is a measurement of how well a Balancing Authority is controlling to its control performance target.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Project WECC-0068 Version ~~2~~3 Comments due	~~12/05/2011~~01/16/2012
2. Meet to answer to comments, address impact statement, draft responses	~~12/06-16/2011~~01/18/2012

Anticipated Actions	Anticipated Date
3. Post responses to comments	~~1/05~~02/13/2012
~~4. Post draft standard for 45-day NERC comment period~~	~~1/05/2012~~
~~5. NERC comment period ends~~	~~02/20/2012~~
~~6. DT completes review and consideration of industry comments to NERC posting~~	~~02/20/2012~~
~~7.~~4. Post for comment and Operating Committee approval	02/24/2012
~~8.~~5. Operating Committee approves proposed standard	03/27/2012
6. Post draft standard for 45-day NERC comment period	04/02/2012
7. NERC comment period ends	05/16/2012
8. DT completes review and consideration of industry comments to NERC posting	06/15/2012
9. Post draft standard for WECC Board approval	05/01/2012
10. WECC Board approval	06/21/2012
11. Post draft standard for 15-day NERC comment period	06/25/2012
12. NERC 15-day comment period ends	07/2012
13. DT completes review and consideration of industry comments to NERC posting	07/2012
14. Submit NERC Board of Trustees approval request	08/2012
15. Receive NERC Board approval	08/2012

.

Implementation Plan

The proposed Implementation Plan is to make the WECC Regional Variance to BAL-001-0.1a and the proposed WECC Regional Reliability Standard BAL-004-WECC-2 effective on the first day of the second quarter, after regulatory approval. Since entities are already controlling with the ATEC ACE equation, but are using the NERC raw ACE equation for purposes of reporting CPS1, the transition to controlling and reporting using the ATEC ACE should be minimal. Additionally, it should not require much time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

Definitions of Terms Used in Regional Variance to a NERC 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 definitions will be removed from the standard and added to the NERC Glossary under WECC Regional Definitions.

Area Control Error: The instantaneous difference between a Balancing Authority's net actual and scheduled interchange, taking into account the effects of Frequency Bias, correction for meter error, and Automatic Time Error Correction~~.~~ (ATEC), if operating in the ATEC mode. ATEC is only applicable to Balancing Authorities in the Western Interconnection.

A. Introduction

1. **Title**: **Real Power Balancing Control Performance**

2. **Number**: BAL-001-0.1a

3. **Purpose**: To maintain Interconnection steady-state frequency within defined limits by balancing real power demand and supply in real-time.

4. **Applicability**:

   4.1. Balancing Authorities

5. **Effective Date:** The WECC Regional Variance to NERC Reliability Standard BAL-001-0.1a is to be effective on the first day of the second quarter, after regulatory approval.

B. Requirements

R1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit ε_1^2 is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \epsilon_1^2 \; or \; \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\epsilon_1^2} \le 1$$

Committee.

The equation for ACE is:

$ACE = (NI_A - NI_S) - 10B (F_A - F_S) - I_{ME}$

where:

- NI_A is the algebraic sum of actual flows on all tie lines.
- NI_S is the algebraic sum of scheduled flows on all tie lines.
- B is the Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.
- F_A is the actual frequency.
- F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.
- I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

R2. Each Balancing Authority shall operate such that its average ACE for at least 90% of clock-ten-minute periods (6 non-overlapping periods per hour) during a calendar

month is within a specific limit, referred to as L_{10}.

$$AVG_{10-\text{minute}}(ACE_i) \le L_{10}$$

where:

$L_{10}=1.65\in_{10}\sqrt{(-10B_i)(-10B_s)}$

ε_{10} is a constant derived from the targeted frequency bound. It is the targeted root-mean-square (RMS) value of ten-minute average Frequency Error based on frequency performance over a given year. The bound, ε_{10}, is the same for every Balancing Authority Area within an Interconnection, and B_s is the sum of the Frequency Bias Settings of the Balancing Authority Areas in the respective Interconnection. For Balancing Authority Areas with variable bias, this is equal to the sum of the minimum Frequency Bias Settings.

R3. Each Balancing Authority providing Overlap Regulation Service shall evaluate Requirement R1 (i.e., Control Performance Standard 1 or CPS1) and Requirement R2 (i.e., Control Performance Standard 2 or CPS2) using the characteristics of the combined ACE and combined Frequency Bias Settings.

R4. Any Balancing Authority receiving Overlap Regulation Service shall not have its control performance evaluated (i.e. from a control performance perspective, the Balancing Authority has shifted all control requirements to the Balancing Authority providing Overlap Regulation Service).

C. Measures

M1. Each Balancing Authority shall achieve, as a minimum, Requirement 1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-\text{month}}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement R1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}}\right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error will be used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

The reporting Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}}[(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}}[n_{\text{one-minutesamplesin clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}}[(\text{CF}_{\text{clock-houraverage-month}})(n_{\text{one-minutesamplesin clock-houraverages}})]}{\sum_{\text{hours-in day}}[n_{\text{one-minutesamplesin clock-houraverages}}]}$$

The 12-month compliance factor becomes:

$$\text{CF}_{\text{12-month}} = \frac{\sum_{\text{i=1}}^{12}(CF_{\text{month-i}})(n_{\text{(one-minutesamplesin month)-i}})]}{\sum_{\text{i=1}}^{12}[n_{\text{(one-minutesamplesin month)-i}}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at

least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

M2. Each Balancing Authority shall achieve, as a minimum, Requirement R2 (CPS2) compliance of 90%. CPS2 relates to a bound on the ten-minute average of ACE. A compliance percentage is calculated as follows:

$$CPS2 = \left[1 - \frac{\text{Violations}_{\text{month}}}{\left(\text{Total Periods}_{\text{month}} - \text{Unavailable Periods}_{\text{month}}\right)}\right] * 100$$

The violations per month are a count of the number of periods that ACE clock-ten-minutes exceeded L_{10}. ACE clock-ten-minutes is the sum of valid ACE samples within a clock-ten-minute period divided by the number of valid samples.

Violation clock-ten-minutes

= 0 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| \le L_{10}$$

= 1 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| > L_{10}$$

Each Balancing Authority shall report the total number of violations and unavailable periods for the month. L_{10} is defined in Requirement R2.

Since CPS2 requires that ACE be averaged over a discrete time period, the same factors that limit total periods per month will limit violations per month. The calculation of total periods per month and violations per month, therefore, must be discussed jointly.

A condition may arise which may impact the normal calculation of total periods per month and violations per month. This condition is a sustained interruption in the recording of ACE.

In order to ensure that the average ACE calculated for any ten-minute interval is representative of that ten-minute interval, it is necessary that at least half the ACE data samples are present for that interval. Should half or more of the ACE data be unavailable due to loss of telemetering or computer unavailability, that ten-minute interval shall be omitted from the calculation of CPS2.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Regional Reliability Organization

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar month.

1.3. Data Retention

The data that supports the calculation of CPS1 and CPS2 (Appendix 1-BAL-001-0) are to be retained in electronic form for at least a one-year period. If the CPS1 and CPS2 data for a Balancing Authority Area are undergoing a review to address a question that has been raised regarding the data, the data are to be saved beyond the normal retention period until the question is formally resolved. Each Balancing Authority shall retain for a rolling 12-month period the values of: one-minute average ACE (ACE_i), one-minute average Frequency Error, and, if using variable bias, one-minute average Frequency Bias.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance – CPS1

2.1. Level 1: The Balancing Authority Area's value of CPS1 is less than 100% but greater than or equal to 95%.

2.2. Level 2: The Balancing Authority Area's value of CPS1 is less than 95% but greater than or equal to 90%.

2.3. Level 3: The Balancing Authority Area's value of CPS1 is less than 90% but greater than or equal to 85%.

2.4. Level 4: The Balancing Authority Area's value of CPS1 is less than 85%.

3. Levels of Non-Compliance – CPS2

3.1. Level 1: The Balancing Authority Area's value of CPS2 is less than 90% but greater than or equal to 85%.

3.2. Level 2: The Balancing Authority Area's value of CPS2 is less than 85% but greater than or equal to 80%.

3.3. Level 3: The Balancing Authority Area's value of CPS2 is less than 80% but greater than or equal to 75%.

3.4. Level 4: The Balancing Authority Area's value of CPS2 is less than 75%.

E. Regional Variances

E.A. The ERCOT Control Performance Standard 2 Waiver approved November 21, 2002.

E.B. Regional Variance for the Western Electricity Coordinating Council

The following Interconnection-wide variance shall be applicable in the Western Interconnection and replaces, in their entirety, Requirement R1 and Section D.2. (i.e., under Compliance replace Levels of Non-Compliance – CPS1). Please note that the ACE equation is replaced in its entirety with the following equation identified in Requirement E.B.1.

Requirements and Measures

E.B.1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit $\in_1^2$ is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \in_1^2 \; or \; \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\in_1^2} \le 1$$

The equation for ACE in the Western Interconnection is:

$$ACE = (NI_A - NI_S) - 10B(F_A - F_S) - I_{ME} + I_{ATEC}$$

Where:

NI_A is the algebraic sum of actual flows on all tie lines.

NI_S is the algebraic sum of scheduled flows on all tie lines.

F_A is the actual frequency.

F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.

B = Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.

I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

Rationale for E.B.1

Premise: When a Balancing Authority Area uses the ACE equation with an ATEC correction component for both control and assessing performance, it provides a more accurate measurement of the Control Performance methodology while at the same time achieving the same reliability objective as the existing BAL-001-0.1a standard.

Justification: Adding the ***I_{ATEC}*** term to the ACE equation reduces the number of manual time error corrections and PII_{accum}.

Goal: To establish an ACE equation that permits the implementation of Automatic Time Error Correction.

$I_{ATEC} = \frac{PII_{accum}^{on/off\ peak}}{(-Y) * H}$ when operating in Automatic Time Error Correction control mode.

I_{ATEC} shall be zero when operating in any other AGC mode.

Y = B / B_S.

H = Number of Hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3.

B_S = Frequency Bias for the Interconnection (MW / 0.1 Hz).

Primary **I**nadvertent **I**nterchange **(PII_{hourly})** is **(1-Y) * (II_{actual} - B * ΔTE/6)**

II_{actual} is the hourly Inadvertent Interchange for the last hour.

ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where:

$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE_{offset})$

TD_{adj} is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks.

t is the number of minutes of Manual Time Error Correction that occurred during the hour.

TE_{offset} is 0.000 or +0.020 or -0.020.

PII_{accum} is the Balancing Authority's accumulated **PII_{hourly}** in MWh. An On-Peak and Off-Peak accumulation accounting is required.

Where:

$PII_{accum}^{on/off\ peak}$ **= last period's** $PII_{accum}^{on/off\ peak}$ **+** PII_{hourly}

[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]

M.E.B.1. Each Balancing Authority shall achieve, as a minimum, Requirement E.B.1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-month}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement E.B.1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}}\right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error are used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

As part of its evidence each Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}}[(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}}[n_{\text{one-minutesamplesin clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}}[(\text{CF}_{\text{clock-houraverage-month}})(n_{\text{one-minutesamplesin clock-houraverages}})]}{\sum_{\text{hours-in day}}[n_{\text{one-minutesamplesin clock-houraverages}}]}$$

The 12-month compliance factor becomes:

$$CF_{12\text{-month}} = \frac{\sum_{i=1}^{12}(CF_{\text{month-i}})(n_{(\text{one-minute samples in month})\geq i})]}{\sum_{i=1}^{12}[n_{(\text{one-minute samples in month})\text{-}i}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

E.B.2. Each Balancing Authority shall limit the absolute value of I_{ATEC}, the Automatic Time Error Correction term as follows: *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*

$$|I_{ATEC}| \leq L_{max}.$$

M.E.B.2. Forms of acceptable evidence for Requirement E.B. 2 may include, but are not limited to:

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or
- Other archived data that demonstrates compliance.

Rationale for E.B.2

Premise: I_{ATEC} greater than L_{max} may result in a risk to reliability caused by large ATEC payback.

Justification: Balancing Authorities should not control their Balancing Authority Areas using an approach that puts system reliability at risk.

Goal: The goal of Requirement E.B.2 is to limit I_{ATEC} to L_{max} in order to reduce potential reliability risks to the interconnection caused by a large ATEC payback term.

E.B.3. Each Balancing Authority shall set L_{max} within the limits as follows:

$$0.20 * |B| \leq L_{max} \leq L_{10}.$$

[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]

M.E.B.3. Forms of acceptable evidence for Requirement E.B. 3 may include, but is not limited to:

Rationale for E.B.3

Premise: Operating within an L_{max} less than 0.20 * |B| may not provide sufficient correction for PII and operating with an L_{max} greater than L_{10} may result in potential reliability risks caused by a large ATEC payback term.

Justification: L_{max} should be limited to prevent Balancing Authorities from creating potential reliability risks caused by a large ATEC payback term.

Goal: The goal of Requirement E.B.3 is to develop a range for L_{max} where Balancing Authorities reduce potential reliability risks by limiting I_{ATEC} to L_{max}.

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or
- Other archived data that demonstrates compliance.

E.B. Compliance

1. Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of I_{ATEC} and L_{max} for the preceding calendar year (January – December), as well as the current calendar year.

Table of Compliance Elements

E #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
E.B.1	Real-time Operations	Medium	The Balancing Authority Area's value of CPS1 was less than 100% but greater than or equal to 95%.	The Balancing Authority Area's value of CPS1 was less than 95% but greater than or equal to 90%.	The Balancing Authority Area's value of CPS1 was less than 90% but greater than or equal to 85%.	The Balancing Authority Area's value of CPS1 was less than 85%.
E.B.2	Real-time Operations	Medium	N/A	N/A	N/A	The Balancing Authority Area's absolute value for I_{ATEC} was greater than L_{max}.
E.B.3	Operations Planning	Medium	N/A	N/A	N/A	The Balancing Authority did not set L_{max} to within the limits in E.B.3 (i.e., $0.20 * \|B\| \leq L_{max} \leq L_{10}$).

F. Associated Documents

Version History

Version	Date	Action	Change Tracking
0	February 8, 2005	BOT Approval	New
0	April 1, 2005	Effective Implementation Date	New
0	August 8, 2005	Removed "Proposed" from Effective Date	Errata
0	July 24, 2007	Corrected R3 to reference M1 and M2 instead of R1 and R2	Errata
0a	December 19, 2007	Added Appendix 2 – Interpretation of R1 approved by BOT on October 23, 2007	Revised
0a	January 16, 2008	In Section A.2., Added "a" to end of standard number In Section F, corrected automatic numbering from "2" to "1" and removed "approved" and added parenthesis to "(October 23, 2007)"	Errata
0	January 23, 2008	Reversed errata change from July 24, 2007	Errata
0.1a	October 29, 2008	Board approved errata changes; updated version number to "0.1a"	Errata
0.1a	May 13, 2009	Approved by FERC	
		WECC Regional Variance Retirement of Appendix 2 Interpretation of Requirement R1	

Standard BAL-001-0.1a
Real Power Balancing Control Performance
Modification of NERC BAL-001-0.1a to add WECC Regional Variance
Version ~~2~~3
Open: ~~11/4~~12/15/2011 Closed: ~~12/5/2011~~1/16/2012

Appendix 1-BAL-001-0
CPS1 and CPS2 Data

CPS1 DATA	Description	Retention Requirements
ε_1	A constant derived from the targeted frequency bound. This number is the same for each Balancing Authority Area in the Interconnection.	Retain the value of ε_1 used in CPS1 calculation.
ACE_i	The clock-minute average of ACE.	Retain the 1-minute average values of ACE (525,600 values).
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value(s) of B_i used in the CPS1 calculation.
F_A	The actual measured frequency.	Retain the 1-minute average frequency values (525,600 values).
F_S	Scheduled frequency for the Interconnection.	Retain the 1-minute average frequency values (525,600 values).

CPS2 DATA	Description	Retention Requirements
V	Number of incidents per hour in which the absolute value of ACE clock-ten-minutes is greater than L_{10}.	Retain the values of V used in CPS2 calculation.
ε_{10}	A constant derived from the frequency bound. It is the same for each Balancing Authority Area within an Interconnection.	Retain the value of ε_{10} used in CPS2 calculation.
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value of B_i used in the CPS2 calculation.
B_s	The sum of Frequency Bias of the Balancing Authority Areas in the respective Interconnection. For systems with variable bias, this is equal to the sum of the minimum Frequency Bias Setting.	Retain the value of B_s used in the CPS2 calculation. Retain the 1-minute minimum bias value (525,600 values).
U	Number of unavailable ten-minute periods per hour used in calculating CPS2.	Retain the number of 10-minute unavailable periods used in calculating CPS2 for the reporting period.

WECC Standard BAL-004-WECC-02
Automatic Time Error Correction
Version 3, Open: 12/15/2011 Closed: 1/16/2012

Document Title	WECC Standard BAL-004-WECC-02
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1	4/15/2011	Version 1 Posted	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Version 3 Posted 12/15/11	Addressed comments from Version 2 posting
4		Standing Committee Approval	
5		WECC Board Approval	

WECC 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.

.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	07/16/2010
9. Notice of development / first 30-day notice	09/2/2010
10. New committee chair orientation meeting	08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 01/18/11 02/10/11 03/11–12/11 03/24/11 04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
16. Post first draft for 45-day comment period	04/15/2011
17. Meet to answer to comments, address impact statement and draft responses	06/2-3/2011 06/14/2011 06/23/2011 06/29/2011
18. Post responses to comments received during 45-day comment period	06/29/2011
19. Meet to answer to comments, address impact statement and	08/8/2011 08/15/2011

Completed Actions	Completion Date
draft responses	08/30/2011 11/01/2011
20. Post the Version 2 for a 30-day comment period	11/04/2011
21. Post consideration of comments of Version 2	12/15/2011
22. Post the third dart for 30-day comment period	12/15/2011

Description of Current Draft:

On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC Standards.[1] In addition, WECC staff identified additional modifications to BAL-004-WECC-1 that would clarify the intent without changing the requirements. Finally, the industry has commented that there is confusion concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as that used during Automatic Generation Control (AGC) mode. This seems to conflict with NERC's comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a)[2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation for control but should use raw ACE for CPS reporting.[3] As part of this filing WECC has submitted a proposed regional variance to BAL-001-0.1a to address this conflict.

The purpose of the refinements to BAL-004-WECC-1 as proposed in WECC Regional Reliability Standard BAL-004-WECC-2 – Automatic Time Error Correction (BAL-004-WECC-2) is to implement the directives in FERC Order 723 and to make other clarifications to BAL-004-WECC-1 as the industry deems necessary, while maintaining the Western Interconnection's reliability. The FERC Order 723 directives are as follows:

1. "The Commission is concerned that the phrases 'large accumulation' and 'in such a situation' as used in Requirement R1.2 leaves to individual interpretation when a 'large' amount of primary inadvertent has accumulated. The ERO and WECC agree that the provision could benefit from further clarity. Accordingly, the Commission adopts its NOPR proposal and directs WECC to develop revisions to the provision so that a

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).

[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).

[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

balancing authority will know with specificity the circumstances that trigger the actions required by Requirement R1.2."[4]

2. "Consistent with the NOPR, pursuant to section 215(d) (5) of the FPA, the Commission directs WECC to develop a modification to the regional Reliability Standard consistent with WECC's and NERC's explanation that the limit set forth in Requirement 2 of '24 hours per calendar quarter' is an accumulated total for the period, resulting from either a singular event or a cumulative time limit from a number of events."[5]
3. "[The Commission] direct[s] that the violation risk factors assigned to BAL-004-WECC-01, Requirements R1, R2, R3, and R4 be modified from 'lower' to 'medium.' The ERO and WECC must submit a filing within 60 days of the effective date of this Final Rule that includes the directed modifications."[6] These modifications were addressed in a compliance filing dated August 28, 2009. [7]
4. "The Commission adopts its NOPR proposal and directs the ERO and WECC to submit violation severity levels for each Requirement and sub-Requirement that has been assigned a violation risk factor. To allow adequate time for the development of the violation severity levels, the ERO and WECC must submit a filing within 120 days of the effective date of this Final Rule that includes the directed violation severity levels."[8] These modifications were addressed in a compliance filing date October 23, 2009.[9]
5. In response to Xcel comments, FERC referenced their approval, in Order No. 713, of an ERO interpretation stating that as long as Balancing Authorities use raw ACE for Control Performance Standard (CPS) reporting purposes and WECC ATEC (ATEC) ACE for control, it is not a violation of BAL-001-0.1a, Requirement 1.[10]. WECC Stakeholders believe it is more appropriate to use the ATEC ACE for control and CPS reporting. To clarify this difference, WECC has developed a regional variance BAL-001-0.1a.

The implementation of an ATEC ACE is part of a regional variance to BAL-001-0.1a associated with this posting. The purpose of this filing is to meet the directives of FERC Order 723 while refining for clarity the existing requirements of BAL-004-WECC-1. Refinements to BAL-004-WECC-1 include:

1. A requirement that defines the large accumulation at 150% of previous year's peak demand or peak generation for generation-only Balancing Authorities. The action required is that the Balancing Authority shall not permit the PII_{accum} to exceed the defined value, which is demonstrated at the end of each month.
2. A clarification in response to the FERC order that the accumulated time for ATEC out of service shall not exceed 24 hours during a calendar quarter.

[4] Order 723 at ¶ 30.

[5] *Id* at ¶ 34.

[6] *Id* at ¶ 51.

[7] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 51 of Order No. 723 – Directed Modification of Violation Risk Factors for Regional Reliability Standard BAL-004-WECC-1, Automatic Time Error Correction, Docket No. RM08-12-000, filed August 28, 2009

[8] Order 723 at ¶ 54.

[9] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 54 of Order No. 723, Docket No. RM08-12-000, filed October 23, 2009

[10] Order 723 at ¶ 44-45.

BAL-004-WECC-2 retains the requirement for Balancing Authorities to compute the Automatic Time Error Correction and Primary Inadvertent Interchange by 50 minutes after the hour and requires that Balancing Authorities have the ability to operate their Automatic Generation Control in other modes. In addition, Balancing Authorities are required to recalculate Primary Inadvertent Interchange when hourly and month-end adjustments are made.

In Version 3 in order to prevent the stranding of Secondary Inadvertent Interchange the Drafting Team added a Requirement R8 that restrictions the payback of Inadvertent Interchange to using ATEC rather than through bilateral and unilateral payback methods.

The proposed BAL-004-WECC-2 will replace the Automatic Time Error Correction definition in the NERC Glossary of Terms in the WECC Regional Definitions section. The WECC definitions for Primary Inadvertent Interchange and Secondary Inadvertent Interchange will be retained under the WECC Regional Definitions in the *Glossary of Terms Used in NERC Reliability Standards*.

Development Plan:

Anticipated Actions	Anticipated Date
1. Project WECC-0068 Version 3 Comments due	01/16/2012
2. Meet to answer to comments, address impact statement, draft responses	01/18/2012
3. Post responses to comments	02/13/2012
4. Post for comment and Operating Committee approval	02/24/2012
5. Operating Committee approves proposed standard	03/27/2012
6. Post draft standard for 45-day NERC comment period	04/02/2012
7. NERC comment period ends	05/16/2012
8. DT completes review and consideration of industry comments to NERC posting	06/15/2012
9. Post draft standard for WECC Board approval	05/01/2012
10. WECC Board approval	06/21/2012
11. Post draft standard for 15-day NERC comment period	06/25/2012
12. NERC 15-day comment period ends	07/2012
13. DT completes review and consideration of industry comments to NERC posting	07/2012
14. Submit NERC Board of Trustees approval request	08/2012
15. Receive NERC Board approval	08/2012

.

Implementation Plan

The Implementation Plan is to make the WECC Regional Variance to BAL-001-0.1a and BAL-004-WECC-2 effective on the first day of the second quarter, after regulatory approval in areas where applicable. Since entities are already controlling their Balancing Authority Area with the ATEC ACE equation – but are reporting using the NERC raw ACE equation for reporting CPS1 – the transition to controlling and reporting using the ATEC ACE should be minimal. Additionally, it should not take much time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

Definitions of Terms Used in Regional 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 definitions will be removed from the standard and added to the NERC Glossary under WECC Regional Definitions. In addition the current definitions for "**Primary Inadvertent Interchange**" and "**Secondary Inadvertent Interchange"** will be retained in the Glossary of Terms Used in NERC Reliability Standards under WECC Regional Definitions.*

Automatic Time Error Correction: The addition of a component to the ACE equation that modifies the control point for the purpose of continuously paying back Primary Inadvertent Interchange to correct accumulated time error.

A. Introduction

1. Title: **Automatic Time Error Correction**

2. Number: BAL-004-WECC-02

3. Purpose: To maintain Interconnection frequency and to ensure that Time Error Corrections and Primary Inadvertent Interchange (PII) payback are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection.

4. Applicability

4.1. Functional Entities

4.1.1 Balancing Authorities that operate synchronously in the Western Interconnection.

5. Effective Date: On the first day of the second quarter, after applicable regulatory approval has been received (or the Reliability Standard otherwise becomes effective the first day of the fourth quarter following NERC Board adoption where regulatory approval is not required).

6. Background:

In February 2003, the WECC Automatic Time Error Correction (ATEC) Procedure (Procedure) became effective for all Balancing Authorities in the Western Interconnection. The original intent of the Procedure was to minimize the number of Manual Time Error Corrections in the Western Interconnection. ATEC provides the added benefit of a superior approach over the current NERC Reliability Standard BAL-004-0 – Time Error Correction for assigning costs and providing for the equitable payback of Inadvertent Interchange. In October 2006, the Procedure became a WECC Criterion. In May 2009, FERC issued Order No.723 that approved Regional Reliability Standard BAL-004-WECC-1 - Automatic Time Error Correction, as submitted by NERC. In addition, the Commission directed WECC to develop several clarifying modifications to BAL-004-WECC-1 using the FERC-approved Process for Developing and Approving WECC Standards. The Effective Date of the BAL-004-WECC-1 standard was July 1, 2009. BAL-004-WECC-1 required Balancing Authorities within the Western Interconnection to maintain Interconnection frequency within a predefined frequency profile and to ensure that Time Error Corrections were effectively conducted in a manner that did not adversely affect the reliability of the Interconnection. In September 2009, WECC received WECC Standards/Regional Criterion Request Form (Request) WECC-0068, which was a request for modification of BAL-004-WECC-1. In July 2010, the chair of the WECC Operating Committee assigned the Request to the Performance Work Group (PWG) for development.

B. Requirements and Measures

R1. Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PII_{accum}) for both the monthly On-Peak period and the monthly Off-Peak period are each individually less than or equal to:

1.1. For load-serving Balancing Authorities, 150% of the previous calendar year's integrated hourly Peak Demand,

1.2. For generation-only Balancing Authorities, 150% of the previous calendar year's integrated hourly peak generation.

[Violation Risk Factor Medium:] [Time Horizon: Operations Assessment]

M1. Forms of acceptable evidence of compliance with Requirement R1include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool (WIT),
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R2. Each Balancing Authority shall, upon discovery of an error in the calculation of PII_{hourly}, recalculate within 90 days, the value of PII_{hourly} and adjust the PII_{accum} from the time of the error. *[Violation Risk*

Rationale for R1:

Premise: Each Balancing Authority should ensure that the absolute value of its PII_{accum} for both the On-Peak period and the Off-Peak period each individually does not exceed 150% of the previous year's Peak Demand for load-serving Balancing Authorities and 150% of the previous year's peak generation for generation-only Balancing Authorities. The Balancing Authority is required to take action to keep each PII_{accum} period within the limit. For example, the Balancing Authorities actions may include:

- Identifying and correcting the source of any metering or accounting error(s) and recalculating the hourly Primary Inadvertent Interchange **(**PII_{hourly}) and the PII_{accum} from the time of the error;
- Validating the implementation of ATEC; or
- Setting L_{max} equal to $L_{10.}$until the PII_{accum} is below the limit in Requirement R1.

Justification: PII_{accum} may grow from month-end adjustments and metering errors, even with the inclusion of I_{ATEC} in the ACE equation.

Goal: To limit the amount of PII_{accum} that a Balancing Authority can have at the end of each month.

Rationale for R2:

Premise: When a Balancing Authority finds an error in the calculation of its PII, the Balancing Authority needs time to correct the error and recalculate PII and PII_{accum}.

Justification: The drafting team selected 90 days as a reasonable amount of time to correct an error and recalculate PII and $PII_{accum,}$ since recalculation of PII and PII_{accum} is not a real-time operations reliability issue.

Goal: To promote the timely correction of errors in the calculation of PII and PII_{accum}.

Factor: Medium] [Time Horizon: Operations Assessment]

M2. Forms of acceptable evidence of compliance with Requirement R2 include but are not limited to any one of the following:

- Data, screen shots from the WIT,
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R3. Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service. *[Violation Risk Factor: Medium] [Time Horizon: Same-day Operations]*

M3. Forms of acceptable evidence of compliance with Requirement R3 may include, but are not limited to:

- Dated archived files,
- Historical data,
- Other data that demonstrates the ATEC was out of service for less than 24 hours per calendar quarter.

Rationale for R3:

Premise: When a Balancing Authority is not participating in ATEC, payback of PII_{accum} is delayed.

Justification: The limit of 24 hours per quarter discourages a Balancing Authority from withdrawing ATEC participation, for example, for economic gain during selected hours. If the limits were increased to 60 hours, a Balancing Authority could technically withdraw ATEC participation for one hour from Monday to Friday.

Goal: To promote fair and timely payback of PII_{accum} balances.

R4. Each Balancing Authority shall compute the following by 50 minutes after each hour:

- **4.1.** $PII_{\mathbf{hourly}}$,
- **4.2.** PII_{accum},
- **4.3.** Automatic Time Error Correction term (I_{ATEC}).

Rationale for R4:

Premise: $PII_{\mathbf{hourly}}$, PII_{accum}, and I_{ATEC} should be determined before the next scheduling hour begins.

Justification: To promote timely calculations 50 minutes was selected because it is before the next hour ramp begins and permits time to collect the data and resolve interchange metering values.

Goal: To promote the timely calculation of $PII_{\mathbf{hourly}}$, PII_{accum}, and I_{ATEC}.

[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]

M4. Forms of acceptable evidence of compliance with Requirement R4 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from internal Balancing Authority tool that demonstrate compliance, or
- Data from any other databases, spreadsheets, displays that demonstrate compliance.

R5. Each Balancing Authority shall be able to change its Automatic Generation Control operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error Control (used in ATEC mode), to correspond to current operating conditions. *[Violation Risk Factor: Medium] [Time Horizon: Real-Time Operations]*

M5. Forms of acceptable evidence of compliance with Requirement R5 include but are not limited to any one of the following:

- Screen shots from Energy Management System,
- Demonstration using an off-line system.

Rationale for R5:

Premise: The ACE equation, and hence the AGC mode, will contain any number of parameters based on system operating conditions. Various AGC modes are identified corresponding to those operating conditions, as well as the specific sets of parameters included in the ACE equation.

Justification: Changing to the proper operating mode, corresponding to current operating conditions, affords proper movement of generating units in response to those conditions. The addition of the ATEC term results in an additional AGC mode and a different set of parameters. The inability to correctly calculate the ATEC term would dictate that AGC not be operated in the ATEC mode.

Goal: To set the AGC mode and calculate ACE in a manner that corresponds to the system operating conditions and to accommodate changes in those conditions.

R6. Each Balancing Authority shall recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly Inadvertent Interchange or ΔTE. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M6. Forms of acceptable evidence of compliance with Requirement R6 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from an internal Balancing Authority

Rationale for R6:

Premise: Hourly adjustments to hourly Inadvertent Interchange (II) require a recalculation of the corresponding hourly PII value, the corresponding PII_{accum}, and all subsequent PII_{accum} for every hour up to the current hour.

Justification: As $PII_{\mathbf{hourly}}$ is corrected, then PII_{accum} should be recalculated.

Goal: To promote accurate, fair and timely payback of accumulated PII balances.

tool that demonstrate compliance with, or

- Data from any other databases, spreadsheets, displays that demonstrate compliance.

R7. Each Balancing Authority shall make the same adjustment to the PII_{accum} as it did for any month-end meter reading adjustments to Inadvertent Interchange. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M7. Forms of acceptable evidence of compliance with Requirement R7 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from an internal Balancing Authority tool that demonstrate compliance,
- Production of data from any other databases, spreadsheets, displays that demonstrate compliance.

Rationale R7:

Premise: Month-end meter-reading adjustments are made, for example, when a Balancing Authority performs monthly comparisons of recorded month-end Net Actual Interchange (NI_A) values derived from hourly Actual Interchange Telemetered Values against month-end Actual Interchange Register Meter readings.

Justification: Month-end adjustments to II_{accum} are applied as 100% PII_{accum}. 100% was chosen for simplicity to bilaterally assign PII_{accum} to both Balancing Authorities, since the effect of this metering error on system frequency is not easily determined over the course of a month.

Goal: To provide a mechanism by which corresponding month-end II adjustments can be applied to PII_{accum}, when such adjustments cannot be attributed to any one particular hour or series of hours.

R8. Each Balancing Authority shall only payback Inadvertent Interchange using ATEC rather than bilateral and unilateral payback. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M8. Forms of acceptable evidence of compliance with Requirement R8 include but are not limited to historical On-Peak and Off-Peak Inadvertent Interchange data, data from the WECC Interchange Tool, and ACE data.

Rationale R8:

Premise: ATEC includes automatic unilateral payback of Primary Inadvertent Interchange and Secondary Inadvertent Interchange.

Justification: Additional unilateral and bilateral exchanges disturb the balance and distribution between Primary Inadvertent Interchange and Secondary Inadvertent Interchange throughout the Interconnection; thereby stranding Secondary Inadvertent Interchange.

Goal: To not strand Secondary Inadvertent Interchange.

C. Compliance

1. Compliance Monitoring Process

1.1 Compliance Enforcement Authority

The Regional Entity shall serve as the Compliance Enforcement Authority.

For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

For responsible entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

1.2 Compliance Monitoring and Assessment Processes:

Compliance Audits

Self-Certifications

Spot Checking

Compliance Investigations

Self-Reporting

Complaints

1.3 Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of PII_{hourly}, PII_{accum} (On-Peak and Off-Peak), ΔTE and any month-end adjustments for the preceding calendar year (January – December), as well as the current calendar year.

Each Balancing Authority in the Western Interconnection shall retain the amount of time the Balancing Authority operated without ATEC for the preceding calendar year (January – December), as well as the current calendar year.

1.4 Additional Compliance Information

None

Table of Compliance Elements

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	Operations Assessment	Medium	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 150%, but was less than or equal to 160% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 160%, but was less than or equal to 170% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 170%, but was less than or equal to 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.
R2	Operations Assessment	Medium	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 90 days of the discovery of the error; but made the required recalculations and adjustments within 120 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 120 days of the discovery of the error; but made the required recalculations and adjustments within 150 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 150 days of the discovery of the error; but made the required recalculations and adjustments within 180 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust PII_{accum} within 180 days of the discovery of the error.

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R3	Real-Time Operations	Medium	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 24 hours, but less than or equal to 72 hours.	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 72 hours, but less than or equal to 120 hours.	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 120 hours, but less than or equal to 168 hours	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 168 hours.
R4	Operations Assessment	Medium	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within 50 minutes, but made the required calculations in less than or equal to two hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within two hours, but made the required calculations in less than or equal to four hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within four hours, but made the required calculations in less than or equal to six hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within six hours.
R5	Real-Time Operations	Medium	N/A	N/A	N/A	The Balancing Authority is not able to change its AGC operating mode between Flat Frequency (for blackout restoration; Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; or Tie Line Bias

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						plus Time Error control (used in ATEC mode).
R6	Operations Assessment	Medium	N/A	N/A	N/A	When making adjustments to hourly Inadvertent Interchange or ΔTE, the Balancing Authority did not recalculate the PII_{hourly} and the PII_{accum} for the On-Peak and Off-Peak periods.
R7	Operations Assessment	Medium	N/A	N/A	N/A	When making any month-end meter reading adjustments to Inadvertent Interchange, the Balancing Authority did not make the same adjustment to the PII_{accum}.
R8	Operations Assessment	Medium	N/A	N/A	N/A	The Balancing Authority paid back Inadvertent Interchange using bilateral and unilateral payback rather than

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						using ATEC.

Guidelines and Technical Basis

Requirement R1:

Requirement R2:

Requirement R3:

Requirement R4:

Requirement R5:

Requirement R6:

Requirement R7:

Requirement R8:

Document Title	WECC Standard BAL-004-WECC-02
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1	4/15/2011	Version 1 Posted	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Version 3 Posted 12/15/11	Addressed comments from Version 2 posting
~~3~~4		Standing Committee Approval	
~~4~~5		WECC Board Approval	

WECC 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.

.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	07/16/2010
9. Notice of development / first 30-day notice	09/2/2010
10. New committee chair orientation meeting	08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 01/18/11 02/10/11 03/11–12/11 03/24/11 04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
16. Post first draft for 45-day comment period	04/15/2011
17. Meet to answer to comments, address impact statement and draft responses	06/2-3/2011 06/14/2011 06/23/2011 06/29/2011
18. Post responses to comments received during 45-day comment period	06/29/2011
19. Meet to answer to comments, address impact statement and	08/8/2011 08/15/2011

Completed Actions	Completion Date
draft responses	08/30/2011 11/01/2011
20. Post the ~~second draft~~Version 2 for a 30-day comment period	11/04/2011
21. Post consideration of comments of Version 2	12/15/2011
22. Post the third dart for 30-day comment period	12/15/2011

Description of Current Draft:

On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC Standards.[1] In addition, WECC staff identified additional modifications to BAL-004-WECC-1 that would clarify the intent without changing the requirements. Finally, the industry has commented that there is confusion concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as that used during Automatic Generation Control (AGC) mode. This seems to conflict with NERC's comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a)[2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation for control but should use raw ACE for CPS reporting.[3] As part of this filing WECC has submitted a proposed regional variance to BAL-001-0.1a to address this conflict.

The purpose of the refinements to BAL-004-WECC-1 as proposed in WECC Regional Reliability Standard BAL-004-WECC-2 – Automatic Time Error Correction (BAL-004-WECC-2) is to implement the directives in FERC Order 723 and to make other clarifications to BAL-004-WECC-1 as the industry deems necessary, while maintaining the Western Interconnection's reliability. The FERC Order 723 directives are as follows:

1. "The Commission is concerned that the phrases 'large accumulation' and 'in such a situation' as used in Requirement R1.2 leaves to individual interpretation when a 'large' amount of primary inadvertent has accumulated. The ERO and WECC agree that the provision could benefit from further clarity. Accordingly, the Commission adopts its NOPR proposal and directs WECC to develop revisions to the provision so that a

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).

[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).

[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

balancing authority will know with specificity the circumstances that trigger the actions required by Requirement R1.2."[4]

2. "Consistent with the NOPR, pursuant to section 215(d) (5) of the FPA, the Commission directs WECC to develop a modification to the regional Reliability Standard consistent with WECC's and NERC's explanation that the limit set forth in Requirement 2 of '24 hours per calendar quarter' is an accumulated total for the period, resulting from either a singular event or a cumulative time limit from a number of events."[5]
3. "[The Commission] direct[s] that the violation risk factors assigned to BAL-004-WECC-01, Requirements R1, R2, R3, and R4 be modified from 'lower' to 'medium.' The ERO and WECC must submit a filing within 60 days of the effective date of this Final Rule that includes the directed modifications."[6] These modifications were addressed in a compliance filing dated August 28, 2009. [7]
4. "The Commission adopts its NOPR proposal and directs the ERO and WECC to submit violation severity levels for each Requirement and sub-Requirement that has been assigned a violation risk factor. To allow adequate time for the development of the violation severity levels, the ERO and WECC must submit a filing within 120 days of the effective date of this Final Rule that includes the directed violation severity levels."[8] These modifications were addressed in a compliance filing date October 23, 2009.[9]
5. In response to Xcel comments, FERC referenced their approval, in Order No. 713, of an ERO interpretation stating that as long as Balancing Authorities use raw ACE for Control Performance Standard (CPS) reporting purposes and WECC ATEC (ATEC) ACE for control, it is not a violation of BAL-001-0.1a, Requirement 1.[10]. WECC Stakeholders believe it is more appropriate to use the ATEC ACE for control and CPS reporting. To clarify this difference, WECC has developed a regional variance BAL-001-0.1a.

The implementation of an ATEC ACE is part of a regional variance to BAL-001-0.1a associated with this posting. The purpose of this filing is to meet the directives of FERC Order 723 while refining for clarity the existing requirements of BAL-004-WECC-1. Refinements to BAL-004-WECC-1 include:

1. A requirement that defines the large accumulation at 150% of previous year's peak demand or peak generation for generation-only Balancing Authorities. The action required is that the Balancing Authority shall not permit the PII_{accum} to exceed the defined value, which is demonstrated at the end of each month.
2. A clarification in response to the FERC order that the accumulated time for ATEC out of service shall not exceed 24 hours during a calendar quarter.

[4] Order 723 at ¶ 30.

[5] *Id* at ¶ 34.

[6] *Id* at ¶ 51.

[7] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 51 of Order No. 723 – Directed Modification of Violation Risk Factors for Regional Reliability Standard BAL-004-WECC-1, Automatic Time Error Correction, Docket No. RM08-12-000, filed August 28, 2009

[8] Order 723 at ¶ 54.

[9] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 54 of Order No. 723, Docket No. RM08-12-000, filed October 23, 2009

[10] Order 723 at ¶ 44-45.

BAL-004-WECC-2 retains the requirement for Balancing Authorities to compute the Automatic Time Error Correction and Primary Inadvertent Interchange by 50 minutes after the hour and requires that Balancing Authorities have the ability to operate their Automatic Generation Control in other modes. In addition, Balancing Authorities are required to recalculate Primary Inadvertent Interchange when hourly and month-end adjustments are made.

In Version 3 in order to prevent the stranding of Secondary Inadvertent Interchange the Drafting Team added a Requirement R8 that restrictions the payback of Inadvertent Interchange to using ATEC rather than through bilateral and unilateral payback methods.

The proposed BAL-004-WECC-2 will replace the Automatic Time Error Correction ~~definition and retire the Secondary Inadvertent Interchange~~ definition in the NERC Glossary of Terms in the WECC Regional Definitions section. The WECC ~~definition~~definitions for Primary Inadvertent Interchange and Secondary Inadvertent Interchange will be retained under the WECC Regional Definitions in the ~~NERC~~ *Glossary of Terms Used in NERC Reliability Standards*.

Development Plan:

Anticipated Actions	Anticipated Date
1. Project WECC-0068 Version ~~2~~3 Comments due	~~12/05/2011~~01/16/2012
2. Meet to answer to comments, address impact statement, draft responses	~~12/06-16/2011~~01/18/2012
3. Post responses to comments	~~1/05~~02/13/2012
~~4. Post draft standard for 45-day NERC comment period~~	~~1/05/2012~~
~~5. NERC comment period ends~~	~~02/20/2012~~
~~6. DT completes review and consideration of industry comments to NERC posting~~	~~02/20/2012~~
~~7.~~4. Post for comment and Operating Committee approval	02/24/2012
~~8.~~5. Operating Committee approves proposed standard	03/27/2012
6. Post draft standard for 45-day NERC comment period	04/02/2012
7. NERC comment period ends	05/16/2012
8. DT completes review and consideration of industry comments to NERC posting	06/15/2012
9. Post draft standard for WECC Board approval	05/01/2012
10. WECC Board approval	06/21/2012
11. Post draft standard for 15-day NERC comment period	06/25/2012
12. NERC 15-day comment period ends	07/2012
13. DT completes review and consideration of industry comments to NERC posting	07/2012
14. Submit NERC Board of Trustees approval request	08/2012

Developed as: **WECC-0068**
Adopted by NERC Board of Trustees:
Mandatory Effective Date:

15. Receive NERC Board approval	08/2012

.

Implementation Plan

The Implementation Plan is to make the WECC Regional Variance to BAL-001-0.1a and BAL-004-WECC-2 effective on the first day of the second quarter, after regulatory approval in areas where applicable. Since entities are already controlling their Balancing Authority Area with the ATEC ACE equation – but are reporting using the NERC raw ACE equation for reporting CPS1 – the transition to controlling and reporting using the ATEC ACE should be minimal. Additionally, it should not take much time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

Definitions of Terms Used in Regional 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 definitions will be removed from the standard and added to the NERC Glossary under WECC Regional Definitions. In addition the current ~~definition~~definitions for "**Primary Inadvertent Interchange**" and "**Secondary Inadvertent Interchange"** will be ~~retired and removed from~~retained in the ~~NERC~~ Glossary of Terms Used in NERC Reliability Standards under WECC Regional Definitions~~,~~.*

Automatic Time Error Correction: The addition of a component to the ACE equation that modifies the control point for the purpose of continuously paying back Primary Inadvertent Interchange to correct accumulated time error.

A. Introduction

1. **Title:** **Automatic Time Error Correction**

2. **Number:** BAL-004-WECC-02

3. **Purpose:** To maintain Interconnection frequency and to ensure that Time Error Corrections and Primary Inadvertent Interchange (PII) payback are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection.

4. **Applicability**

   4.1. Functional Entities

   4.1.1 Balancing Authorities that operate synchronously in the Western Interconnection.

5. **Effective Date:** On the first day of the second quarter, after applicable regulatory approval has been received (or the Reliability Standard otherwise becomes effective the first day of the fourth quarter following NERC Board adoption where regulatory approval is not required).

6. **Background:**

   In February 2003, the WECC Automatic Time Error Correction (ATEC) Procedure (Procedure) became effective for all Balancing Authorities in the Western Interconnection. The original intent of the Procedure was to minimize the number of Manual Time Error Corrections in the Western Interconnection. ATEC provides the added benefit of a superior approach over the current NERC Reliability Standard BAL-004-0 – Time Error Correction for assigning costs and providing for the equitable payback of Inadvertent Interchange. In October 2006, the Procedure became a WECC Criterion. In May 2009, FERC issued Order No.723 that approved Regional Reliability Standard BAL-004-WECC-1 - Automatic Time Error Correction, as submitted by NERC. In addition, the Commission directed WECC to develop several clarifying modifications to BAL-004-WECC-1 using the FERC-approved Process for Developing and Approving WECC Standards. The Effective Date of the BAL-004-WECC-1 standard was July 1, 2009. BAL-004-WECC-1 required Balancing Authorities within the Western Interconnection to maintain Interconnection frequency within a predefined frequency profile and to ensure that Time Error Corrections were effectively conducted in a manner that did not adversely affect the reliability of the Interconnection. In September 2009, WECC received WECC Standards/Regional Criterion Request Form (Request) WECC-0068, which was a request for modification of BAL-004-WECC-1. In July 2010, the chair of the WECC Operating Committee assigned the Request to the Performance Work Group (PWG) for development.

B. Requirements and Measures

R1. Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PII_{accum}) for both the monthly On-Peak period and the monthly Off-Peak period are each individually less than or equal to:

1.1. For load-serving Balancing Authorities, 150% of the previous calendar year's integrated hourly Peak Demand,

1.2. For generation-only Balancing Authorities, 150% of the previous calendar year's integrated hourly peak generation.

[Violation Risk Factor Medium:] [Time Horizon: Operations Assessment]

M1. Forms of acceptable evidence of compliance with Requirement R1include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool (WIT),
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R2. Each Balancing Authority shall, upon discovery of an error in the calculation of PII_{hourly}, recalculate within 90 days, the value of PII_{hourly} and adjust the PII_{accum} from the time of the error. *[Violation Risk*

Rationale for R1:

Premise: Each Balancing Authority should ensure that the absolute value of its PII_{accum} for both the On-Peak period and the Off-Peak period each individually does not exceed 150% of the previous year's Peak Demand for load-serving Balancing Authorities and 150% of the previous year's peak generation for generation-only Balancing Authorities. The Balancing Authority is required to take action to keep each PII_{accum} period within the limit. For example, the Balancing Authorities actions may include:

- Identifying and correcting the source of any metering or accounting error(s) and recalculating the hourly Primary Inadvertent Interchange **(**PII_{hourly}) and the PII_{accum} from the time of the error;
- Validating the implementation of ATEC; or
- Setting L_{max} equal to $L_{10.}$until the PII_{accum} is below the limit in Requirement R1.

Justification: PII_{accum} may grow from month-end adjustments and metering errors, even with the inclusion of I_{ATEC} in the ACE equation.

Goal: To limit the amount of PII_{accum} that a Balancing Authority can have at the end of each month.

Rationale for R2:

Premise: When a Balancing Authority finds an error in the calculation of its PII, the Balancing Authority needs time to correct the error and recalculate PII and PII_{accum}.

Justification: The drafting team selected 90 days as a reasonable amount of time to correct an error and recalculate PII and $PII_{accum,}$ since recalculation of PII and PII_{accum} is not a real-time operations reliability issue.

Goal: To promote the timely correction of errors in the calculation of PII and PII_{accum}.

Factor: Medium] [Time Horizon: Operations Assessment]

M2. Forms of acceptable evidence of compliance with Requirement R2 include but are not limited to any one of the following:

- Data, screen shots from the WIT,
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R3. Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service. *[Violation Risk Factor: Medium] [Time Horizon: Same-day Operations]*

M3. Forms of acceptable evidence of compliance with Requirement R3 may include, but are not limited to:

- Dated archived files,
- Historical data,
- Other data that demonstrates the ATEC was out of service for less than 24 hours per calendar quarter.

Rationale for R3:

Premise: When a Balancing Authority is not participating in ATEC, payback of PII_{accum} is delayed.

Justification: The limit of 24 hours per quarter discourages a Balancing Authority from withdrawing ATEC participation, for example, for economic gain during selected hours. If the limits were increased to 60 hours, a Balancing Authority could technically withdraw ATEC participation for one hour from Monday to Friday.

Goal: To promote fair and timely payback of PII_{accum} balances.

R4. Each Balancing Authority shall compute the following by 50 minutes after each hour:

4.1. $PII_{\mathbf{hourly}}$,

4.2. PII_{accum},

4.3. Automatic Time Error Correction term (I_{ATEC}).

[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]

Rationale for R4:

Premise: $PII_{\mathbf{hourly}}$, PII_{accum}, and I_{ATEC} should be determined before the next scheduling hour begins.

Justification: To promote timely calculations 50 minutes was selected because it is before the next hour ramp begins and permits time to collect the data and resolve interchange metering values.

Goal: To promote the timely calculation of $PII_{\mathbf{hourly}}$, PII_{accum}, and I_{ATEC}.

M4. Forms of acceptable evidence of compliance with Requirement R4 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from internal Balancing Authority tool that demonstrate compliance, or
- Data from any other databases, spreadsheets, displays that demonstrate compliance.

R5. Each Balancing Authority shall be able to change its Automatic Generation Control operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error Control (used in ATEC mode), to correspond to current operating conditions. *[Violation Risk Factor: Medium] [Time Horizon: Real-Time Operations]*

M5. Forms of acceptable evidence of compliance with Requirement R5 include but are not limited to any one of the following:

- Screen shots from Energy Management System,
- Demonstration using an off-line system.

Rationale for R5:

Premise: The ACE equation, and hence the AGC mode, will contain any number of parameters based on system operating conditions. Various AGC modes are identified corresponding to those operating conditions, as well as the specific sets of parameters included in the ACE equation.

Justification: Changing to the proper operating mode, corresponding to current operating conditions, affords proper movement of generating units in response to those conditions. The addition of the ATEC term results in an additional AGC mode and a different set of parameters. The inability to correctly calculate the ATEC term would dictate that AGC not be operated in the ATEC mode.

Goal: To set the AGC mode and calculate ACE in a manner that corresponds to the system operating conditions and to accommodate changes in those conditions.

R6. Each Balancing Authority shall recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly Inadvertent Interchange or ΔTE. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M6. Forms of acceptable evidence of compliance with Requirement R6 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from an internal Balancing Authority

Rationale for R6:

Premise: Hourly adjustments to hourly Inadvertent Interchange (II) require a recalculation of the corresponding hourly PII value, the corresponding PII_{accum}, and all subsequent PII_{accum} for every hour up to the current hour.

Justification: As $PII_{\mathbf{hourly}}$ is corrected, then PII_{accum} should be recalculated.

Goal: To promote accurate, fair and timely payback of accumulated PII balances.

tool that demonstrate compliance with, or

- Data from any other databases, spreadsheets, displays that demonstrate compliance.

R7. Each Balancing Authority shall make the same adjustment to the PII_{accum} as it did for any month-end meter reading adjustments to Inadvertent Interchange. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M7. Forms of acceptable evidence of compliance with Requirement R7 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from an internal Balancing Authority tool that demonstrate compliance,
- Production of data from any other databases, spreadsheets, displays that demonstrate compliance.

~~**Rationale R7:**~~

~~**Premise:** Month-end meter-reading adjustments are made, for example, when a Balancing Authority performs monthly comparisons of recorded month-end Net Actual Interchange (NI_A) values derived from hourly Actual Interchange Telemetered Values against month-end Actual Interchange Register Meter readings.~~

~~**Justification**: Month-end adjustments to II_{accum} are applied as 100% PII_{accum}. 100% was chosen for simplicity to bilaterally assign PII_{accum} to both Balancing Authorities, since the effect of this metering error on system frequency is not easily determined over the course of a month.~~

~~**Goal**: To provide a mechanism by which corresponding month-end II adjustments can be applied to PII_{accum}, when such adjustments cannot be attributed to any one particular hour or series of hours.~~

R8. Each Balancing Authority shall only payback Inadvertent Interchange using ATEC rather than bilateral and unilateral payback. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M8. Forms of acceptable evidence of compliance with Requirement R8 include but are not limited to historical On-Peak and Off-Peak Inadvertent Interchange data, data from

Rationale R8:

Premise: ATEC includes automatic unilateral payback of Primary Inadvertent Interchange and Secondary Inadvertent Interchange.

Justification: Additional unilateral and bilateral exchanges disturb the balance and distribution between Primary Inadvertent Interchange and Secondary Inadvertent Interchange throughout the Interconnection; thereby stranding Secondary Inadvertent Interchange.

Goal: To not strand Secondary Inadvertent Interchange.

Developed as: **WECC-0068**
Adopted by NERC Board of Trustees:
Mandatory Effective Date:

the WECC Interchange Tool, and ACE data.

C. Compliance

1. Compliance Monitoring Process

1.1 Compliance Enforcement Authority

The Regional Entity shall serve as the Compliance Enforcement Authority.

For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

For responsible entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

1.2 Compliance Monitoring and Assessment Processes:

Compliance Audits

Self-Certifications

Spot Checking

Compliance Investigations

Self-Reporting

Complaints

1.3 Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of PII_{hourly}, PII_{accum} (On-Peak and Off-Peak), ΔTE and any month-end adjustments for the preceding calendar year (January – December), as well as the current calendar year.

Each Balancing Authority in the Western Interconnection shall retain the amount of time the Balancing Authority operated without ATEC for the preceding calendar year (January – December), as well as the current calendar year.

1.4 Additional Compliance Information

None

Table of Compliance Elements

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	Operations Assessment	Medium	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 150%, but was less than or equal to 160% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 160%, but was less than or equal to 170% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 170%, but was less than or equal to 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.
R2	Operations Assessment	Medium	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 90 days of the discovery of the error; but made the required recalculations and adjustments within 120 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 120 days of the discovery of the error; but made the required recalculations and adjustments within 150 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 150 days of the discovery of the error; but made the required recalculations and adjustments within 180 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust PII_{accum} within 180 days of the discovery of the error.

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R3	Real-Time Operations	Medium	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 24 hours, but less than or equal to 72 hours.	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 72 hours, but less than or equal to 120 hours.	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 120 hours, but less than or equal to 168 hours	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 168 hours.
R4	Operations Assessment	Medium	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within 50 minutes, but made the required calculations in less than or equal to two hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within two hours, but made the required calculations in less than or equal to four hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within four hours, but made the required calculations in less than or equal to six hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within six hours.
R5	Real-Time Operations	Medium	N/A	N/A	N/A	The Balancing Authority is not able to change its AGC operating mode between Flat Frequency (for blackout restoration; Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; or Tie Line Bias

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						plus Time Error control (used in ATEC mode).
R6	Operations Assessment	Medium	N/A	N/A	N/A	When making adjustments to hourly Inadvertent Interchange or ΔTE, the Balancing Authority did not recalculate the PII_{hourly} and the PII_{accum} for the On-Peak and Off-Peak periods.
R7	Operations Assessment	Medium	N/A	N/A	N/A	When making any month-end meter reading adjustments to Inadvertent Interchange, the Balancing Authority did not make the same adjustment to the PII_{accum}.
R8	Operations Assessment	Medium	N/A	N/A	N/A	The Balancing Authority paid back Inadvertent Interchange using bilateral and unilateral payback rather than

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						using ATEC.

Guidelines and Technical Basis

Requirement R1:

Requirement R2:

Requirement R3:

Requirement R4:

Requirement R5:

Requirement R6:

Requirement R7:

Requirement R8:

FERC Directives for BAL-004-WECC-1 Automatic Time Error Correction
December 13, 2011

Received From	FERC Order 723[1] Snapshot WECC-0068 Mod. To BAL-004-WECC-1	The BAL-004-WECC-2 and Variance to BAL-001-0.1a Completed Actions
FERC	P 30. As explained in the NOPR, the Commission is concerned that the phrases "large accumulation" and "in such a situation," as used in Requirement R1.2, leaves to individual interpretation when a "large" amount of primary inadvertent has accumulated. The ERO and WECC agree that the provision should be clarified. Accordingly, the Commission adopts its NOPR proposal and directs WECC to develop revisions to the provision so that a Balancing Authority will know specifically which circumstances trigger the actions required by Requirement R1.2.	See BAL-004-WECC-2 in Requirement R1 where the term "large accumulation is eliminated and replaced with a quantifiable maximum limit for each Balancing Authority to be within by the end of each month.
FERC	P 34. Consistent with the NOPR, pursuant to Section 215(d) (5) of the FPA, the Commission directs WECC to develop a modification to the Regional Reliability Standard consistent with WECC's and NERC's explanation that the limit set forth in Requirement 2 of "24 hours per calendar quarter" is an accumulated total for the period – resulting from either a singular event or a cumulative time limit from a number of events.	See BAL-004-WECC-2 Requirement R3, which has been revised to specify an accumulation over the period.
FERC	P 44. FERC requires that Balancing Authorities use Raw ACE for CPS	See BAL-001-0.1a. Section E.B is a Regional Variance for WECC that

[1] 127 FERC ¶ 61,176 UNITED STATES OF AMERICA FEDERAL ENERGY REGULATORY COMMISSION, 18 CFR Part 40, Docket No. RM08-12-000; Order No.723, Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction (Issued May 21, 2009)

Received From	FERC Order 723[1] Snapshot WECC-0068 Mod. To BAL-004-WECC-1	The BAL-004-WECC-2 and Variance to BAL-001-0.1a Completed Actions
	reporting and WATEC ACE for control. The Interconnect prefers to use the WATEC ACE for control and CPS reporting. Develop a Regional Variance to BAL-001-0.1a to resolve the issue.	replaces Requirement R1 and Section D Compliance 2. This Regional Variance establishes a single ACE equation for use in WECC for all NERC standards referencing ACE. Furthermore, the Drafting Team for WECC-0068 requests withdrawal of BAL-001-0.1a Appendix 2 Interpretation of Requirement 1 and BAL-003-0.1b Appendix 1 Interpretation of Requirement R3.
FERC	P 51. FERC adopts its NOPR proposal and directs that the violation risk factors assigned to BAL-004-WECC-01, Requirements R1, R2, R3, and R4, be modified from "lower" to "medium." The ERO and WECC must submit a filing that includes the directed modifications within 60 days of the effective date of this Final Rule.	NERC and WECC, in their compliance filing of August 28, 2009,[2] adjusted the Violation Risk Factors to medium as directed. Likewise, the corresponding requirements in BAL-001-0.1a E.B.1, BAL-004-WECC-2 Requirements R3, R4, and R5 have been assigned Violation Risk Factors of Medium.
FERC	P 54. The Commission adopts its NOPR proposal and directs the ERO and WECC to submit violation severity levels for each Requirement and sub-Requirement that has been assigned a violation risk factor. To allow adequate time for the development of the violation severity levels, the ERO and WECC must submit a filing that includes the directed violation severity levels within 120 days of the effective date of this Final Rule.	NERC and WECC in its compliance filing of October 23, 2009[3] adjusted the violation severity levels as directed. The drafting team has established similar violation severity levels for each requirement in both BAL-001-01.1a E.B and BAL-004-WECC-2.

[2] *Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 51 of Order No. 723 – Directed Modification of Violation Risk Factors for Regional Reliability Standard BAL-004-WECC-1, Automatic Time Error Correction*, Docket No. RM08-12-000, filed August 28, 2009.

[3] *Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 54 of Order No. 723*, Docket No. RM08-12-000, filed October 23, 2009.

The Project WECC-0068 (BAL-004-WECC-2 and Regional Variance to BAL-001-0.1a)
Drafting Team Completed Actions
December 13, 2011

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
R1. Each BA that operates synchronously to the Western Interconnection shall continuously operate utilizing Automatic Time Error Correction (ATEC) in its Automatic Generation Control (AGC) system. [Risk Factor: Lower] $ACE_{ATEC} = (NI_A - NI'_S) - 10B_i(F_A - F_S) - T_{0b} + I_{ME}$ **Where:** **NI_A =** Net Interchange Actual (MW). **F_A =** Frequency Actual (Hz). **F_S** = Frequency Scheduled (Normally 60 Hz). **B_i** = Frequency Bias for the Balancing Authority's Area (MW / 0.1 Hz). **T_{0b} =** Remaining Bilateral Payback for Inadvertent Interchange created prior to implementing automatic payback (MW). **I_{ME} =** Meter Error Correction (MW). $NI'_S = NI_S - \frac{II^{on/off\ peak}_{Primary}}{(-Y) * H}$ **NI_S =** Net Interchange Scheduled (MW). **Y** = B_i / B_S.	**E.B.1.** Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit $\in_1^2$ is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee. $AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \in_1^2 \ or \ \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\in_1^2} \le 1$ The equation for ACE in the Western Interconnection is: $ACE = (NI_A - NI_S) - 10B(F_A - F_S) - I_{ME} + I_{ATEC}$ **Where:** **NI_A** is the algebraic sum of actual flows on all tie lines. **F_A** is the actual frequency. **F_S** is the scheduled frequency. F_S is normally 60 Hz but	Establishing a Regional Variance in BAL-001-01.1a in which an ACE equation for WECC is specified provides the following benefits from a Standards perspective: a) Locates in a single standard the definition of ACE for all Interconnections; b) Identifies a single ACE formula for all Interconnections with common terminology and uncommon differences (i.e., there is no longer a NERC ACE and a "control" ACE); and	Reducing the NERC ACE and "control" ACE to a single ACE, allows Operations to "control to the target." This means that control actions will directly affect the monitored, measured objective function. Since the amount of the adjustment during any one hour is limited by L_{10}, Balancing Authorities automatically limit the risk and the amount of the transaction.

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
H = Number of Hours used to payback Inadvertent Interchange Energy. The WECC Performance Work Group has set the value of H to 3. **B_S** = Frequency Bias for the Interconnection (MW / 0.1 Hz). $II_{primary}^{on/off\ peak}$ = is the Balancing Authority's accumulated primary inadvertent interchange in MWh. An On-Peak and Off-Peak accumulation accounting is required. Where: $II_{primary}^{on/off\ peak}$ **= last period's** $II_{primary}^{on/off\ peak}$ **+ (1-Y) * (II_{actual} - B_i * ΔTE/6)** **II_{actual}** is the hourly Inadvertent Interchange for the last hour. **ΔTE** is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where: **ΔTE = $TE_{end\ hour}$ – $TE_{begin\ hour}$ – TD_{adj} – (t)*(TE offset)** **TD_{adj}** is any operator adjustment to the control center Time Error to correct for differences with the time monitor. **t** is the number of minutes of Manual Time Error Correction that occurred	may be offset to effect manual time error corrections. **B** = Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz. I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero. $I_{ATEC} = \frac{PII_{accum}^{on/off\ peak}}{(-Y) * H}$ when operating in Automatic Time Error Correction control mode. I_{ATEC} shall be zero when operating in any other AGC mode. **NI_S** is the algebraic sum of scheduled flows on all tie lines. **Y** = B / B_S. **H** = Number of Hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3. **B_S** = Frequency Bias for the Interconnection (MW / 0.1 Hz). **P**rimary **I**nadvertent **I**nterchange **(PII_{hourly})** is **(1-Y) * (II_{actual} - B * ΔTE/6)** **II_{actual}** is the hourly Inadvertent Interchange for the last hour. **ΔTE** is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where: **ΔTE = $TE_{end\ hour}$ – $TE_{begin\ hour}$ – TD_{adj} – (t)*(TE_{offset})**	c) Eliminates consideration of exceptional circumstances governing multiple ACEs.	

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
during the hour. **TE offset** is 0.000 or +0.020 or -0.020.	**TD_{adj}** is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks. **t** is the number of minutes of Manual Time Error Correction that occurred during the hour. **TE_{offset}** is 0.000 or +0.020 or -0.020. **PII_{accum}** is the Balancing Authority's accumulated **PII_{hourly}** in MWh. An On-Peak and Off-Peak accumulation accounting is required. Where: $PII_{accum}^{on/off\ peak}$ **= last period's** $PII_{accum}^{on/off\ peak}$ **+** PII_{hourly}		
R1.1. The absolute value of the WECC Automatic Time Error Correction term is limited as follows: $\left\| \frac{II_{primary}^{on/off\ peak}}{(1\text{-}Y)\cdot H} \right\| \le L_{max}$ Where L_{max} is chosen by the BA and is bounded as follows: $0.20 * \|B_i\| \le L_{max} \le L_{10}$ L_{10} is the Balancing Authority CPS2 limit in MW. If the WECC Automatic Time Error Correction term is less than the upper limit, use the calculated WECC Automatic Time Error Correction term.	**E.B.2.** Each Balancing Authority shall limit the absolute value of I_{ATEC}, the Automatic Time Error Correction term as follows: $\left\| I_{ATEC} \right\| \le L_{max}$. **E.B.3.** Each Balancing Authority shall set L_{max} within the limits as follows: $0.20 * \|B\| \le L_{max} \le L_{10}$.	Provides clarity in requirements and actions to be taken by the Balancing Authorities. Relocating this requirement to BAL-001-0.1a consolidates all requirements affecting calculation of terms in the ACE equation.	Eliminates potential confusion regarding limitation of the ATEC term, which could affect the final ACE value, subsequent control of units, and associated impact on system frequency.

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
R1.2 Large accumulations of primary inadvertent point to an invalid implementation of ATEC, loose control, metering or accounting errors. A BA [Balancing Authority] in such a situation should identify the source of the error(s) and make the corrections, recalculate the primary inadvertent from the time of the error, adjust the accumulated primary inadvertent caused by the error(s), validate the implementation of ATEC, set L_{max} equal to $L_{10,}$ and continue to operate with ATEC reducing the accumulation as system parameters allow.	**R1.** Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PII_{accum}) for both the monthly On-Peak period and the monthly Off-Peak period are each individually less than or equal to: **1.1** For load-serving Balancing Authorities, 150% of the previous calendar year's integrated hourly Peak Demand, **1.2** For generation-only Balancing Authorities, 150% of the previous calendar year's integrated hourly peak generation.	FERC directed WECC to define large accumulations for PII_{accum}. As a result in Requirement R1 the large accumulation limit was set to 150% of previous year's peak demand or peak generation for generation only Balancing Authorities. The action required is that the Balancing Authority shall not permit the PII_{accum} to exceed the defined value, which is demonstrated at the end of each month. Requirement R2 contains the provision to recalculate. Since an upper limit is now defined, the list of possible actions to be taken was moved to the premise for Requirement R1.	The drafting team reviewed historical data to identify an appropriate amount to limit PII_{accum} and accommodate month end adjustments.

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
R2. Each BA [Balancing Authority] that is synchronously connected to the Western Interconnection, and operates in any AGC operating mode other than ATEC, shall notify all other BAs of its operating mode through the designated Interconnection communication system. Each BA, while synchronously connected to the Western Interconnection, will be allowed to have ATEC out of service for a maximum of 24 hours per calendar quarter, for reasons including maintenance and testing. [Risk Factor: Lower]	**R3.** Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service.	Resolve that the "out of service" duration is an accumulation over the specified period. Also recognizes that extremely short interruptions in ATEC need not be communicated to the Interconnection. For example, computer maintenance processes could result in momentary interruptions (e.g., system upgrades) that do not require notifying neighboring Balancing Authorities.	Ninety 90 days was selected as a reasonable amount of time to correct an error and recalculate PII and $PII_{accum,}$ since recalculation of PII and PII_{accum} is not a real-time operations reliability issue.
R3. BAs in the Western Interconnection shall be able to change their AGC operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error control (used in ATEC mode). The ACE used for NERC reports shall be the same ACE as the AGC operating mode in use. [Risk Factor: Lower]	**R5.** Each Balancing Authority shall be able to change its Automatic Generation Control operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error Control (used in ATEC mode), to correspond to current operating conditions.	Removed reference to NERC report because with the adoption of a WECC regional variance to BAL-001-0.1a such a requirement is not necessary.	Changing to the proper operating mode, corresponding to current operating conditions, affords proper movement of generating units in response to those conditions. The addition of the ATEC term results in an additional

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
			AGC mode and a different set of parameters. The inability to correctly calculate the ATEC term would dictate that AGC not be operated in the ATEC mode.
R4. Regardless of the AGC operating mode, each BA in the Western Interconnection shall compute its hourly Primary Inadvertent Interchange when hourly checkout is complete. If hourly checkout is not complete by 50 minutes after the hour, compute Primary Inadvertent Interchange with best available data. This hourly value shall be added to the appropriate accumulated Primary Inadvertent Interchange balance for either On-Peak or Off-Peak periods. [Risk Factor: Lower]	**R4.** Each Balancing Authority shall compute the following by 50 minutes after each hour: **4.1.** $PII_{\mathbf{hourly}}$, **4.2.** PII_{accum}, **4.3.** Automatic Time Error Correction term (I_{ATEC}). **R6.** Each Balancing Authority shall recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly Inadvertent Interchange or ΔTE.	The drafting team clarified the previous requirement and adopted the NERC requirement format.	To promote timely calculations, 50 minutes was selected because it is before the next hour ramp begins, and permits time to collect the data and resolve interchange metering values. As hourly PII is corrected, then PII_{accum} should be recalculated.
R4.1 Each BA in the Western Interconnection shall use the change in Time Error distributed by the Interconnection Time Monitor.		This adjustment is included as part of equation in Requirement E.B.1. as ΔTE.	

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
R4.2 All corrections to any previous hour Primary Inadvertent Interchange shall be added to the appropriate On-Peak or Off-Peak accumulated Primary Inadvertent Interchange.	**R2**. Each Balancing Authority shall, upon discovery of an error in the calculation of PII_{hourly}, recalculate within 90 days, the value of PII_{hourly} and adjust the PII_{accum} from the time of the error. **R6.** Each Balancing Authority shall recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly Inadvertent Interchange or ΔTE.	The drafting team clarified the previous requirement and adopted the NERC requirement format.	The drafting team selected 90 days as a reasonable amount of time to correct an error and recalculate PII_{hourly} and $PII_{accum,}$ since recalculation of PII_{hourly} and PII_{accum} is not a real-time operations reliability issue.
R4.3 Month-end Inadvertent Adjustments are 100% Primary Inadvertent Interchange and shall be added to the appropriate On-Peak or Off-Peak accumulated Primary Inadvertent Interchange, unless such adjustments can be pinpointed to specific hours in which case R4.2 applies.	**R7.** Each Balancing Authority shall make the same adjustment to the PII_{accum} as it did for any month-end meter reading adjustments to Inadvertent Interchange.	The drafting team clarified the previous requirement and adopted the NERC requirement format.	Month-end adjustments to II are applied as 100% PII_{accum}. 100% was chosen for simplicity to bilaterally assign PII to both Balancing Authorities, since the effect of this metering error on system frequency is not easily determined over the course of a month.
R4.4 Each BA in the Western Interconnection shall synchronize its Time Error to the nearest 0.001 seconds of the system Time Error by comparing its reading at the designated time each day to the reading		The requirement was deleted because the Interconnection Time Monitor is responsible for monitoring and	

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
broadcast by the Interconnection Time Monitor. Any difference shall be applied as an adjustment to its current Time Error.		calculating Time Error. Balancing Authorities are no longer responsible for Time Error monitoring, so the requirement was removed.	
	R8. Each Balancing Authority shall only payback Inadvertent Interchange using ATEC rather than bilateral and unilateral payback.	Added new requirement to prevent stranded Secondary Inadvertent Interchange.	
Definitions of Terms Used in Regional Standard **Area Control Error:** Means the instantaneous difference between net actual and scheduled interchange, taking into account the effects of Frequency Bias including correction for meter error. **Automatic Time Error Correction:** A frequency control automatic action that a Balancing Authority uses to offset its frequency contribution, to support the Interconnection's scheduled frequency. **Primary Inadvertent Interchange:** The component of area (n) inadvertent interchange caused by the regulating deficiencies of the area (n). **Secondary Inadvertent Interchange:** The component of area (n) inadvertent interchange	**Revised Definitions of Terms Used in Regional Standard** **Area Control Error**: The instantaneous difference between a Balancing Authority's net actual and scheduled interchange, taking into account the effects of Frequency Bias, correction for meter error, and Automatic Time Error Correction (ATEC), if operating in the ATEC mode. ATEC is only applicable to Balancing Authorities in the Western Interconnection. **Automatic Time Error Correction:** The addition of a component to the ACE equation that modifies the control point for the purpose of continuously paying back Primary Inadvertent Interchange to correct accumulated time error.	The Automatic Time Error Correction definition was modified to more accurately define Automatic Time Error Correction. The current definitions for Primary Inadvertent Interchange and Secondary Inadvertent Interchange were retained.	

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
caused by the regulating deficiencies of area (i).			

Comment Report Form for Project WECC-0068 Modification of BAL-004-WECC-1 Posting 3

The Project WECC-0068 (Regional Variance to BAL-001-0.1a — Real Power Balancing Control Performance and refinements to BAL-004-WECC-2 — Automatic Time Error Correction) Drafting Team thanks everyone who submitted comments on the WECC Regional Variance to the NERC BAL-001- 0.1a — Real Power Balancing Control Performance and to BAL-004-WECC-2 — Automatic Time Error Correction. These standards were posted for a 30-day public comment period from December 15, 2011 through January 16, 2011. WECC distributed the notice for the posting on December 14, 2011. The Standard Drafting Team asked stakeholders to provide feedback on the variance to the NERC Reliability Standard through a special Standard Comment Form. WECC received comments from two companies representing four of the 10 Industry Segments, as shown in the table on the following page.

In this "Consideration of Comments" document, stakeholder's comments have been organized so that it is easier to see the responses associated with each stakeholder. All comments received on the standard can be viewed in their original format at:

http://www.wecc.biz/Standards/Development/WECC-0068/Lists/WECC0068%20Modification%20to%20BAL004WECC1%20Posting%203/AllItems.aspx.

If you feel that your comment has been overlooked, please let WECC know immediately. WECC's goal is to give every comment serious consideration in this process. If you feel there has been an error or omission, please contact the Director of Standards, Steve Rueckert, at steve@wecc.biz. In addition, there is a WECC Reliability Standards Appeals Process.[1]

[1] The appeals process is described in the Process for Developing and Approving WECC Standards: http://www.wecc.biz/Standards/Documents/WECC%20Standards%20Development%20Process.pdf

Comment Report Form for Project WECC-0068 Modification of BAL-004-WECC-1

The Industry Segments are:

1 — Transmission Owners
2 — RTOs, ISOs
3 — Load-serving Entities
4 — Transmission-dependent Utilities
5 — Electric Generators
6 — Electricity Brokers, Aggregators, and Marketers
7 — Large Electricity End Users
8 — Small Electricity End Users
9 — Federal, State, Provincial Regulatory or other Government Entities
10 — Regional Reliability Organizations, Regional Entities

Commenter		Organization	Industry Segment									
			1	2	3	4	5	6	7	8	9	10
1.	Cynthia Oder (submitting for Mike Gentry)	Salt River Project	✓		✓		✓	✓				
2.	Annie Lauterbach Submitting on behalf of the following Subject Matter Experts: James Murphy, BPA - Technical Operations David Kirsch, BPA Technical Operations	Bonneville Power Administration	✓		✓		✓	✓				
3.												

Index to Questions, Comments, and Responses

Comment Report Form for Project WECC-0068 Modification of BAL-004-WECC-1

1. Do you agree with revisions made to the Area Control Error definition in order to incorporate recommendations from the NERC staff? If you answered "No" to the previous question, please explain why you do not support the revisions.

Summary Consideration:

Commenter	Yes	No	Comment
Cynthia Oder (submitting for Mike Gentry) Salt River Project cindy.oder@srpnet.com	Yes		
Response: Thank you.			
Annie Lauterbach Bonneville Power Administration Submitting on behalf of the following Subject Matter Experts: James Murphy, BPA - Technical Operations David Kirsch, BPA Technical Operations	Yes		
Response: Thank you.			
Response:			

2. Do you agree with adding Requirement R8 in BAL-004-WECC-02 that prevents the stranding of Secondary Inadvertent Interchange by restricting the payback of Inadvertent Interchange to using ATEC rather than through bilateral and unilateral payback methods? If you answered "Yes" to the previous question, please indicate why you support addition. If you answered "No" to the previous question, please explain why you do not support the addition.

Summary Consideration:

Commenter	Yes	No	Comment
Cynthia Oder (submitting for Mike Gentry) Salt River Project cindy.oder@srpnet.com	Yes		
Response: Thank you.			
Annie Lauterbach Bonneville Power Administration	Yes		

Commenter	Yes	No	Comment
Submitting on behalf of the following Subject Matter Experts: James Murphy, BPA - Technical Operations David Kirsch, BPA Technical Operations			
Response: Thank you.			
Response:			

3. The WECC-0068 (Modification of BAL-004-WECC-1) drafting team welcomes additional comments on any and all aspects of the proposed Regional Variance to BAL-001-0.1a, Regional Reliability Standard BAL-004-WECC-2, and addressing the directives of FERC Order 723.

Summary Consideration:

Commenter	Yes	No	Comment
Cynthia Oder (submitting for Mike Gentry) Salt River Project cindy.oder@srpnet.com			
Response:			
Annie Lauterbach Bonneville Power Administration Submitting on behalf of the following Subject Matter Experts: James Murphy, BPA - Technical Operations David Kirsch, BPA Technical Operations			
Response:			
Response:			

Posting 4

Michael Mraz,
Arizona Public Service Company
Chair, WECC-0068 Drafting Team
BAL-001-0.1a / BAL-004-WECC-2
(602) 250-1061

February 6, 2012

Subject: Notification of Completion
WECC-0068

WECC Standard BAL-004-WECC-02
Automatic Time Error Correction (ATEC)
WECC Regional Variance to BAL-001-0.1a,
Modification of NERC BAL-001-0.1a

To: Operating Committee

In accordance with the Western Electricity Coordinating Council's (WECC) Process for Developing and Approving WECC Standards (Process), the WECC ATEC Drafting Team has completed drafting WECC-0068 to include WECC Standard BAL-004-WECC-02 / Automatic Time Error Correction and Modification of NERC BAL-001-0.1a with the addition of a WECC Regional Variance.

On December 15, 2011, the drafting team posted Version 3 of the proposed documents to the WECC web site for comments. After review of comments received and after making appropriate non-substantive changes to the documents, the team voted to forward Version 3 to the Standing Committee for approval at the March 2012 Operating Committee meeting to be held in Salt Lake City, UT.

In addition to the final documents, additional supporting documentation can be found at: http://www.wecc.biz/Standards/Development/WECC-0068/Shared%20Documents/Forms/AllItems.aspx?RootFolder=%2fStandards%2fDevelopment%2fWECC%2d0068%2fShared%20Documents%2fPosting%204%20to%20OC&FolderCTID=&View=%7bAB2713D9%2dBB53%2d4EFE%2d8BF7%2d6378E4B1AFCF%7d

Background

When FERC issued a Final Rule (FERC Order 723) approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1), FERC directed WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC

Standards.[1] The purpose of the WECC Regional Standard BAL-004-WECC-2 is to comply with FERC Order 723 and to make other clarifications to BAL-004-WECC-1 as the industry deems necessary.

The purpose of this proposed WECC Regional Variance to BAL-001-0.1a (WECC Variance) is to replace Requirements R1 and Section D. Compliance, Subsection 2 of BAL-001-0.1a with three new requirements. In Requirement E.B.1 of the WECC Variance, the drafting team proposes to replace the NERC Area Control Error (ACE) equation with an ACE equation that includes the ATEC term. Replacing the NERC raw ACE equation with the ATEC ACE equation through a WECC Variance will require Balancing Authorities in the Western Interconnection to use the ATEC ACE for control and Control Performance Standard (CPS) reporting purposes. Using the ATEC ACE equation for CPS reporting is more appropriate because it is a more accurate measure of how well a Balancing Authority is controlling to its control performance target.

The drafting team for Project WECC-0068 also requests withdrawal of the BAL-001-0.1a Appendix 2 Interpretation of Requirement R1 and the BAL-003-0.1b Appendix 1 Interpretation of Requirement R3. By creating the WECC Variance that replaces BAL-001-01.a Requirement R1, these interpretations are no longer needed. The drafting team revised the definition for Area Control Error (ACE) to closely align with NERC definition for ACE while at the same recognizing the concept of ATEC.

Drafting Team Voting Results

In accordance with the Process a majority vote of the drafting team is required to approve submitting the recommended document to the Standing Committee. Of the eleven-member team polled, ten members timely voted "yes" to submit the document to the Standing Committee for approval. None voted "no." None abstained. One member did not cast a ballot. Results of the poll are attached as Appendix A.

All comments received during the development process can be found on the WECC-0068 Team Site located at:
http://www.wecc.biz/Standards/Development/WECC-0068/default.aspx

Impact Statement

The Process requires the drafting team to prepare and post an impact assessment report regarding the estimated costs to implement the draft document. Comments were solicited regarding potential impacts should the document be approved. Since the WECC Regional Standard BAL-004-WECC-01 has been in effect since July 1, 2009, the costs to implement BAL-004-WECC-02 and the WECC Variance are expected to be minimal. The Drafting Team did not receive any impact assessment comments during the development period.

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).

Recommendations

The drafting team is making the following recommendations to the Operating Committee:

1) Approve WECC Standard BAL-004-WECC-02, Automatic Time Error Correction (ATEC), the revision to the definition for Automatic Time Error Correction, and the retirement of BAL-004-WECC-01.
2) Approve WECC Variance to NERC Standard BAL-001-0.1a, [Modification of NERC BAL-001-0.1a by adding Section E.B., the associated Measures and Violation Severity Levels, and the revision to the definition for Area Control Error (ACE)].
3) Approve withdrawal of the BAL-001-0.1a Appendix 2 Interpretation of Requirement R1
4) Approve withdrawal of the BAL-003-0.1b Appendix 1 Interpretation of Requirement R3

Please note the current definitions for “Primary Inadvertent Interchange” and “Secondary Inadvertent Interchange” will be retained in the Glossary of Terms Used in NERC Reliability Standards.

If you have questions, please feel free to contact me.

Sincerely,

Michael Mraz

Chair, Project WECC-0068 Standard Drafting Team

Appendix A

WECC-0068
WECC Standard BAL-004-WECC-02
Automatic Time Error Correction (ATEC)

WECC Regional Variance to NERC Standard BAL-001-0.1a

Polling Results for Submittal of the Final Draft Document To the Operating Committee for Approval

Out of the eleven members of the drafting team, when asked whether the final draft of the documents should be forwarded to the Operating Committee for approval, the results of that poll showed:

10= "yes" votes cast in a timely fashion
0= "no" vote
0= "abstain" and
1= "Did not cast a vote"
11 Total

Name	Organization	Yes	No	Abstain	Did not cast a Vote
Craig N. Figart	Avista Corp.	X			
Don Badley	Northwest Power Pool				X
Jamie Murphy	Bonneville Power Administration Transmission	X			
John Tolo	Tucson Electric Power Company	X			
Mike Mraz, Chair	Arizona Public Service Company	X			
Perpetuo Tan	Los Angeles Department of Water and Power	X			
Randy Beckwith	Public Service Company of Colorado [Xcel]	X			
Raymond Vojdani	Western Area Power Administration	X			
Sirajul Chowdhury	California Independent System Operator	X			
Tony Nguyen	British Columbia Transmission Corporation	X			
Madhukar Gaddam	PacifiCorp	X			

Standard BAL-001-0.1a
Real Power Balancing Control Performance
Modification of NERC BAL-001-0.1a to add WECC Regional Variance
Version 4

For Approval

Document Title	WECC Regional Variance to NERC Standard BAL-001-0.1a
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1		Version 1 Posted 4/15/11-6/1/11	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Version 3 Posted 12/15/11	Addressed comments from Version 2 posting
4		Standing Committee Approval	
5		WECC Board Approval	

Regional Variance 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.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	07/16/2010
9. Notice of development / first 30-day notice	09/2/2010
10. New committee chair orientation meeting	08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 01/18/11 02/10/11 03/11–12/11 03/24/11 04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
16. Post first draft for 45-day comment period	04/15/2011
17. Meeting to answer comments, address impact statement and draft responses	06/2-3/2011 06/14/2011

	06/23/2011 06/29/2011
18. Post responses to comments received during 45-day comment period	06/29/2011
19. Meet to answer to comments, address impact statement and draft responses	08/8/2011 08/15/2011 08/30/2011 11/01/2011
20. Post Version 2 for a 30-day comment period	11/04/2011
21. Post consideration of comments of Version 2	12/15/2011
22. Post Version 3 for 30-day comment period	12/15/2011
23. Project WECC-0068 Version 3 Comments were due	01/16/2012
24. Met to answer to comments, address impact statement, draft responses	01/18/2012
25. Post responses to comments	02/13/2012
26. Post for Operating Committee approval	02/24/2012

Description of Current Draft:

On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC Standards.[1] Since the approval of BAL-004-WECC-1 the industry has commented that there is confusion concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as that used during Automatic Generation Control (AGC) mode. The use of two ACE equations came as a result of NERC's comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a)[2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).

[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).

for control but should use raw ACE for CPS reporting.[3] The industry desires to use the same ACE equation for control and reporting because it provides better a measurement of control performance.

The purpose of this proposed WECC Regional Variance to BAL-001-01.a (WECC Variance) is to replace Requirements R1 and Section D. Compliance, Subsection 2. of BAL-001-0.1a with three new requirements. In Requirement E.B.1 of the WECC Variance, the drafting team proposes to replace the NERC ACE equation with an ACE equation that includes the ATEC term. Replacing the NERC raw ACE equation with the ATEC ACE equation through a Regional Variance will require Balancing Authorities in the Western Interconnection to use the ATEC ACE for control and CPS reporting purposes. Using the ATEC ACE equation for CPS reporting is more appropriate because, as discussed further below, it is a more accurate measure of how well a Balancing Authority is controlling to its control performance target.

The drafting team for Project WECC-0068 also requests withdrawal of the BAL-001-0.1a Appendix 2 Interpretation of Requirement R1and the BAL-003-0.1b Appendix 1 Interpretation of Requirement R3. By creating a Regional Variance that replaces Requirement R1, these interpretations are no longer needed. The drafting team revised the definition for Area Control Error (ACE) in the WECC Regional Definitions to closely align with NERC definition for ACE while at the same recognizing concept of ATEC.

In order to obtain a Regional Variance[4] to a NERC Reliability Standard, it must be demonstrated that:

- The variance is not inconsistent with or less stringent than the NERC reliability standard;
- Is necessitated by a physical difference; or
- Is an alternative methodology with the same reliability objective.

Replacing the NERC ACE equation with an ATEC ACE equation is an alternative methodology with the same reliability objective as the existing BAL-001-0.1a standard. It is a method of automatically scheduling Primary Inadvertent Interchange (PII) back to other Balancing Authorities. The inclusion of the Automatic Time Error Correction term in the ACE equation changes the Balancing Authority's control performance target. The current NERC ACE equation requires that Balancing Authorities control the frequency and Interchange within their Balancing Authority Area to a target point of zero, but it allows the control to stay within a predefined range called L_{max} which is between 0.20 * |B| and $\pm L_{10}$. The proposed ACE equation, with an Automatic Time Error adjustment, works similarly to the NERC equation; however, the target

[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

[4] "Entity variance" means an aspect of a reliability standard that applies only within a particular entity or a subset of entities within a limited portion of a regional entity, such as a variance that would apply to a regional transmission organization or particular market or to a subset of bulk power system owners, operators or users. An entity variance may not be inconsistent with or less stringent than the reliability standards as it would otherwise exist without the entity variance. An entity variance shall be approved only through the NERC standards development procedure and shall be made part of the NERC reliability standards." (Rules of Procedure of the North American Electric Reliability Corporation, Section 200 — Definition of Terms, page 2.)

point for control is adjusted by the ATEC adjustment. The ATEC component defines a new control point and is equivalent to making an interchange schedule that would automatically payback PII. The modification to the ACE equation is equivalent to making an adjustment because of a metering error. Since the amount of the adjustment during any one hour is limited by L_{max}, Balancing Authorities automatically limit the risk to the interconnection and the amount of the transaction.

The addition of the I_{ATEC} component meets the standard of justification for a Regional Variance as an alternative methodology, with the same reliability objective as the NERC Reliability Standard. In addition, the proposed WECC variance to BAL-001-0.1a is consistent with — or more stringent than — the NERC BAL-001-0.1a Reliability Standard. The reasons the WECC Variance meets the standard of justification are:

1. The addition of I_{ATEC} to the ACE equation and adjustment to the control performance target used for controlling frequency and interchange does not place any addition risk to reliability because limits are set in the magnitude of the I_{ATEC} adjustment.
2. The Regional Variance allows the use of the same control performance target for control and reporting providing a better methodology for measuring performance.
3. It is another control methodology that achieves the same reliability objective as BAL-001-0.1a.

BAL-004-WECC-1 requires Balancing Authorities in the Western Interconnection to use ATEC ACE for control. As proposed in the WECC Variance, Balancing Authorities in the Western Interconnection are required to operate synchronously to the Interconnection, using the ATEC ACE, which automatically corrects time error. The ATEC component in the ACE equation has been effective in mitigating two main issues in the Western Interconnection.

1. It has been used to reduce the number of hours of Manual Time Error Corrections, or the amount of manual adjustments of timing errors that accumulate on clocks, which make certain interconnection scheduled frequency deviations.
2. Since time error is directly related to Inadvertent Interchange, the procedure has been used to reduce accumulated Inadvertent Interchange, or the difference between the actual and scheduled interchange.

The ATEC procedure requires Balancing Authorities in the Western Interconnection to determine their contribution to the Interconnection time error. The Balancing Authority does this by calculating its PII. BAL-001-0.1a Requirement E.B.1 requires that each Balancing Authority calculate its PII_{accum} and I_{ATEC} from its hourly Inadvertent Interchange. When the resulting I_{ATEC} is entered into Balancing Authority's ACE equation, I_{ATEC} continuously corrects for its portion of the time error automatically, as opposed to manually, as specified in the continent-wide standard on Time Error Correction BAL-004-1 Requirement R2. Although the maximum payback is bounded between limits, the continuous correction enables equitable payback of Primary Inadvertent Interchange.

The drafting team is proposing the same Violation Severity Levels for Requirement R1 of the WECC Variance as those in Requirement R1 of BAL-001-01.a because it is a measurement of how well a Balancing Authority is controlling to its control performance target.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Post draft standard for 45-day NERC comment period	02/01/2012
2. NERC comment period ends	03/27/2012
3. Operating Committee approves proposed standard	03/27/2012
4. DT completes review and consideration of industry comments to NERC posting	04/27/2012
5. Post draft standard for WECC Board approval	05/01/2012
6. WECC Board approval	06/21/2012
7. Post draft standard for 15-day NERC comment period	06/25/2012
8. NERC 15-day comment period ends	07/2012
9. DT completes review and consideration of industry comments to NERC posting	07/2012
10. Submit NERC Board of Trustees approval request	08/2012
11. Receive NERC Board approval	08/2012

.

Implementation Plan

The proposed Implementation Plan is to make the WECC Regional Variance to BAL-001-0.1a and the proposed WECC Regional Reliability Standard BAL-004-WECC-2 effective on the first day of the second quarter, after regulatory approval. Since entities are already controlling with the ATEC ACE equation, but are using the NERC raw ACE equation for purposes of reporting CPS1, the transition to controlling and reporting using the ATEC ACE should be minimal. Additionally, it should not require much time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

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 definitions will be removed from the standard and added to the NERC Glossary.

Area Control Error: The instantaneous difference between a Balancing Authority's net actual and scheduled interchange, taking into account the effects of Frequency Bias, correction for meter error, and Automatic Time Error Correction (ATEC), if operating in the ATEC mode. ATEC is only applicable to Balancing Authorities in the Western Interconnection.

A. Introduction

1. **Title**: **Real Power Balancing Control Performance**

2. **Number**: BAL-001-0.1a

3. **Purpose**: To maintain Interconnection steady-state frequency within defined limits by balancing real power demand and supply in real-time.

4. **Applicability**:

   4.1. Balancing Authorities

5. **Effective Date:** The WECC Regional Variance to NERC Reliability Standard BAL-001-0.1a is to be effective on the first day of the second quarter, after regulatory approval.

B. Requirements

R1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit ε_1^2 is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \epsilon_1^2 \; or \; \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\epsilon_1^2} \le 1$$

Committee.

The equation for ACE is:

$ACE = (NI_A - NI_S) - 10B (F_A - F_S) - I_{ME}$

where:

- NI_A is the algebraic sum of actual flows on all tie lines.
- NI_S is the algebraic sum of scheduled flows on all tie lines.
- B is the Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.
- F_A is the actual frequency.
- F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.
- I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

R2. Each Balancing Authority shall operate such that its average ACE for at least 90% of clock-ten-minute periods (6 non-overlapping periods per hour) during a calendar

month is within a specific limit, referred to as L_{10}.

$$AVG_{10-\text{minute}}(ACE_i) \le L_{10}$$

where:

$L_{10} = 1.65 \in_{10} \sqrt{(-10B_i)(-10B_s)}$

ε_{10} is a constant derived from the targeted frequency bound. It is the targeted root-mean-square (RMS) value of ten-minute average Frequency Error based on frequency performance over a given year. The bound, ε_{10}, is the same for every Balancing Authority Area within an Interconnection, and B_s is the sum of the Frequency Bias Settings of the Balancing Authority Areas in the respective Interconnection. For Balancing Authority Areas with variable bias, this is equal to the sum of the minimum Frequency Bias Settings.

R3. Each Balancing Authority providing Overlap Regulation Service shall evaluate Requirement R1 (i.e., Control Performance Standard 1 or CPS1) and Requirement R2 (i.e., Control Performance Standard 2 or CPS2) using the characteristics of the combined ACE and combined Frequency Bias Settings.

R4. Any Balancing Authority receiving Overlap Regulation Service shall not have its control performance evaluated (i.e. from a control performance perspective, the Balancing Authority has shifted all control requirements to the Balancing Authority providing Overlap Regulation Service).

C. Measures

M1. Each Balancing Authority shall achieve, as a minimum, Requirement 1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-\text{month}}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement R1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}}\right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error will be used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

The reporting Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}}[(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}}[n_{\text{one-minutesamplesin clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}}[(\text{CF}_{\text{clock-houraverage-month}})(n_{\text{one-minutesamplesin clock-houraverages}})]}{\sum_{\text{hours-in day}}[n_{\text{one-minutesamplesin clock-houraverages}}]}$$

The 12-month compliance factor becomes:

$$\text{CF}_{\text{12-month}} = \frac{\sum_{\text{i=1}}^{12}(CF_{\text{month-i}})(n_{\text{(one-minutesamplesin month)-i}})]}{\sum_{\text{i=1}}^{12}[n_{\text{(one-minutesamplesin month)-i}}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at

least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

M2. Each Balancing Authority shall achieve, as a minimum, Requirement R2 (CPS2) compliance of 90%. CPS2 relates to a bound on the ten-minute average of ACE. A compliance percentage is calculated as follows:

$$CPS2 = \left[1 - \frac{\text{Violations}_{\text{month}}}{\left(\text{Total Periods}_{\text{month}} - \text{Unavailable Periods}_{\text{month}}\right)}\right] * 100$$

The violations per month are a count of the number of periods that ACE clock-ten-minutes exceeded L_{10}. ACE clock-ten-minutes is the sum of valid ACE samples within a clock-ten-minute period divided by the number of valid samples.

Violation clock-ten-minutes

= 0 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| \leq L_{10}$$

= 1 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| > L_{10}$$

Each Balancing Authority shall report the total number of violations and unavailable periods for the month. L_{10} is defined in Requirement R2.

Since CPS2 requires that ACE be averaged over a discrete time period, the same factors that limit total periods per month will limit violations per month. The calculation of total periods per month and violations per month, therefore, must be discussed jointly.

A condition may arise which may impact the normal calculation of total periods per month and violations per month. This condition is a sustained interruption in the recording of ACE.

In order to ensure that the average ACE calculated for any ten-minute interval is representative of that ten-minute interval, it is necessary that at least half the ACE data samples are present for that interval. Should half or more of the ACE data be unavailable due to loss of telemetering or computer unavailability, that ten-minute interval shall be omitted from the calculation of CPS2.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Regional Reliability Organization

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar month.

1.3. Data Retention

The data that supports the calculation of CPS1 and CPS2 (Appendix 1-BAL-001-0) are to be retained in electronic form for at least a one-year period. If the CPS1 and CPS2 data for a Balancing Authority Area are undergoing a review to address a question that has been raised regarding the data, the data are to be saved beyond the normal retention period until the question is formally resolved. Each Balancing Authority shall retain for a rolling 12-month period the values of: one-minute average ACE (ACE_i), one-minute average Frequency Error, and, if using variable bias, one-minute average Frequency Bias.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance – CPS1

2.1. Level 1: The Balancing Authority Area's value of CPS1 is less than 100% but greater than or equal to 95%.

2.2. Level 2: The Balancing Authority Area's value of CPS1 is less than 95% but greater than or equal to 90%.

2.3. Level 3: The Balancing Authority Area's value of CPS1 is less than 90% but greater than or equal to 85%.

2.4. Level 4: The Balancing Authority Area's value of CPS1 is less than 85%.

3. Levels of Non-Compliance – CPS2

3.1. Level 1: The Balancing Authority Area's value of CPS2 is less than 90% but greater than or equal to 85%.

3.2. Level 2: The Balancing Authority Area's value of CPS2 is less than 85% but greater than or equal to 80%.

3.3. Level 3: The Balancing Authority Area's value of CPS2 is less than 80% but greater than or equal to 75%.

3.4. Level 4: The Balancing Authority Area's value of CPS2 is less than 75%.

E. Regional Variances

E.A. The ERCOT Control Performance Standard 2 Waiver approved November 21, 2002.

E.B. Regional Variance for the Western Electricity Coordinating Council

The following Interconnection-wide variance shall be applicable in the Western Interconnection and replaces, in their entirety, Requirement R1 and Section D.2. (i.e., under Compliance replace Levels of Non-Compliance – CPS1). Please note that the ACE equation is replaced in its entirety with the following equation identified in Requirement E.B.1.

Requirements and Measures

E.B.1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit $\in_1^2$ is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \in_1^2 \; or \; \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\in_1^2} \le 1$$

The equation for ACE in the Western Interconnection is:

$$ACE = (NI_A - NI_S) - 10B(F_A - F_S) - I_{ME} + I_{ATEC}$$

Where:

NI_A is the algebraic sum of actual flows on all tie lines.

NI_S is the algebraic sum of scheduled flows on all tie lines.

F_A is the actual frequency.

F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.

B = Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.

I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

Rationale for E.B.1

Premise: When a Balancing Authority Area uses the ACE equation with an ATEC correction component for both control and assessing performance, it provides a more accurate measurement of the Control Performance methodology while at the same time achieving the same reliability objective as the existing BAL-001-0.1a standard.

Justification: Adding the ***I_{ATEC}*** term to the ACE equation reduces the number of manual time error corrections and PII_{accum}.

Goal: To establish an ACE equation that permits the implementation of Automatic Time Error Correction.

$I_{ATEC} = \frac{\mathrm{PII}_{\mathrm{accum}}^{\mathrm{on/off\ peak}}}{(-Y) * H}$ when operating in Automatic Time Error Correction control mode.

I_{ATEC} shall be zero when operating in any other AGC mode.

Y = B / B_S.

H = Number of Hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3.

B_S = Frequency Bias for the Interconnection (MW / 0.1 Hz).

Primary **I**nadvertent **I**nterchange **(PII_{hourly})** is **(1-Y) * (II_{actual} - B * ΔTE/6)**

II_{actual} is the hourly Inadvertent Interchange for the last hour.

ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where:

$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE_{offset})$

TD_{adj} is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks.

t is the number of minutes of Manual Time Error Correction that occurred during the hour.

TE_{offset} is 0.000 or +0.020 or -0.020.

PII_{accum} is the Balancing Authority's accumulated **PII_{hourly}** in MWh. An On-Peak and Off-Peak accumulation accounting is required.

Where:

$\mathrm{PII}_{\mathrm{accum}}^{\mathrm{on/off\ peak}}$ **= last period's** $\mathrm{PII}_{\mathrm{accum}}^{\mathrm{on/off\ peak}}$ **+** PII_{hourly}

[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]

M.E.B.1. Each Balancing Authority shall achieve, as a minimum, Requirement E.B.1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-\mathrm{month}}}{(\in_1)^2}$$

where: $\in_1$ is defined in Requirement E.B.1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}}\right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error are used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

As part of its evidence each Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}}[(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}}[n_{\text{one-minutesamplesin clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}}[(\text{CF}_{\text{clock-houraverage-month}})(n_{\text{one-minutesamplesin clock-houraverages}})]}{\sum_{\text{hours-in day}}[n_{\text{one-minutesamplesin clock-houraverages}}]}$$

The 12-month compliance factor becomes:

$$CF_{12\text{-month}} = \frac{\sum_{i=1}^{12}(CF_{\text{month-i}})(n_{(\text{one-minute samples in month})\text{-i}})]}{\sum_{i=1}^{12}[n_{(\text{one-minute samples in month})\text{-i}}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

Rationale for E.B.2

Premise: I_{ATEC} greater than L_{max} may result in a risk to reliability caused by large ATEC payback.

Justification: Balancing Authorities should not control their Balancing Authority Areas using an approach that puts system reliability at risk.

Goal: The goal of Requirement E.B.2 is to limit I_{ATEC} to L_{max} in order to reduce potential reliability risks to the interconnection caused by a large ATEC payback term.

E.B.2. Each Balancing Authority shall limit the absolute value of I_{ATEC}, the Automatic Time Error Correction term as follows: *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*

$$|I_{ATEC}| \leq L_{max}.$$

M.E.B.2. Forms of acceptable evidence for Requirement E.B. 2 may include, but are not limited to:

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or
- Other archived data that demonstrates compliance.

Rationale for E.B.3

Premise: Operating within an L_{max} less than 0.20 * |B| may not provide sufficient correction for PII and operating with an L_{max} greater than L_{10} may result in potential reliability risks caused by a large ATEC payback term.

Justification: L_{max} should be limited to prevent Balancing Authorities from creating potential reliability risks caused by a large ATEC payback term.

Goal: The goal of Requirement E.B.3 is to develop a range for L_{max} where Balancing Authorities reduce potential reliability risks by limiting I_{ATEC} to L_{max}.

E.B.3. Each Balancing Authority shall set L_{max} within the limits as follows:

$$0.20 * |B| \leq L_{max} \leq L_{10}.$$

[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]

M.E.B.3. Forms of acceptable evidence for Requirement E.B. 3 may include, but is not limited to:

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or
- Other archived data that demonstrates compliance.

E.B. Compliance

1. Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of I_{ATEC} and L_{max} for the preceding calendar year (January – December), as well as the current calendar year.

Table of Compliance Elements

E #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
E.B.1	Real-time Operations	Medium	The Balancing Authority Area's value of CPS1 was less than 100% but greater than or equal to 95%.	The Balancing Authority Area's value of CPS1 was less than 95% but greater than or equal to 90%.	The Balancing Authority Area's value of CPS1 was less than 90% but greater than or equal to 85%.	The Balancing Authority Area's value of CPS1 was less than 85%.
E.B.2	Real-time Operations	Medium	N/A	N/A	N/A	The Balancing Authority Area's absolute value for I_{ATEC} was greater than L_{max}.
E.B.3	Operations Planning	Medium	N/A	N/A	N/A	The Balancing Authority did not set L_{max} to within the limits in E.B.3 (i.e., $0.20 * \|B\| \leq L_{max} \leq L_{10}$).

F. Associated Documents

Version History

Version	Date	Action	Change Tracking
0	February 8, 2005	BOT Approval	New
0	April 1, 2005	Effective Implementation Date	New
0	August 8, 2005	Removed “Proposed” from Effective Date	Errata
0	July 24, 2007	Corrected R3 to reference M1 and M2 instead of R1 and R2	Errata
0a	December 19, 2007	Added Appendix 2 – Interpretation of R1 approved by BOT on October 23, 2007	Revised
0a	January 16, 2008	In Section A.2., Added “a” to end of standard number In Section F, corrected automatic numbering from “2” to “1” and removed “approved” and added parenthesis to “(October 23, 2007)”	Errata
0	January 23, 2008	Reversed errata change from July 24, 2007	Errata
0.1a	October 29, 2008	Board approved errata changes; updated version number to “0.1a”	Errata
0.1a	May 13, 2009	Approved by FERC	
		WECC Regional Variance Retirement of Appendix 2 Interpretation of Requirement R1	

Standard BAL-001-0.1a
Real Power Balancing Control Performance
Modification of NERC BAL-001-0.1a to add WECC Regional Variance
Version 4
For Approval

Appendix 1-BAL-001-0
CPS1 and CPS2 Data

CPS1 DATA	Description	Retention Requirements
ε_1	A constant derived from the targeted frequency bound. This number is the same for each Balancing Authority Area in the Interconnection.	Retain the value of ε_1 used in CPS1 calculation.
ACE_i	The clock-minute average of ACE.	Retain the 1-minute average values of ACE (525,600 values).
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value(s) of B_i used in the CPS1 calculation.
F_A	The actual measured frequency.	Retain the 1-minute average frequency values (525,600 values).
F_S	Scheduled frequency for the Interconnection.	Retain the 1-minute average frequency values (525,600 values).

CPS2 DATA	Description	Retention Requirements
V	Number of incidents per hour in which the absolute value of ACE clock-ten-minutes is greater than L_{10}.	Retain the values of V used in CPS2 calculation.
ε_{10}	A constant derived from the frequency bound. It is the same for each Balancing Authority Area within an Interconnection.	Retain the value of ε_{10} used in CPS2 calculation.
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value of B_i used in the CPS2 calculation.
B_s	The sum of Frequency Bias of the Balancing Authority Areas in the respective Interconnection. For systems with variable bias, this is equal to the sum of the minimum Frequency Bias Setting.	Retain the value of B_s used in the CPS2 calculation. Retain the 1-minute minimum bias value (525,600 values).
U	Number of unavailable ten-minute periods per hour used in calculating CPS2.	Retain the number of 10-minute unavailable periods used in calculating CPS2 for the reporting period.

Standard BAL-001-0.1a
Real Power Balancing Control Performance
Modification of NERC BAL-001-0.1a to add WECC Regional Variance
Version 4

For Approval

Document Title	WECC Regional Variance to NERC Standard BAL-001-0.1a
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1		Version 1 Posted 4/15/11-6/1/11	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Version 3 Posted 12/15/11	Addressed comments from Version 2 posting
4		Standing Committee Approval	
5		WECC Board Approval	

Regional Variance 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.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	07/16/2010
9. Notice of development / first 30-day notice	09/2/2010
10. New committee chair orientation meeting	08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 01/18/11 02/10/11 03/11–12/11 03/24/11 04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
16. Post first draft for 45-day comment period	04/15/2011
17. Meeting to answer comments, address impact statement and draft responses	06/2-3/2011 06/14/2011

	06/23/2011 06/29/2011
18. Post responses to comments received during 45-day comment period	06/29/2011
19. Meet to answer to comments, address impact statement and draft responses	08/8/2011 08/15/2011 08/30/2011 11/01/2011
20. Post Version 2 for a 30-day comment period	11/04/2011
21. Post consideration of comments of Version 2	12/15/2011
22. Post Version 3 for 30-day comment period	12/15/2011
23. Project WECC-0068 Version 3 Comments were due	01/16/2012
24. Met to answer to comments, address impact statement, draft responses	01/18/2012
25. Post responses to comments	02/13/2012
26. Post for Operating Committee approval	02/24/2012

Description of Current Draft:

On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC Standards.[1] Since the approval of BAL-004-WECC-1 the industry has commented that there is confusion concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as that used during Automatic Generation Control (AGC) mode. The use of two ACE equations came as a result of NERC's comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a)[2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).

[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).

for control but should use raw ACE for CPS reporting.[3] The industry desires to use the same ACE equation for control and reporting because it provides better a measurement of control performance.

The purpose of this proposed WECC Regional Variance to BAL-001-01.a (WECC Variance) is to replace Requirements R1 and Section D. Compliance, Subsection 2. of BAL-001-0.1a with three new requirements. In Requirement E.B.1 of the WECC Variance, the drafting team proposes to replace the NERC ACE equation with an ACE equation that includes the ATEC term. Replacing the NERC raw ACE equation with the ATEC ACE equation through a Regional Variance will require Balancing Authorities in the Western Interconnection to use the ATEC ACE for control and CPS reporting purposes. Using the ATEC ACE equation for CPS reporting is more appropriate because, as discussed further below, it is a more accurate measure of how well a Balancing Authority is controlling to its control performance target.

The drafting team for Project WECC-0068 also requests withdrawal of the BAL-001-0.1a Appendix 2 Interpretation of Requirement R1and the BAL-003-0.1b Appendix 1 Interpretation of Requirement R3. By creating a Regional Variance that replaces Requirement R1, these interpretations are no longer needed. The drafting team revised the definition for Area Control Error (ACE) in the WECC Regional Definitions to closely align with NERC definition for ACE while at the same recognizing concept of ATEC.

In order to obtain a Regional Variance[4] to a NERC Reliability Standard, it must be demonstrated that:

- The variance is not inconsistent with or less stringent than the NERC reliability standard;
- Is necessitated by a physical difference; or
- Is an alternative methodology with the same reliability objective.

Replacing the NERC ACE equation with an ATEC ACE equation is an alternative methodology with the same reliability objective as the existing BAL-001-0.1a standard. It is a method of automatically scheduling Primary Inadvertent Interchange (PII) back to other Balancing Authorities. The inclusion of the Automatic Time Error Correction term in the ACE equation changes the Balancing Authority's control performance target. The current NERC ACE equation requires that Balancing Authorities control the frequency and Interchange within their Balancing Authority Area to a target point of zero, but it allows the control to stay within a predefined range called L_{max} which is between 0.20 * |B| and $\pm L_{10}$. The proposed ACE equation, with an Automatic Time Error adjustment, works similarly to the NERC equation; however, the target

[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

[4] "Entity variance" means an aspect of a reliability standard that applies only within a particular entity or a subset of entities within a limited portion of a regional entity, such as a variance that would apply to a regional transmission organization or particular market or to a subset of bulk power system owners, operators or users. An entity variance may not be inconsistent with or less stringent than the reliability standards as it would otherwise exist without the entity variance. An entity variance shall be approved only through the NERC standards development procedure and shall be made part of the NERC reliability standards." (Rules of Procedure of the North American Electric Reliability Corporation, Section 200 — Definition of Terms, page 2.)

point for control is adjusted by the ATEC adjustment. The ATEC component defines a new control point and is equivalent to making an interchange schedule that would automatically payback PII. The modification to the ACE equation is equivalent to making an adjustment because of a metering error. Since the amount of the adjustment during any one hour is limited by L_{max}, Balancing Authorities automatically limit the risk to the interconnection and the amount of the transaction.

The addition of the I_{ATEC} component meets the standard of justification for a Regional Variance as an alternative methodology, with the same reliability objective as the NERC Reliability Standard. In addition, the proposed WECC variance to BAL-001-0.1a is consistent with — or more stringent than — the NERC BAL-001-0.1a Reliability Standard. The reasons the WECC Variance meets the standard of justification are:

1. The addition of I_{ATEC} to the ACE equation and adjustment to the control performance target used for controlling frequency and interchange does not place any addition risk to reliability because limits are set in the magnitude of the I_{ATEC} adjustment.
2. The Regional Variance allows the use of the same control performance target for control and reporting providing a better methodology for measuring performance.
3. It is another control methodology that achieves the same reliability objective as BAL-001-0.1a.

BAL-004-WECC-1 requires Balancing Authorities in the Western Interconnection to use ATEC ACE for control. As proposed in the WECC Variance, Balancing Authorities in the Western Interconnection are required to operate synchronously to the Interconnection, using the ATEC ACE, which automatically corrects time error. The ATEC component in the ACE equation has been effective in mitigating two main issues in the Western Interconnection.

1. It has been used to reduce the number of hours of Manual Time Error Corrections, or the amount of manual adjustments of timing errors that accumulate on clocks, which make certain interconnection scheduled frequency deviations.
2. Since time error is directly related to Inadvertent Interchange, the procedure has been used to reduce accumulated Inadvertent Interchange, or the difference between the actual and scheduled interchange.

The ATEC procedure requires Balancing Authorities in the Western Interconnection to determine their contribution to the Interconnection time error. The Balancing Authority does this by calculating its PII. BAL-001-0.1a Requirement E.B.1 requires that each Balancing Authority calculate its PII_{accum} and I_{ATEC} from its hourly Inadvertent Interchange. When the resulting I_{ATEC} is entered into Balancing Authority's ACE equation, I_{ATEC} continuously corrects for its portion of the time error automatically, as opposed to manually, as specified in the continent-wide standard on Time Error Correction BAL-004-1 Requirement R2. Although the maximum payback is bounded between limits, the continuous correction enables equitable payback of Primary Inadvertent Interchange.

The drafting team is proposing the same Violation Severity Levels for Requirement R1 of the WECC Variance as those in Requirement R1 of BAL-001-01.a because it is a measurement of how well a Balancing Authority is controlling to its control performance target.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Post draft standard for 45-day NERC comment period	02/01/2012
2. NERC comment period ends	03/27/2012
3. Operating Committee approves proposed standard	03/27/2012
4. DT completes review and consideration of industry comments to NERC posting	04/27/2012
5. Post draft standard for WECC Board approval	05/01/2012
6. WECC Board approval	06/21/2012
7. Post draft standard for 15-day NERC comment period	06/25/2012
8. NERC 15-day comment period ends	07/2012
9. DT completes review and consideration of industry comments to NERC posting	07/2012
10. Submit NERC Board of Trustees approval request	08/2012
11. Receive NERC Board approval	08/2012

.

Implementation Plan

The proposed Implementation Plan is to make the WECC Regional Variance to BAL-001-0.1a and the proposed WECC Regional Reliability Standard BAL-004-WECC-2 effective on the first day of the second quarter, after regulatory approval. Since entities are already controlling with the ATEC ACE equation, but are using the NERC raw ACE equation for purposes of reporting CPS1, the transition to controlling and reporting using the ATEC ACE should be minimal. Additionally, it should not require much time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

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 definitions will be removed from the standard and added to the NERC Glossary.

Area Control Error: The instantaneous difference between a Balancing Authority's net actual and scheduled interchange, taking into account the effects of Frequency Bias, correction for meter error, and Automatic Time Error Correction (ATEC), if operating in the ATEC mode. ATEC is only applicable to Balancing Authorities in the Western Interconnection.

A. Introduction

1. **Title**: **Real Power Balancing Control Performance**

2. **Number**: BAL-001-0.1a

3. **Purpose**: To maintain Interconnection steady-state frequency within defined limits by balancing real power demand and supply in real-time.

4. **Applicability**:

   4.1. Balancing Authorities

~~5. **Effective Date:** May 13, 2009~~

5. **Effective Date:** The WECC Regional Variance to NERC Reliability Standard BAL-001-0.1a is to be effective on the first day of the second quarter, after regulatory approval.

B. Requirements

R1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit ε_1^2 is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \epsilon_1^2 \quad or \quad \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\epsilon_1^2} \le 1$$

Committee.

The equation for ACE is:

$ACE = (NI_A - NI_S) - 10B (F_A - F_S) - I_{ME}$

where:

- NI_A is the algebraic sum of actual flows on all tie lines.
- NI_S is the algebraic sum of scheduled flows on all tie lines.
- B is the Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.
- F_A is the actual frequency.
- F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.
- I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

R2. Each Balancing Authority shall operate such that its average ACE for at least 90% of clock-ten-minute periods (6 non-overlapping periods per hour) during a calendar month is within a specific limit, referred to as L_{10}.

$$AVG_{10-\text{minute}}(ACE_i) \le L_{10}$$

where:

$L_{10} = 1.65 \in_{10} \sqrt{(-10B_i)(-10B_s)}$

ε_{10} is a constant derived from the targeted frequency bound. It is the targeted root-mean-square (RMS) value of ten-minute average Frequency Error based on frequency performance over a given year. The bound, ε_{10}, is the same for every Balancing Authority Area within an Interconnection, and B_s is the sum of the Frequency Bias Settings of the Balancing Authority Areas in the respective Interconnection. For Balancing Authority Areas with variable bias, this is equal to the sum of the minimum Frequency Bias Settings.

R3. Each Balancing Authority providing Overlap Regulation Service shall evaluate Requirement R1 (i.e., Control Performance Standard 1 or CPS1) and Requirement R2 (i.e., Control Performance Standard 2 or CPS2) using the characteristics of the combined ACE and combined Frequency Bias Settings.

R4. Any Balancing Authority receiving Overlap Regulation Service shall not have its control performance evaluated (i.e. from a control performance perspective, the Balancing Authority has shifted all control requirements to the Balancing Authority providing Overlap Regulation Service).

C. Measures

M1. Each Balancing Authority shall achieve, as a minimum, Requirement 1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-\text{month}}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement R1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}}\right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error will be used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

The reporting Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}}[(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}}[n_{\text{one-minutesamplesin clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}}[(\text{CF}_{\text{clock-houraverage-month}})(n_{\text{one-minutesamplesin clock-houraverages}})]}{\sum_{\text{hours-in day}}[n_{\text{one-minutesamplesin clock-houraverages}}]}$$

The 12-month compliance factor becomes:

$$\text{CF}_{\text{12-month}} = \frac{\sum_{\text{i=1}}^{12}(CF_{\text{month-i}})(n_{(\text{one-minutesamplesin month})\text{-i}})]}{\sum_{\text{i=1}}^{12}[n_{(\text{one-minutesamplesin month})\text{-i}}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

M2. Each Balancing Authority shall achieve, as a minimum, Requirement R2 (CPS2) compliance of 90%. CPS2 relates to a bound on the ten-minute average of ACE. A compliance percentage is calculated as follows:

$$CPS2 = \left[1 - \frac{\text{Violations}_{\text{month}}}{\left(\text{Total Periods}_{\text{month}} - \text{Unavailable Periods}_{\text{month}}\right)}\right] * 100$$

The violations per month are a count of the number of periods that ACE clock-ten-minutes exceeded L_{10}. ACE clock-ten-minutes is the sum of valid ACE samples within a clock-ten-minute period divided by the number of valid samples.

Violation clock-ten-minutes

= 0 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| \leq L_{10}$$

= 1 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| > L_{10}$$

Each Balancing Authority shall report the total number of violations and unavailable periods for the month. L_{10} is defined in Requirement R2.

Since CPS2 requires that ACE be averaged over a discrete time period, the same factors that limit total periods per month will limit violations per month. The calculation of total periods per month and violations per month, therefore, must be discussed jointly.

A condition may arise which may impact the normal calculation of total periods per month and violations per month. This condition is a sustained interruption in the recording of ACE.

In order to ensure that the average ACE calculated for any ten-minute interval is representative of that ten-minute interval, it is necessary that at least half the ACE data samples are present for that interval. Should half or more of the ACE data be unavailable due to loss of telemetering or computer unavailability, that ten-minute interval shall be omitted from the calculation of CPS2.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Regional Reliability Organization~~.~~

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar month.

1.3. Data Retention

The data that supports the calculation of CPS1 and CPS2 (Appendix 1-BAL-001-0) are to be retained in electronic form for at least a one-year period. If the CPS1 and CPS2 data for a Balancing Authority Area are undergoing a review to address a question that has been raised regarding the data, the data are to be saved beyond the normal retention period until the question is formally resolved. Each Balancing Authority shall retain for a rolling 12-month period the values of: one-minute average ACE (ACE_i), one-minute average Frequency Error, and, if using variable bias, one-minute average Frequency Bias.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance – CPS1

2.1. Level 1: The Balancing Authority Area's value of CPS1 is less than 100% but greater than or equal to 95%.

2.2. Level 2: The Balancing Authority Area's value of CPS1 is less than 95% but greater than or equal to 90%.

2.3. Level 3: The Balancing Authority Area's value of CPS1 is less than 90% but greater than or equal to 85%.

2.4. Level 4: The Balancing Authority Area's value of CPS1 is less than 85%.

3. Levels of Non-Compliance – CPS2

3.1. Level 1: The Balancing Authority Area's value of CPS2 is less than 90% but greater than or equal to 85%.

3.2. Level 2: The Balancing Authority Area's value of CPS2 is less than 85% but greater than or equal to 80%.

3.3. Level 3: The Balancing Authority Area's value of CPS2 is less than 80% but greater than or equal to 75%.

3.4. Level 4: The Balancing Authority Area's value of CPS2 is less than 75%.

E. Regional ~~Differences~~Variances

~~1.~~E.A. The ERCOT Control Performance Standard 2 Waiver approved November 21, 2002.

E.B. Regional Variance for the Western Electricity Coordinating Council

The following Interconnection-wide variance shall be applicable in the Western Interconnection and replaces, in their entirety, Requirement R1 and Section D.2.

(i.e., under Compliance replace Levels of Non-Compliance – CPS1). Please note that the ACE equation is replaced in its entirety with the following equation identified in Requirement E.B.1.

Requirements and Measures

E.B.1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit $\in_1^2$ is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \in_1^2 \; or \; \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\in_1^2} \le 1$$

The equation for ACE in the Western Interconnection is:

$$ACE = (NI_A - NI_S) - 10B(F_A - F_S) - I_{ME} + I_{ATEC}$$

Where:

NI_A is the algebraic sum of actual flows on all tie lines.

NI_S is the algebraic sum of scheduled flows on all tie lines.

F_A is the actual frequency.

F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.

B = Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.

I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line

Rationale for E.B.1

Premise: When a Balancing Authority Area uses the ACE equation with an ATEC correction component for both control and assessing performance, it provides a more accurate measurement of the Control Performance methodology while at the same time achieving the same reliability objective as the existing BAL-001-0.1a standard.

Justification: Adding the ***I_{ATEC}*** term to the ACE equation reduces the number of manual time error corrections and PII_{accum}.

Goal: To establish an ACE equation that permits the implementation of Automatic Time Error Correction.

flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

$I_{ATEC} = \frac{PII_{accum}^{on/off\ peak}}{(-Y) * H}$ when operating in Automatic Time Error Correction control mode.

I_{ATEC} shall be zero when operating in any other AGC mode.

Y = B / B_S.

H = Number of Hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3.

B_S = Frequency Bias for the Interconnection (MW / 0.1 Hz).

Primary **I**nadvertent **I**nterchange **(PII_{hourly})** is **(1-Y) * (II_{actual} - B * ΔTE/6)**

II_{actual} is the hourly Inadvertent Interchange for the last hour.

ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where:

$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE_{offset})$

TD_{adj} is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks.

t is the number of minutes of Manual Time Error Correction that occurred during the hour.

TE_{offset} is 0.000 or +0.020 or -0.020.

PII_{accum} is the Balancing Authority's accumulated **PII_{hourly}** in MWh. An On-Peak and Off-Peak accumulation accounting is required.

Where:

$PII_{accum}^{on/off\ peak}$ **= last period's** $PII_{accum}^{on/off\ peak}$ **+** PII_{hourly}

[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]

M.E.B.1. Each Balancing Authority shall achieve, as a minimum, Requirement E.B.1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-\text{month}}}{(\in_1)^2}$$

where: $\in_1$ is defined in Requirement E.B.1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}}\right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error are used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

As part of its evidence each Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}}[(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}}[n_{\text{one-minutesamplesin clock-hour}}]}$$

$$CF_{month} = \frac{\sum_{hours\text{-}in\text{-}day}[(CF_{clock\text{-}hour\,average\text{-}month})(n_{one\text{-}minute\,samples\,in\,clock\text{-}hour\,averages})]}{\sum_{hours\text{-}in\,day}[n_{one\text{-}minute\,samples\,in\,clock\text{-}hour\,averages}]}$$

The 12-month compliance factor becomes:

$$CF_{12\text{-}month} = \frac{\sum_{i=1}^{12}(CF_{month\text{-}i})(n_{(one\text{-}minute\,samples\,in\,month)\text{-}i})]}{\sum_{i=1}^{12}[n_{(one\text{-}minute\,samples\,in\,month)\text{-}i}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

E.B.2. Each Balancing Authority shall limit the absolute value of I_{ATEC}, the Automatic Time Error Correction term as follows: *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*

$$|I_{ATEC}| \leq L_{max}.$$

Rationale for E.B.2

Premise: I_{ATEC} greater than L_{max} may result in a risk to reliability caused by large ATEC payback.

Justification: Balancing Authorities should not control their Balancing Authority Areas using an approach that puts system reliability at risk.

Goal: The goal of Requirement E.B.2 is to limit I_{ATEC} to L_{max} in order to reduce potential reliability risks to the interconnection caused by a large ATEC payback term.

M.E.B.2. Forms of acceptable evidence for Requirement E.B. 2 may include, but are not limited to:

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or

Rationale for E.B.3

Premise: Operating within an L_{max} less than 0.20 * |B| may not provide sufficient correction for PII and operating with an L_{max} greater than L_{10} may result in potential reliability risks caused by a large ATEC payback term.

Justification: L_{max} should be limited to prevent Balancing Authorities from creating potential reliability risks caused by a large ATEC payback term.

Goal: The goal of Requirement E.B.3 is to develop a range for L_{max} where Balancing Authorities reduce potential reliability risks by limiting I_{ATEC} to L_{max}.

- Other archived data that demonstrates compliance.

E.B.3. Each Balancing Authority shall set L_{max} within the limits as follows:

$$0.20 * |B| \leq L_{max} \leq L_{10}.$$

[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]

M.E.B.3. Forms of acceptable evidence for Requirement E.B. 3 may include, but is not limited to:

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or
- Other archived data that demonstrates compliance.

E.B. Compliance

1. Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of I_{ATEC} and L_{max} for the preceding calendar year (January – December), as well as the current calendar year.

Table of Compliance Elements

E #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
E.B.1	Real-time Operations	Medium	The Balancing Authority Area's value of CPS1 was less than 100% but greater than or equal to 95%.	The Balancing Authority Area's value of CPS1 was less than 95% but greater than or equal to 90%.	The Balancing Authority Area's value of CPS1 was less than 90% but greater than or equal to 85%.	The Balancing Authority Area's value of CPS1 was less than 85%.
E.B.2	Real-time Operations	Medium	N/A	N/A	N/A	The Balancing Authority Area's absolute value for I_{ATEC} was greater than L_{max}.
E.B.3	Operations Planning	Medium	N/A	N/A	N/A	The Balancing Authority did not set L_{max} to within the limits in E.B.3 (i.e., $0.20 * \lvert B \rvert \leq L_{max} \leq L_{10}$).

F. Associated Documents

E.A. Appendix 2 – Interpretation of Requirement R1 (October 23, 2007).

Version History

Version	Date	Action	Change Tracking
0	February 8, 2005	BOT Approval	New
0	April 1, 2005	Effective Implementation Date	New
0	August 8, 2005	Removed "Proposed" from Effective Date	Errata
0	July 24, 2007	Corrected R3 to reference M1 and M2 instead of R1 and R2	Errata
0a	December 19, 2007	Added Appendix 2 – Interpretation of R1 approved by BOT on October 23, 2007	Revised
0a	January 16, 2008	In Section A.2., Added "a" to end of standard number In Section F, corrected automatic numbering from "2" to "1" and removed "approved" and added parenthesis to "(October 23, 2007)"	Errata
0	January 23, 2008	Reversed errata change from July 24, 2007	Errata
0.1a	October 29, 2008	Board approved errata changes; updated version number to "0.1a"	Errata
0.1a	May 13, 2009	Approved by FERC	
		WECC Regional Variance Retirement of Appendix 2 Interpretation of Requirement R1	

Appendix 1-BAL-001-0
CPS1 and CPS2 Data

CPS1 DATA	Description	Retention Requirements
ε_1	A constant derived from the targeted frequency bound. This number is the same for each Balancing Authority Area in the Interconnection.	Retain the value of ε_1 used in CPS1 calculation.
ACE_i	The clock-minute average of ACE.	Retain the 1-minute average values of ACE (525,600 values).
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value(s) of B_i used in the CPS1 calculation.
F_A	The actual measured frequency.	Retain the 1-minute average frequency values (525,600 values).
F_S	Scheduled frequency for the Interconnection.	Retain the 1-minute average frequency values (525,600 values).

CPS2 DATA	Description	Retention Requirements
V	Number of incidents per hour in which the absolute value of ACE clock-ten-minutes is greater than L_{10}.	Retain the values of V used in CPS2 calculation.
ε_{10}	A constant derived from the frequency bound. It is the same for each Balancing Authority Area within an Interconnection.	Retain the value of ε_{10} used in CPS2 calculation.
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value of B_i used in the CPS2 calculation.
B_s	The sum of Frequency Bias of the Balancing Authority Areas in the respective Interconnection. For systems with variable bias, this is equal to the sum of the minimum Frequency Bias Setting.	Retain the value of B_s used in the CPS2 calculation. Retain the 1-minute minimum bias value (525,600 values).
U	Number of unavailable ten-minute periods per hour used in calculating CPS2.	Retain the number of 10-minute unavailable periods used in calculating CPS2 for the reporting period.

Appendix 2

Interpretation of Requirement 1

Request: *Does the WECC Automatic Time Error Control Procedure (WATEC) violate Requirement 1 of BAL-001-0?*

Interpretation:
Requirement 1 of BAL-001 — Real Power Balancing Control Performance, is the definition of the area control error (ACE) equation and the limits established for Control Performance Standard 1 (CPS1).

BAL-001-0

R1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit ε12 is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

- The WATEC procedural documents ask Balancing Authorities to maintain raw ACE for CPS reporting and to control via WATEC-adjusted ACE.
- As long as Balancing Authorities use raw (unadjusted for WATEC) ACE for CPS reporting purposes, the use of WATEC for control is not in violation of BAL-001 Requirement 1.

Document Title	WECC Standard BAL-004-WECC-02
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1	4/15/2011	Version 1 Posted	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Version 3 Posted 12/15/11	Addressed comments from Version 2 posting
4		Standing Committee Approval	
5		WECC Board Approval	

WECC 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.

.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	07/16/2010
9. Notice of development / first 30-day notice	09/2/2010
10. New committee chair orientation meeting	08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 01/18/11 02/10/11 03/11–12/11 03/24/11 04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
16. Post first draft for 45-day comment period	04/15/2011
17. Meet to answer to comments, address impact statement and draft responses	06/2-3/2011 06/14/2011 06/23/2011 06/29/2011
18. Post responses to comments received during 45-day comment period	06/29/2011
19. Meet to answer to comments, address impact statement and	08/8/2011 08/15/2011

Completed Actions	Completion Date
draft responses	08/30/2011 11/01/2011
20. Post the Version 2 for a 30-day comment period	11/04/2011
21. Post consideration of comments of Version 2	12/15/2011
22. Post the third dart for 30-day comment period	12/15/2011
23. Project WECC-0068 Version 3 Comments were due	01/16/2012
24. Meeting to answer comments, address impact statement, draft responses	01/18/2012
25. Post responses to comments	02/13/2012
26. Post for Operating Committee approval	02/24/2012

Description of Current Draft:

On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC Standards.[1] In addition, WECC staff identified additional modifications to BAL-004-WECC-1 that would clarify the intent without changing the requirements. Finally, the industry has commented that there is confusion concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as that used during Automatic Generation Control (AGC) mode. This seems to conflict with NERC's comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a)[2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation for control but should use raw ACE for CPS reporting.[3] As part of this filing WECC has submitted a proposed regional variance to BAL-001-0.1a to address this conflict.

The purpose of the refinements to BAL-004-WECC-1 as proposed in WECC Regional Reliability Standard BAL-004-WECC-2 – Automatic Time Error Correction (BAL-004-WECC-2) is to implement the directives in FERC Order 723 and to make other clarifications to BAL-004-WECC-1 as the industry deems necessary, while maintaining the Western Interconnection's

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).

[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).

[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

reliability. The FERC Order 723 directives are as follows:

1. "The Commission is concerned that the phrases 'large accumulation' and 'in such a situation' as used in Requirement R1.2 leaves to individual interpretation when a 'large' amount of primary inadvertent has accumulated. The ERO and WECC agree that the provision could benefit from further clarity. Accordingly, the Commission adopts its NOPR proposal and directs WECC to develop revisions to the provision so that a balancing authority will know with specificity the circumstances that trigger the actions required by Requirement R1.2."[4]
2. "Consistent with the NOPR, pursuant to section 215(d) (5) of the FPA, the Commission directs WECC to develop a modification to the regional Reliability Standard consistent with WECC's and NERC's explanation that the limit set forth in Requirement 2 of '24 hours per calendar quarter' is an accumulated total for the period, resulting from either a singular event or a cumulative time limit from a number of events."[5]
3. "[The Commission] direct[s] that the violation risk factors assigned to BAL-004-WECC-01, Requirements R1, R2, R3, and R4 be modified from 'lower' to 'medium.' The ERO and WECC must submit a filing within 60 days of the effective date of this Final Rule that includes the directed modifications."[6] These modifications were addressed in a compliance filing dated August 28, 2009. [7]
4. "The Commission adopts its NOPR proposal and directs the ERO and WECC to submit violation severity levels for each Requirement and sub-Requirement that has been assigned a violation risk factor. To allow adequate time for the development of the violation severity levels, the ERO and WECC must submit a filing within 120 days of the effective date of this Final Rule that includes the directed violation severity levels."[8] These modifications were addressed in a compliance filing date October 23, 2009.[9]
5. In response to Xcel comments, FERC referenced their approval, in Order No. 713, of an ERO interpretation stating that as long as Balancing Authorities use raw ACE for Control Performance Standard (CPS) reporting purposes and WECC ATEC (ATEC) ACE for control, it is not a violation of BAL-001-0.1a, Requirement 1.[10]. WECC Stakeholders believe it is more appropriate to use the ATEC ACE for control and CPS reporting. To clarify this difference, WECC has developed a regional variance BAL-001-0.1a.

The implementation of an ATEC ACE is part of a regional variance to BAL-001-0.1a associated with this posting. The purpose of this filing is to meet the directives of FERC Order 723 while refining for clarity the existing requirements of BAL-004-WECC-1. Refinements to BAL-004-WECC-1 include:

---

[4] Order 723 at ¶ 30.

[5] *Id* at ¶ 34.

[6] *Id* at ¶ 51.

[7] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 51 of Order No. 723 – Directed Modification of Violation Risk Factors for Regional Reliability Standard BAL-004-WECC-1, Automatic Time Error Correction, Docket No. RM08-12-000, filed August 28, 2009

[8] Order 723 at ¶ 54.

[9] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 54 of Order No. 723, Docket No. RM08-12-000, filed October 23, 2009

[10] Order 723 at ¶ 44-45.

1. A requirement that defines the large accumulation at 150% of previous year's peak demand or peak generation for generation-only Balancing Authorities. The action required is that the Balancing Authority shall not permit the PII_{accum} to exceed the defined value, which is demonstrated at the end of each month.
2. A clarification in response to the FERC order that the accumulated time for ATEC out of service shall not exceed 24 hours during a calendar quarter.

BAL-004-WECC-2 retains the requirement for Balancing Authorities to compute the Automatic Time Error Correction and Primary Inadvertent Interchange by 50 minutes after the hour and requires that Balancing Authorities have the ability to operate their Automatic Generation Control in other modes. In addition, Balancing Authorities are required to recalculate Primary Inadvertent Interchange when hourly and month-end adjustments are made.

In Version 3 in order to prevent the stranding of Secondary Inadvertent Interchange the drafting team added a Requirement R8 that restrictions the payback of Inadvertent Interchange to using ATEC rather than through bilateral and unilateral payback methods.

The proposed BAL-004-WECC-2 will replace the Automatic Time Error Correction definition in the NERC Glossary of Terms. The WECC definitions for Primary Inadvertent Interchange and Secondary Inadvertent Interchange will be retained in the *Glossary of Terms Used in NERC Reliability Standards*.

Development Plan:

Anticipated Actions	Anticipated Date
1. Post draft standard for 45-day NERC comment period	02/01/2012
2. NERC comment period ends	03/27/2012
3. Operating Committee approves proposed standard	03/27/2012
4. DT completes review and consideration of industry comments to NERC posting	04/27/2012
5. Post draft standard for WECC Board approval	05/01/2012
6. WECC Board approval	06/21/2012
7. Post draft standard for 15-day NERC comment period	06/25/2012
8. NERC 15-day comment period ends	07/2012
9. DT completes review and consideration of industry comments to NERC posting	07/2012
10. Submit NERC Board of Trustees approval request	08/2012
11. Receive NERC Board approval	08/2012

.

Implementation Plan

The Implementation Plan is to make the WECC Regional Variance to BAL-001-0.1a and BAL-004-WECC-2 effective on the first day of the second quarter, after regulatory approval in areas

where applicable. Since entities are already controlling their Balancing Authority Area with the ATEC ACE equation – but are reporting using the NERC raw ACE equation for reporting CPS1 – the transition to controlling and reporting using the ATEC ACE should be minimal. Additionally, it should not take much time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

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 definitions will be removed from the standard and added to the NERC Glossary. In addition the current definitions for "**Primary Inadvertent Interchange**" and "**Secondary Inadvertent Interchange"** will be retained in the Glossary of Terms Used in NERC Reliability Standards.*

Automatic Time Error Correction: The addition of a component to the ACE equation that modifies the control point for the purpose of continuously paying back Primary Inadvertent Interchange to correct accumulated time error.

A. Introduction

1. Title: **Automatic Time Error Correction**

2. Number: BAL-004-WECC-02

3. Purpose: To maintain Interconnection frequency and to ensure that Time Error Corrections and Primary Inadvertent Interchange (PII) payback are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection.

4. Applicability

4.1. Functional Entities

4.1.1 Balancing Authorities that operate synchronously in the Western Interconnection.

5. Effective Date: On the first day of the second quarter, after applicable regulatory approval has been received (or the Reliability Standard otherwise becomes effective the first day of the fourth quarter following NERC Board adoption where regulatory approval is not required).

6. Background:

In February 2003, the WECC Automatic Time Error Correction (ATEC) Procedure (Procedure) became effective for all Balancing Authorities in the Western Interconnection. The original intent of the Procedure was to minimize the number of Manual Time Error Corrections in the Western Interconnection. ATEC provides the added benefit of a superior approach over the current NERC Reliability Standard BAL-004-0 – Time Error Correction for assigning costs and providing for the equitable payback of Inadvertent Interchange. In October 2006, the Procedure became a WECC Criterion. In May 2009, FERC issued Order No.723 that approved Regional Reliability Standard BAL-004-WECC-1 - Automatic Time Error Correction, as submitted by NERC. In addition, the Commission directed WECC to develop several clarifying modifications to BAL-004-WECC-1 using the FERC-approved Process for Developing and Approving WECC Standards. The Effective Date of the BAL-004-WECC-1 standard was July 1, 2009. BAL-004-WECC-1 required Balancing Authorities within the Western Interconnection to maintain Interconnection frequency within a predefined frequency profile and to ensure that Time Error Corrections were effectively conducted in a manner that did not adversely affect the reliability of the Interconnection. In September 2009, WECC received WECC Standards/Regional Criterion Request Form (Request) WECC-0068, which was a request for modification of BAL-004-WECC-1. In July 2010, the chair of the WECC Operating Committee assigned the Request to the Performance Work Group (PWG) for development.

B. Requirements and Measures

R1. Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PII_{accum}) for both the monthly On-Peak period and the monthly Off-Peak period are each individually less than or equal to:

1.1. For load-serving Balancing Authorities, 150% of the previous calendar year's integrated hourly Peak Demand,

1.2. For generation-only Balancing Authorities, 150% of the previous calendar year's integrated hourly peak generation.

[Violation Risk Factor Medium:] [Time Horizon: Operations Assessment]

M1. Forms of acceptable evidence of compliance with Requirement R1include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool (WIT),
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R2. Each Balancing Authority shall, upon discovery of an error in the calculation of PII_{hourly}, recalculate within 90 days, the value of PII_{hourly} and adjust the PII_{accum} from the time of the error. *[Violation Risk*

Rationale for R1:

Premise: Each Balancing Authority should ensure that the absolute value of its PII_{accum} for both the On-Peak period and the Off-Peak period each individually does not exceed 150% of the previous year's Peak Demand for load-serving Balancing Authorities and 150% of the previous year's peak generation for generation-only Balancing Authorities. The Balancing Authority is required to take action to keep each PII_{accum} period within the limit. For example, the Balancing Authorities actions may include:

- Identifying and correcting the source of any metering or accounting error(s) and recalculating the hourly Primary Inadvertent Interchange **(**PII_{hourly}) and the PII_{accum} from the time of the error;
- Validating the implementation of ATEC; or
- Setting L_{max} equal to $L_{10.}$until the PII_{accum} is below the limit in Requirement R1.

Justification: PII_{accum} may grow from month-end adjustments and metering errors, even with the inclusion of I_{ATEC} in the ACE equation.

Goal: To limit the amount of PII_{accum} that a Balancing Authority can have at the end of each month.

Rationale for R2:

Premise: When a Balancing Authority finds an error in the calculation of its PII, the Balancing Authority needs time to correct the error and recalculate PII and PII_{accum}.

Justification: The drafting team selected 90 days as a reasonable amount of time to correct an error and recalculate PII and $PII_{accum,}$ since recalculation of PII and PII_{accum} is not a real-time operations reliability issue.

Goal: To promote the timely correction of errors in the calculation of PII and PII_{accum}.

Factor: Medium] [Time Horizon: Operations Assessment]

M2. Forms of acceptable evidence of compliance with Requirement R2 include but are not limited to any one of the following:

- Data, screen shots from the WIT,
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R3. Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service. *[Violation Risk Factor: Medium] [Time Horizon: Same-day Operations]*

M3. Forms of acceptable evidence of compliance with Requirement R3 may include, but are not limited to:

- Dated archived files,
- Historical data,
- Other data that demonstrates the ATEC was out of service for less than 24 hours per calendar quarter.

Rationale for R3:

Premise: When a Balancing Authority is not participating in ATEC, payback of PII_{accum} is delayed.

Justification: The limit of 24 hours per quarter discourages a Balancing Authority from withdrawing ATEC participation, for example, for economic gain during selected hours. If the limits were increased to 60 hours, a Balancing Authority could technically withdraw ATEC participation for one hour from Monday to Friday.

Goal: To promote fair and timely payback of PII_{accum} balances.

R4. Each Balancing Authority shall compute the following by 50 minutes after each hour:

- **4.1.** $PII_{\mathbf{hourly}}$,
- **4.2.** PII_{accum},
- **4.3.** Automatic Time Error Correction term (I_{ATEC}).

Rationale for R4:

Premise: $PII_{\mathbf{hourly}}$, PII_{accum}, and I_{ATEC} should be determined before the next scheduling hour begins.

Justification: To promote timely calculations 50 minutes was selected because it is before the next hour ramp begins and permits time to collect the data and resolve interchange metering values.

Goal: To promote the timely calculation of $PII_{\mathbf{hourly}}$, PII_{accum}, and I_{ATEC}.

[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]

M4. Forms of acceptable evidence of compliance with Requirement R4 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from internal Balancing Authority tool that demonstrate compliance, or
- Data from any other databases, spreadsheets, displays that demonstrate compliance.

R5. Each Balancing Authority shall be able to change its Automatic Generation Control operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error Control (used in ATEC mode), to correspond to current operating conditions. *[Violation Risk Factor: Medium] [Time Horizon: Real-Time Operations]*

M5. Forms of acceptable evidence of compliance with Requirement R5 include but are not limited to any one of the following:

- Screen shots from Energy Management System,
- Demonstration using an off-line system.

Rationale for R5:

Premise: The ACE equation, and hence the AGC mode, will contain any number of parameters based on system operating conditions. Various AGC modes are identified corresponding to those operating conditions, as well as the specific sets of parameters included in the ACE equation.

Justification: Changing to the proper operating mode, corresponding to current operating conditions, affords proper movement of generating units in response to those conditions. The addition of the ATEC term results in an additional AGC mode and a different set of parameters. The inability to correctly calculate the ATEC term would dictate that AGC not be operated in the ATEC mode.

Goal: To set the AGC mode and calculate ACE in a manner that corresponds to the system operating conditions and to accommodate changes in those conditions.

R6. Each Balancing Authority shall recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly Inadvertent Interchange or ΔTE. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M6. Forms of acceptable evidence of compliance with Requirement R6 include but are not limited to any one of the following:

Rationale for R6:

Premise: Hourly adjustments to hourly Inadvertent Interchange (II) require a recalculation of the corresponding hourly PII value, the corresponding PII_{accum}, and all subsequent PII_{accum} for every hour up to the current hour.

Justification: As $PII_{\mathbf{hourly}}$ is corrected, then PII_{accum} should be recalculated.

Goal: To promote accurate, fair and timely payback of accumulated PII balances.

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from an internal Balancing Authority tool that demonstrate compliance with, or
- Data from any other databases, spreadsheets, displays that demonstrate compliance.

R7. Each Balancing Authority shall make the same adjustment to the PII_{accum} as it did for any month-end meter reading adjustments to Inadvertent Interchange. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M7. Forms of acceptable evidence of compliance with Requirement R7 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from an internal Balancing Authority tool that demonstrate compliance,
- Production of data from any other databases, spreadsheets, displays that demonstrate compliance.

Rationale R7:

Premise: Month-end meter-reading adjustments are made, for example, when a Balancing Authority performs monthly comparisons of recorded month-end Net Actual Interchange (NI_A) values derived from hourly Actual Interchange Telemetered Values against month-end Actual Interchange Register Meter readings.

Justification: Month-end adjustments to II_{accum} are applied as 100% PII_{accum}. 100% was chosen for simplicity to bilaterally assign PII_{accum} to both Balancing Authorities, since the effect of this metering error on system frequency is not easily determined over the course of a month.

Goal: To provide a mechanism by which corresponding month-end II adjustments can be applied to PII_{accum}, when such adjustments cannot be attributed to any one particular hour or series of hours.

R8. Each Balancing Authority shall payback Inadvertent Interchange using ATEC rather than bilateral and unilateral payback. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M8. Forms of acceptable evidence of compliance with Requirement R8 include but are not limited to historical On-Peak and Off-Peak Inadvertent Interchange data, data from

Rationale R8:

Premise: ATEC includes automatic unilateral payback of Primary Inadvertent Interchange and Secondary Inadvertent Interchange.

Justification: Additional unilateral and bilateral exchanges disturb the balance and distribution between Primary Inadvertent Interchange and Secondary Inadvertent Interchange throughout the Interconnection; thereby stranding Secondary Inadvertent Interchange.

Goal: To not strand Secondary Inadvertent Interchange.

the WECC Interchange Tool, and ACE data.

C. Compliance

1. Compliance Monitoring Process

1.1 Compliance Enforcement Authority

The Regional Entity shall serve as the Compliance Enforcement Authority.

For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

For responsible entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

1.2 Compliance Monitoring and Assessment Processes:

Compliance Audits

Self-Certifications

Spot Checking

Compliance Investigations

Self-Reporting

Complaints

1.3 Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of PII_{hourly}, PII_{accum} (On-Peak and Off-Peak), ΔTE and any month-end adjustments for the preceding calendar year (January – December), as well as the current calendar year.

Each Balancing Authority in the Western Interconnection shall retain the amount of time the Balancing Authority operated without ATEC for the preceding calendar year (January – December), as well as the current calendar year.

1.4 Additional Compliance Information

None

Table of Compliance Elements

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	Operations Assessment	Medium	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 150%, but was less than or equal to 160% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 160%, but was less than or equal to 170% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 170%, but was less than or equal to 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.
R2	Operations Assessment	Medium	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 90 days of the discovery of the error; but made the required recalculations and adjustments within 120 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 120 days of the discovery of the error; but made the required recalculations and adjustments within 150 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 150 days of the discovery of the error; but made the required recalculations and adjustments within 180 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust PII_{accum} within 180 days of the discovery of the error.

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R3	Real-Time Operations	Medium	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 24 hours, but less than or equal to 72 hours.	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 72 hours, but less than or equal to 120 hours.	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 120 hours, but less than or equal to 168 hours	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 168 hours.
R4	Operations Assessment	Medium	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within 50 minutes, but made the required calculations in less than or equal to two hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within two hours, but made the required calculations in less than or equal to four hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within four hours, but made the required calculations in less than or equal to six hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within six hours.
R5	Real-Time Operations	Medium	N/A	N/A	N/A	The Balancing Authority is not able to change its AGC operating mode between Flat Frequency (for blackout restoration; Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; or Tie Line Bias

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						plus Time Error control (used in ATEC mode).
R6	Operations Assessment	Medium	N/A	N/A	N/A	When making adjustments to hourly Inadvertent Interchange or ΔTE, the Balancing Authority did not recalculate the PII_{hourly} and the PII_{accum} for the On-Peak and Off-Peak periods.
R7	Operations Assessment	Medium	N/A	N/A	N/A	When making any month-end meter reading adjustments to Inadvertent Interchange, the Balancing Authority did not make the same adjustment to the PII_{accum}.
R8	Operations Assessment	Medium	N/A	N/A	N/A	The Balancing Authority paid back Inadvertent Interchange using bilateral and unilateral payback rather than

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						using ATEC.

Guidelines and Technical Basis

Requirement R1:

Requirement R2:

Requirement R3:

Requirement R4:

Requirement R5:

Requirement R6:

Requirement R7:

Requirement R8:

WECC Standard BAL-004-WECC-02
Automatic Time Error Correction
Version 4, For Approval

Document Title	WECC Standard BAL-004-WECC-02
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1	4/15/2011	Version 1 Posted	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Version 3 Posted 12/15/11	Addressed comments from Version 2 posting
4		Standing Committee Approval	
5		WECC Board Approval	

WECC 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.

.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	07/16/2010
9. Notice of development / first 30-day notice	09/2/2010
10. New committee chair orientation meeting	08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 01/18/11 02/10/11 03/11–12/11 03/24/11 04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
~~1.~~16. Post ~~Draft Standard~~first draft for ~~initial industry comments~~45-day comment period	~~November 14, 2006~~04/15/2011
~~2.~~17. ~~Drafting Team~~Meet to ~~review and respond~~answer to ~~initial industry~~ comments, address impact statement and draft responses	~~January 30, 2007~~06/2-3/2011 06/14/2011 06/23/2011 06/29/2011
18. Post responses to comments received during 45-day	06/29/2011

Completed Actions	Completion Date
comment period	
~~3.~~19. ~~Drafting Team posted a second draft for industry comments~~Meet to answer to comments, address impact statement and draft responses	~~March 13, 2007~~08/8/2011 08/15/2011 08/30/2011 11/01/2011
20. Post the Version 2 for a 30-day comment period	11/04/2011
21. Post consideration of comments of Version 2	12/15/2011
22. Post the third dart for 30-day comment period	12/15/2011
23. Project WECC-0068 Version 3 Comments were due	01/16/2012
~~4.~~24. ~~Drafting Team posted a revised second draft for industry comments~~Meeting to answer comments, address impact statement, draft responses	~~April 12, 2007~~01/18/2012
25. Post responses to comments	02/13/2012
~~5.~~26. ~~Drafting Team posted a third draft~~Post for Operating Committee approval	~~May 14, 2007~~02/24/2012
~~6. WECC Operating Committee approved proposed standard~~	~~June 14, 2007~~
~~7. Drafting Team posted the ATEC Standard for Board approval~~	~~June 22, 2007~~
~~8. WECC Board of Directors approved proposed standard~~	~~July 27, 2007~~
~~9. WECC submits ATEC Standard to NERC for posting~~	~~August 7, 2008~~
~~10. NERC posts the ATEC Standard for 45 days~~	~~September 21, 2007~~
~~11. NERC Board Approval~~	~~March 26, 2008~~

Description of Current Draft:

~~The Automatic Time Error Correction (ATEC) component is now included in the NI's term instead of as a separate term in the ACE equation. This only changes the order of the terms in the ATEC ACE equation, not the calculated ACE.~~

~~**Future**~~

On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC Standards.[1] In addition, WECC staff identified additional modifications to BAL-004-WECC-1 that would clarify the intent without changing the requirements. Finally, the industry

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).

has commented that there is confusion concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as that used during Automatic Generation Control (AGC) mode. This seems to conflict with NERC's comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a)[2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation for control but should use raw ACE for CPS reporting.[3] As part of this filing WECC has submitted a proposed regional variance to BAL-001-0.1a to address this conflict.

The purpose of the refinements to BAL-004-WECC-1 as proposed in WECC Regional Reliability Standard BAL-004-WECC-2 – Automatic Time Error Correction (BAL-004-WECC-2) is to implement the directives in FERC Order 723 and to make other clarifications to BAL-004-WECC-1 as the industry deems necessary, while maintaining the Western Interconnection's reliability. The FERC Order 723 directives are as follows:

1. "The Commission is concerned that the phrases 'large accumulation' and 'in such a situation' as used in Requirement R1.2 leaves to individual interpretation when a 'large' amount of primary inadvertent has accumulated. The ERO and WECC agree that the provision could benefit from further clarity. Accordingly, the Commission adopts its NOPR proposal and directs WECC to develop revisions to the provision so that a balancing authority will know with specificity the circumstances that trigger the actions required by Requirement R1.2."[4]
2. "Consistent with the NOPR, pursuant to section 215(d) (5) of the FPA, the Commission directs WECC to develop a modification to the regional Reliability Standard consistent with WECC's and NERC's explanation that the limit set forth in Requirement 2 of '24 hours per calendar quarter' is an accumulated total for the period, resulting from either a singular event or a cumulative time limit from a number of events."[5]
3. "[The Commission] direct[s] that the violation risk factors assigned to BAL-004-WECC-01, Requirements R1, R2, R3, and R4 be modified from 'lower' to 'medium.' The ERO and WECC must submit a filing within 60 days of the effective date of this Final Rule that includes the directed modifications."[6] These modifications were addressed in a compliance filing dated August 28, 2009. [7]

[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).

[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

[4] Order 723 at ¶ 30.

[5] *Id* at ¶ 34.

[6] *Id* at ¶ 51.

[7] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 51 of Order No. 723 – Directed Modification of Violation Risk Factors for Regional Reliability Standard BAL-004-WECC-1, Automatic Time Error Correction, Docket No. RM08-12-000, filed August 28, 2009

4. "The Commission adopts its NOPR proposal and directs the ERO and WECC to submit violation severity levels for each Requirement and sub-Requirement that has been assigned a violation risk factor. To allow adequate time for the development of the violation severity levels, the ERO and WECC must submit a filing within 120 days of the effective date of this Final Rule that includes the directed violation severity levels."[8] These modifications were addressed in a compliance filing date October 23, 2009.[9]
5. In response to Xcel comments, FERC referenced their approval, in Order No. 713, of an ERO interpretation stating that as long as Balancing Authorities use raw ACE for Control Performance Standard (CPS) reporting purposes and WECC ATEC (ATEC) ACE for control, it is not a violation of BAL-001-0.1a, Requirement 1.[10]. WECC Stakeholders believe it is more appropriate to use the ATEC ACE for control and CPS reporting. To clarify this difference, WECC has developed a regional variance BAL-001-0.1a.

The implementation of an ATEC ACE is part of a regional variance to BAL-001-0.1a associated with this posting. The purpose of this filing is to meet the directives of FERC Order 723 while refining for clarity the existing requirements of BAL-004-WECC-1. Refinements to BAL-004-WECC-1 include:

1. A requirement that defines the large accumulation at 150% of previous year's peak demand or peak generation for generation-only Balancing Authorities. The action required is that the Balancing Authority shall not permit the PII_{accum} to exceed the defined value, which is demonstrated at the end of each month.
2. A clarification in response to the FERC order that the accumulated time for ATEC out of service shall not exceed 24 hours during a calendar quarter.

BAL-004-WECC-2 retains the requirement for Balancing Authorities to compute the Automatic Time Error Correction and Primary Inadvertent Interchange by 50 minutes after the hour and requires that Balancing Authorities have the ability to operate their Automatic Generation Control in other modes. In addition, Balancing Authorities are required to recalculate Primary Inadvertent Interchange when hourly and month-end adjustments are made.

In Version 3 in order to prevent the stranding of Secondary Inadvertent Interchange the drafting team added a Requirement R8 that restrictions the payback of Inadvertent Interchange to using ATEC rather than through bilateral and unilateral payback methods.

The proposed BAL-004-WECC-2 will replace the Automatic Time Error Correction definition in the NERC Glossary of Terms. The WECC definitions for Primary Inadvertent Interchange and Secondary Inadvertent Interchange will be retained in the *Glossary of Terms Used in NERC Reliability Standards*.

Development Plan:

Anticipated Actions	Anticipated Date

[8] Order 723 at ¶ 54.

[9] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 54 of Order No. 723, Docket No. RM08-12-000, filed October 23, 2009

[10] Order 723 at ¶ 44-45.

1. ~~Request FERC Approval~~Post draft standard for 45-day NERC comment period	~~May 2008~~02/01/2012
2. ~~Request Canadian Regulatory Approval~~NERC comment period ends	~~2008~~03/27/2012
3. Operating Committee approves proposed standard	03/27/2012
4. DT completes review and consideration of industry comments to NERC posting	04/27/2012
5. Post draft standard for WECC Board approval	05/01/2012
6. WECC Board approval	06/21/2012
7. Post draft standard for 15-day NERC comment period	06/25/2012
8. NERC 15-day comment period ends	07/2012
9. DT completes review and consideration of industry comments to NERC posting	07/2012
10. Submit NERC Board of Trustees approval request	08/2012
11. Receive NERC Board approval	08/2012

.

Implementation Plan

The Implementation Plan is to make the WECC Regional Variance to BAL-001-0.1a and BAL-004-WECC-2 effective on the first day of the second quarter, after regulatory approval in areas where applicable. Since entities are already controlling their Balancing Authority Area with the ATEC ACE equation – but are reporting using the NERC raw ACE equation for reporting CPS1 – the transition to controlling and reporting using the ATEC ACE should be minimal. Additionally, it should not take much time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

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 definitions will be removed from the standard and added to the ~~Glossary.~~NERC Glossary. In addition the current definitions for "**Primary Inadvertent Interchange**" and "**Secondary Inadvertent Interchange"** will be retained in the Glossary of Terms Used in NERC Reliability Standards.*

Automatic Time Error Correction: ~~A frequency~~ The addition of a component to the ACE equation that modifies the control ~~automatic action that a Balancing Authority uses to offset its frequency contribution to support the Interconnection's scheduled frequency.~~

point for the purpose of continuously paying back Primary Inadvertent Interchange~~: The component of area (n) inadvertent interchange caused by the regulating deficiencies of the area (n).~~ to correct accumulated time error.

~~**Secondary Inadvertent Interchange:** The component of area (n) inadvertent interchange caused by the regulating deficiencies of area (i).~~

A. Introduction

1. Title: **Automatic Time Error Correction**

2. Number: BAL-004-WECC-~~01~~02

3. Purpose: To maintain Interconnection frequency ~~**within a predefined frequency profile under all conditions (i.e. normal and abnormal), and**~~ and to ensure that Time Error Corrections and Primary Inadvertent Interchange (PII) payback are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection.

4. Applicability~~:~~

4.1. Functional Entities

~~**1.**~~ **4.1.1** Balancing Authorities ~~**(BA)**~~ that operate synchronously ~~**to**~~in the Western Interconnection.

5. Effective Date: On the first day of the ~~**first**~~second quarter, after applicable regulatory approval~~.~~ has been received (or the Reliability Standard otherwise becomes effective the first day of the fourth quarter following NERC Board adoption where regulatory approval is not required).

~~**B. Requirements**~~

~~**R1.** Each BA that operates synchronously to the Western Interconnection shall continuously operate utilizing Automatic Time Error Correction (ATEC) in its Automatic Generation Control (AGC) system. [Risk Factor: Lower]~~

~~$$ACE_{ATEC} = (NI_A - NI'_S) - 10B_i(F_A - F_S) - T_{0b} + I_{ME}$$~~

~~**Where:**~~

~~NI_A = Net Interchange Actual (MW).~~

~~F_A = Frequency Actual (Hz).~~

~~F_S = Frequency Scheduled (Normally 60 Hz).~~

~~B_i = Frequency Bias for the Balancing Authority's Area (MW / 0.1 Hz).~~

~~T_{0b} = Remaining Bilateral Payback for Inadvertent Interchange created prior to implementing automatic payback (MW).~~

~~I_{ME} = Meter Error Correction (MW).~~

~~$$NI'_S = NI_S - \frac{II^{on/off\ peak}_{Primary}}{(-Y)*H}$$~~

~~NI_S = Net Interchange Scheduled (MW).~~

~~$Y = B_i / B_S$.~~

~~H = Number of Hours used to payback Inadvertent Interchange Energy. The WECC Performance Work Group has set the value of H to 3.~~

~~**B_S** = Frequency Bias for the Interconnection (MW / 0.1 Hz).~~

~~$II_{primary}^{on/off\ peak}$ = is the Balancing Authority's accumulated primary inadvertent interchange in MWh. An On-Peak and Off-Peak accumulation accounting is required.~~

~~Where:~~

~~$II_{primary}^{on/off\ peak}$ = last period's $II_{primary}^{on/off\ peak}$ + (1-Y) * (II_{actual} - B_i * ΔTE/6)~~

~~**II_{actual}** is the hourly Inadvertent Interchange for the last hour.~~

~~**ΔTE** is the hourly change in system Time Error as distributed by the Interconnection Time Monitor.~~

~~Where:~~

~~**ΔTE = $TE_{end\ hour}$ - $TE_{begin\ hour}$ - TD_{adj} (t)*(TE offset)**~~

~~**TD_{adj}** is any operator adjustment to the control center Time Error to correct for differences with the time monitor.~~

~~**t** is the number of minutes of Manual Time Error Correction that occurred during the hour.~~

~~**TE offset** is 0.000 or +0.020 or -0.020.~~

~~**R1.1.** The absolute value of the WECC Automatic Time Error Correction term is limited as follows:~~

$$\left| \frac{II_{primary}^{on/off\ peak}}{(1\text{-}Y) \cdot H} \right| \leq L_{max}$$

~~Where L_{max} is chosen by the Balancing Authority and is bounded as follows:~~

~~$0.20 * |B_i| \leq L_{max} \leq L_{10}$~~

~~L_{10} is the Balancing Authority CPS2 limit in MW. If the WECC Automatic Time Error Correction term is less than the upper limit, use the calculated WECC Automatic Time Error Correction term.~~

~~**R1.2.** Large accumulations of primary inadvertent point to an invalid implementation of ATEC, loose control, metering or accounting errors. A BA in such a situation should identify the source of the error(s) and make the corrections, recalculate the primary inadvertent from the time of the error, adjust the accumulated primary inadvertent caused by the error(s), validate the implementation of ATEC, set L_{max} equal to L_{10} and continue to operate with ATEC reducing the accumulation as system parameters allow.~~

~~**R2.** Each BA that is synchronously connected to the Western Interconnection and operates in any AGC operating mode other than ATEC shall notify all other BAs of its operating mode through the designated Interconnection communication system. Each BA while synchronously connected to the Western Interconnection will be allowed to~~

~~have ATEC out of service for a maximum of 24 hours per calendar quarter, for reasons including maintenance and testing. [Risk Factor: Lower]~~

~~BAs in the Western Interconnection~~6. Background:

In February 2003, the WECC Automatic Time Error Correction (ATEC) Procedure (Procedure) became effective for all Balancing Authorities in the Western Interconnection. The original intent of the Procedure was to minimize the number of Manual Time Error Corrections in the Western Interconnection. ATEC provides the added benefit of a superior approach over the current NERC Reliability Standard BAL-004-0 – Time Error Correction for assigning costs and providing for the equitable payback of Inadvertent Interchange. In October 2006, the Procedure became a WECC Criterion. In May 2009, FERC issued Order No.723 that approved Regional Reliability Standard BAL-004-WECC-1 - Automatic Time Error Correction, as submitted by NERC. In addition, the Commission directed WECC to develop several clarifying modifications to BAL-004-WECC-1 using the FERC-approved Process for Developing and Approving WECC Standards. The Effective Date of the BAL-004-WECC-1 standard was July 1, 2009. BAL-004-WECC-1 required Balancing Authorities within the Western Interconnection to maintain Interconnection frequency within a predefined frequency profile and to ensure that Time Error Corrections were effectively conducted in a manner that did not adversely affect the reliability of the Interconnection. In September 2009, WECC received WECC Standards/Regional Criterion Request Form (Request) WECC-0068, which was a request for modification of BAL-004-WECC-1. In July 2010, the chair of the WECC Operating Committee assigned the Request to the Performance Work Group (PWG) for development.

B. Requirements and Measures

R1. Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PII_{accum}) for both the monthly On-Peak period and the monthly Off-Peak period are each individually less than or equal to:

1.1. For load-serving Balancing Authorities, 150% of the previous calendar year's integrated hourly Peak Demand,

1.2. For generation-only Balancing Authorities, 150% of the previous calendar year's integrated hourly peak generation.

[Violation Risk Factor Medium:] [Time Horizon: Operations Assessment]

M1. Forms of acceptable evidence of compliance with Requirement R1include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool (WIT),
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R2. Each Balancing Authority shall, upon discovery of an error in the calculation of PII_{hourly}, recalculate within 90 days, the value of PII_{hourly} and adjust the PII_{accum} from the time of the error. *[Violation Risk*

Rationale for R1:

Premise: Each Balancing Authority should ensure that the absolute value of its PII_{accum} for both the On-Peak period and the Off-Peak period each individually does not exceed 150% of the previous year's Peak Demand for load-serving Balancing Authorities and 150% of the previous year's peak generation for generation-only Balancing Authorities. The Balancing Authority is required to take action to keep each PII_{accum} period within the limit. For example, the Balancing Authorities actions may include:

- Identifying and correcting the source of any metering or accounting error(s) and recalculating the hourly Primary Inadvertent Interchange (PII_{hourly}) and the PII_{accum} from the time of the error;
- Validating the implementation of ATEC; or
- Setting L_{max} equal to L_{10} until the PII_{accum} is below the limit in Requirement R1.

Justification: PII_{accum} may grow from month-end adjustments and metering errors, even with the inclusion of I_{ATEC} in the ACE equation.

Goal: To limit the amount of PII_{accum} that a Balancing Authority can have at the end of each month.

Rationale for R2:

Premise: When a Balancing Authority finds an error in the calculation of its PII, the Balancing Authority needs time to correct the error and recalculate PII and PII_{accum}.

Justification: The drafting team selected 90 days as a reasonable amount of time to correct an error and recalculate PII and PII_{accum}, since recalculation of PII and PII_{accum} is not a real-time operations reliability issue.

Goal: To promote the timely correction of errors in the calculation of PII and PII_{accum}.

Factor: Medium] [Time Horizon: Operations Assessment]

M2. Forms of acceptable evidence of compliance with Requirement R2 include but are not limited to any one of the following:

- Data, screen shots from the WIT,
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R3. Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service. *[Violation Risk Factor: Medium] [Time Horizon: Same-day Operations]*

M3. Forms of acceptable evidence of compliance with Requirement R3 may include, but are not limited to:

- Dated archived files,
- Historical data,
- Other data that demonstrates the ATEC was out of service for less than 24 hours per calendar quarter.

Rationale for R3:

Premise: When a Balancing Authority is not participating in ATEC, payback of PII_{accum} is delayed.

Justification: The limit of 24 hours per quarter discourages a Balancing Authority from withdrawing ATEC participation, for example, for economic gain during selected hours. If the limits were increased to 60 hours, a Balancing Authority could technically withdraw ATEC participation for one hour from Monday to Friday.

Goal: To promote fair and timely payback of PII_{accum} balances.

R4. Each Balancing Authority shall compute the following by 50 minutes after each hour:

4.1. PII_{hourly},

4.2. PII_{accum},

4.3. Automatic Time Error Correction term (I_{ATEC}).

Rationale for R4:

Premise: PII_{hourly}, PII_{accum}, and I_{ATEC} should be determined before the next scheduling hour begins.

Justification: To promote timely calculations 50 minutes was selected because it is before the next hour ramp begins and permits time to collect the data and resolve interchange metering values.

Goal: To promote the timely calculation of PII_{hourly}, PII_{accum}, and I_{ATEC}.

[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]

M4. Forms of acceptable evidence of compliance with Requirement R4 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from internal Balancing Authority tool that demonstrate compliance, or
- Data from any other databases, spreadsheets, displays that demonstrate compliance.

~~**R3.**~~**R5.** Each Balancing Authority shall be able to change ~~their AGC~~its Automatic Generation Control operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error ~~control~~Control (used in ATEC mode~~). The ACE used for NERC reports shall be the same ACE as the AGC~~), to correspond to current operating ~~mode in use. [~~conditions. *[Violation Risk Factor: ~~Lower]~~Medium] [Time Horizon: Real-Time Operations]*

~~Regardless~~

M5. Forms of acceptable evidence of compliance with Requirement R5 include but are not limited to any one of the ~~AGC operating mode each BA in the Western Interconnection~~following:

- Screen shots from Energy Management System,
- Demonstration using an off-line system.

R6. Each Balancing Authority shall ~~compute its~~ recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly ~~Primary~~ Inadvertent Interchange ~~when hourly checkout is complete. If hourly checkout is not complete by 50 minutes after the hour, compute Primary~~ or ΔTE. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

Developed as: **WECC-0068**
Adopted by NERC Board of Trustees:
Mandatory Effective Date:

Rationale for R5:

Premise: The ACE equation, and hence the AGC mode, will contain any number of parameters based on system operating conditions. Various AGC modes are identified corresponding to those operating conditions, as well as the specific sets of parameters included in the ACE equation.

Justification: Changing to the proper operating mode, corresponding to current operating conditions, affords proper movement of generating units in response to those conditions. The addition of the ATEC term results in an additional AGC mode and a different set of parameters. The inability to correctly calculate the ATEC term would dictate that AGC not be operated in the ATEC mode.

Goal: To set the AGC mode and calculate ACE in a manner that corresponds to the system operating conditions and to accommodate changes in those conditions.

Rationale for R6:

Premise: Hourly adjustments to hourly Inadvertent Interchange (II) require a recalculation of the corresponding hourly PII value, the corresponding PII_{accum}, and all subsequent PII_{accum} for every hour up to the current hour.

Justification: As PII_{hourly} is corrected, then PII_{accum} should be recalculated.

Goal: To promote accurate, fair and timely payback of accumulated PII balances.

M6. Forms of acceptable evidence of compliance with Requirement R6 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from an internal Balancing Authority tool that demonstrate compliance with, or
- Data from any other databases, spreadsheets, displays that demonstrate compliance.

R7. Each Balancing Authority shall make the same adjustment to the PII_{accum} as it did for any month-end meter reading adjustments to Inadvertent Interchange ~~with best available~~. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M7. Forms of acceptable evidence of compliance with Requirement R7 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from an internal Balancing Authority tool that demonstrate compliance,
- Production of data~~. This hourly value shall be added to the appropriate accumulated Primary~~ from any other databases, spreadsheets, displays that demonstrate compliance.

Rationale R7:

Premise: Month-end meter-reading adjustments are made, for example, when a Balancing Authority performs monthly comparisons of recorded month-end Net Actual Interchange (NI_A) values derived from hourly Actual Interchange Telemetered Values against month-end Actual Interchange Register Meter readings.

Justification: Month-end adjustments to II_{accum} are applied as 100% PII_{accum}. 100% was chosen for simplicity to bilaterally assign PII_{accum} to both Balancing Authorities, since the effect of this metering error on system frequency is not easily determined over the course of a month.

Goal: To provide a mechanism by which corresponding month-end II adjustments can be applied to PII_{accum}, when such adjustments cannot be attributed to any one particular hour or series of hours.

~~**R4.**~~**R8.** Each Balancing Authority shall payback Inadvertent Interchange ~~balance for either On-Peak or Off-Peak periods. [Risk Factor: Lower~~using ATEC rather than bilateral and unilateral payback. *[Violation Risk Factor:*

Rationale R8:

Premise: ATEC includes automatic unilateral payback of Primary Inadvertent Interchange and Secondary Inadvertent Interchange.

Justification: Additional unilateral and bilateral exchanges disturb the balance and distribution between Primary Inadvertent Interchange and Secondary Inadvertent Interchange throughout the Interconnection; thereby stranding Secondary Inadvertent Interchange.

Goal: To not strand Secondary Inadvertent Interchange.

Developed as: **WECC-0068**
Adopted by NERC Board of Trustees:
Mandatory Effective Date:

Medium] [Time Horizon: Operations Assessment]

R4.1. Each BA in the Western Interconnection shall use the change in Time Error distributed by the Interconnection Time Monitor.

All corrections to any previous hour Primary

R4.2. **M8**. Forms of acceptable evidence of compliance with Requirement R8 include but are not limited to historical On-Peak and Off-Peak Inadvertent Interchange shall be added to the appropriate On- or Off-Peak accumulated Primary Inadvertent Interchange.

R4.3. Month end Inadvertent Adjustments are 100% Primary Inadvertent Interchange and shall be added to the appropriate On- or Off-Peak accumulated Primary Inadvertentdata, data from the WECC Interchange, unless such adjustments can be pinpointed to specific hours in which case R4.2 applies.

R4.4. Each BA in the Western Interconnection shall synchronize its Time Error to the nearest 0.001 seconds of the system Time Error by comparing its reading at the designated time each day to the reading broadcast by the Interconnection Time Monitor. Any difference shall be applied as an adjustment to its current Time Error.

C. Measures

M1. For Requirement R1, a BA shall provide upon request a document showing that it is correctly calculating its hourly Primary Inadvertent Interchange number that is used to calculate its accumulated Primary Inadvertent Interchange and how it is used in its ACE equation for Automatic Time Error Correction.

M2. For Requirement R2, a BA shall record the date, time, reason, and notification [to other BAs within the Western Interconnection] for any time it is not operating utilizing Automatic Time Error Correction (ATEC) in its AGC system.

M3. For Requirement R3, a BA in the Western Interconnection must be able to demonstrate its ability to change its AGC operating mode when requested or during compliance audits and readiness reviews.

M4. For Requirement R4, a BA in the Western Interconnection must record its hourly Primary Inadvertent Interchange Tool, and keep an accurate record of its accumulation of Primary Inadvertent Interchange for both On-Peak and Off-Peak accounts. These records must be available for review when requested or during compliance audits and readiness reviews.ACE data.

D.C. Compliance

1. Compliance Monitoring Process

1.1 Compliance Enforcement Authority

The Regional Entity shall serve as the Compliance Enforcement Authority.

For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

For responsible entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

~~1.1.~~ **1.2 Compliance Monitoring** ~~Responsibility~~**and Assessment Processes:**

~~Regional Entity~~

Compliance ~~Monitoring Period and Reset time Frame~~Audits

~~The reporting period for ATEC is one calendar quarter, starting on the first second of the quarter and ending on the final second of the quarter.~~

~~The Performance-reset Period is one calendar quarter.~~

~~1.2. Data Retention~~

Self-Certifications

Spot Checking

Compliance Investigations

Self-Reporting

Complaints

1.3 Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain **~~its hourly calculation of total and Primary Inadvertent Interchange calculated hourly, as well as the amount of Primary Inadvertent paid back hourly~~**the values of PII_{hourly}, PII_{accum} (On-Peak and Off-Peak), ΔTE and any month-end adjustments for the preceding calendar year (January – December**~~) plus~~**), as well as the current calendar year.

Each Balancing Authority in the Western Interconnection shall retain ~~its total accumulated Inadvertent and total Primary Inadvertent, updated hourly, for On- and Off-Peak for the preceding calendar year (January – December) plus the current year.~~

~~Each Balancing Authority in the Western Interconnection shall retain its record of the amount of time it~~ the amount of time the Balancing Authority operated without ATEC **~~and the notification to the Interconnection of these times for the~~** for the preceding calendar year (January – December**~~) plus~~**), as well as the current calendar year.

~~The Compliance Monitor shall retain audit data for three calendar years.~~

~~1.3.~~ **1.4 Additional Compliance Information**

~~The Compliance Monitor shall use quarterly data to monitor compliance. The Compliance Monitor may also use periodic audits (on site, per a schedule), with spot reviews and investigations initiated in response to a complaint to assess performance.~~

~~The Balancing Authority in the Western Interconnection shall have the following documentation available for its Compliance Monitor to inspect during a scheduled, on-site review or within five business days of a request as part of a triggered investigation:~~

~~1.3.1. Source data for calculating Primary Inadvertent.~~

~~1.3.2. Data showing On- and Off-Peak Primary Inadvertent accumulations.~~

~~1.3.3. Data showing hourly payback of Primary Inadvertent.~~

~~1.3.4. Documentation on number of times not on ATEC and reasons for going off ATEC.~~

~~2. Violation Severity Levels~~

~~**2.1. Lower:** Time not in ATEC Mode greater than one day and less than or equal to three days, or if a Balancing Authority in the Western Interconnection operates without ATEC and does not notify other Balancing Authorities in the Western Interconnection 2 times in quarter.~~

~~**2.2. Moderate:** Time not in ATEC Mode greater than three days and less than or equal to five days, or if a Balancing Authority in the Western Interconnection operates without ATEC and does not notify other Balancing Authorities in the Western Interconnection 3 times in quarter.~~

~~**2.3. High:** Time not in ATEC Mode greater than five days and less than or equal to seven days, or if a Balancing Authority in the Western Interconnection operates without ATEC and does not notify other Balancing Authorities in the Western Interconnection 4 times in quarter.~~

~~**2.4. Severe:** Time not in ATEC Mode greater than seven days, or if a Balancing Authority in the Western Interconnection operates without ATEC and does not notify other Balancing Authorities in the Western Interconnection more than 4 times in quarter or Balancing Authority in the Western Interconnection cannot change AGC operating mode or Balancing Authority in the Western Interconnection incorrectly calculates Primary Inadvertent.~~

~~**Version History**~~

None

Table of Compliance Elements

~~Version~~ R #	~~Date~~Time Horizon	~~Action~~ VRF	~~Change Tracking~~Violation Severity Levels			
~~1~~	~~February 4, 2003~~	~~Effective Date.~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
~~1~~	~~October 17, 2006~~	~~Created Standard from Procedure.~~	~~Errata~~			
~~1~~	~~February 6, 2007~~	~~Changed the Standard Version from 0 to 1 in the Version History Table.~~	~~Errata~~			
~~1~~R1	~~February 6, 2007~~Operations Assessment	Medium	~~The upper limit bounds to the amount of Automatic Time Error Correction term was inadvertently omitted during the Standard Translation. The bound was added to the requirement R1.4.~~Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 150%, but was less than or equal to 160%	~~Errata~~Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 160%, but was less than or equal to 170% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 170%, but was less than or equal to 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.

~~Version R #~~	~~Date~~Time Horizon	~~Action~~ VRF	~~Change Tracking~~Violation Severity Levels			
~~1~~	~~February 4, 2003~~	~~Effective Date.~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
			of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.			
~~1~~R2	~~February 6, 2007~~Operations Assessment	Medium	~~The statement "The Time Monitor may declare offsets in 0.001 second increments" was moved from TEoffset to TDadj and offsets was corrected to adjustments.~~The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 90 days of the discovery of the error; but made the required recalculations and adjustments within 120 days.	~~Errata~~The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 120 days of the discovery of the error; but made the required recalculations and adjustments within 150 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 150 days of the discovery of the error; but made the required recalculations and adjustments within 180 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust PII_{accum} within 180 days of the discovery of the error.
~~1~~R3	~~February 6, 2007~~Real-Time	Medium	~~The reference to seconds was deleted from the TE offset~~	~~Errata~~The Balancing Authority operated during a calendar	The Balancing Authority operated during a calendar	The Balancing Authority operated during a calendar

~~Version R #~~	~~Date~~Time Horizon	~~Action~~ VRF	~~Change Tracking~~Violation Severity Levels			
~~1~~	~~February 4, 2003~~	~~Effective Date.~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
	Operations		~~term.~~The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 24 hours, but less than or equal to 72 hours.	quarter without ATEC in service for more than an accumulated 72 hours, but less than or equal to 120 hours.	quarter without ATEC in service for more than an accumulated 120 hours, but less than or equal to 168 hours	quarter without ATEC in service for more than an accumulated 168 hours.
~~1~~R4	~~June 19, 2007~~Operations Assessment	Medium	~~The standard number BAL-STD-004-1 was changed to BAL-004-WECC-01 to be consistent with the NERC Regional Reliability Standard Numbering Convention.~~ The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within 50 minutes, but made the required calculations in less than or equal to two hours.	~~Errata~~The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within two hours, but made the required calculations in less than or equal to four hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within four hours, but made the required calculations in less than or equal to six hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within six hours.

~~Version #~~	~~Date~~Time Horizon	~~Action~~ VRF	~~Change Tracking~~Violation Severity Levels			
~~1~~	~~February 4, 2003~~	~~Effective Date.~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
R5	Real-Time Operations	Medium	N/A	N/A	N/A	The Balancing Authority is not able to change its AGC operating mode between Flat Frequency (for blackout restoration; Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; or Tie Line Bias plus Time Error control (used in ATEC mode).
R6	Operations Assessment	Medium	N/A	N/A	N/A	When making adjustments to hourly Inadvertent Interchange or ΔTE, the Balancing Authority did not recalculate the PII_{hourly} and the PII_{accum} for the On-Peak and Off-Peak periods.
R7	Operations	Medium	N/A	N/A	N/A	When making any month-end meter

~~Version #~~	~~Date~~Time Horizon	~~Action~~ VRF	~~Change Tracking~~Violation Severity Levels			
~~1~~	~~February 4, 2003~~	~~Effective Date.~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
	Assessment					reading adjustments to Inadvertent Interchange, the Balancing Authority did not make the same adjustment to the PII_{accum}.
R8	Operations Assessment	Medium	N/A	N/A	N/A	The Balancing Authority paid back Inadvertent Interchange using bilateral and unilateral payback rather than using ATEC.

Guidelines and Technical Basis

Requirement R1:

Requirement R2:

Requirement R3:

Requirement R4:

Requirement R5:

Requirement R6:

Requirement R7:

Requirement R8:

FERC Directives for BAL-004-WECC-1 Automatic Time Error Correction
January 18, 2012

Received From	FERC Order 723[1] Snapshot WECC-0068 Mod. To BAL-004-WECC-1	The BAL-004-WECC-2 and Variance to BAL-001-0.1a Completed Actions
FERC	P 30. As explained in the NOPR, the Commission is concerned that the phrases "large accumulation" and "in such a situation," as used in Requirement R1.2, leaves to individual interpretation when a "large" amount of primary inadvertent has accumulated. The ERO and WECC agree that the provision should be clarified. Accordingly, the Commission adopts its NOPR proposal and directs WECC to develop revisions to the provision so that a Balancing Authority will know specifically which circumstances trigger the actions required by Requirement R1.2.	See BAL-004-WECC-2 in Requirement R1 where the term "large accumulation is eliminated and replaced with a quantifiable maximum limit for each Balancing Authority to be within by the end of each month.
FERC	P 34. Consistent with the NOPR, pursuant to Section 215(d) (5) of the FPA, the Commission directs WECC to develop a modification to the Regional Reliability Standard consistent with WECC's and NERC's explanation that the limit set forth in Requirement 2 of "24 hours per calendar quarter" is an accumulated total for the period – resulting from either a singular event or a cumulative time limit from a number of events.	See BAL-004-WECC-2 Requirement R3, which has been revised to specify an accumulation over the period.
FERC	P 44. FERC requires that Balancing Authorities use Raw ACE for CPS	See BAL-001-0.1a. Section E.B is a Regional Variance for WECC that

[1] 127 FERC ¶ 61,176 UNITED STATES OF AMERICA FEDERAL ENERGY REGULATORY COMMISSION, 18 CFR Part 40, Docket No. RM08-12-000; Order No.723, Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction (Issued May 21, 2009)

Received From	FERC Order 723[1] Snapshot WECC-0068 Mod. To BAL-004-WECC-1	The BAL-004-WECC-2 and Variance to BAL-001-0.1a Completed Actions
	reporting and WATEC ACE for control. The Interconnect prefers to use the WATEC ACE for control and CPS reporting. Develop a Regional Variance to BAL-001-0.1a to resolve the issue.	replaces Requirement R1 and Section D Compliance 2. This Regional Variance establishes a single ACE equation for use in WECC for all NERC standards referencing ACE. Furthermore, the Drafting Team for WECC-0068 requests withdrawal of BAL-001-0.1a Appendix 2 Interpretation of Requirement 1 and BAL-003-0.1b Appendix 1 Interpretation of Requirement R3.
FERC	P 51. FERC adopts its NOPR proposal and directs that the violation risk factors assigned to BAL-004-WECC-01, Requirements R1, R2, R3, and R4, be modified from "lower" to "medium." The ERO and WECC must submit a filing that includes the directed modifications within 60 days of the effective date of this Final Rule.	NERC and WECC, in their compliance filing of August 28, 2009,[2] adjusted the Violation Risk Factors to medium as directed. Likewise, the corresponding requirements in BAL-001-0.1a E.B.1, BAL-004-WECC-2 Requirements R3, R4, and R5 have been assigned Violation Risk Factors of Medium.
FERC	P 54. The Commission adopts its NOPR proposal and directs the ERO and WECC to submit violation severity levels for each Requirement and sub-Requirement that has been assigned a violation risk factor. To allow adequate time for the development of the violation severity levels, the ERO and WECC must submit a filing that includes the directed violation severity levels within 120 days of the effective date of this Final Rule.	NERC and WECC in its compliance filing of October 23, 2009[3] adjusted the violation severity levels as directed. The drafting team has established similar violation severity levels for each requirement in both BAL-001-01.1a E.B and BAL-004-WECC-2.

[2] *Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 51 of Order No. 723 – Directed Modification of Violation Risk Factors for Regional Reliability Standard BAL-004-WECC-1, Automatic Time Error Correction*, Docket No. RM08-12-000, filed August 28, 2009.

[3] *Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 54 of Order No. 723*, Docket No. RM08-12-000, filed October 23, 2009.

The Project WECC-0068 (BAL-004-WECC-2 and Regional Variance to BAL-001-0.1a)
Drafting Team Completed Actions
January 18, 2012

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
R1. Each BA that operates synchronously to the Western Interconnection shall continuously operate utilizing Automatic Time Error Correction (ATEC) in its Automatic Generation Control (AGC) system. [Risk Factor: Lower] $ACE_{ATEC} = (NI_A - NI'_S) - 10B_i(F_A - F_S) - T_{0b} + I_{ME}$ **Where:** **NI_A =** Net Interchange Actual (MW). **F_A =** Frequency Actual (Hz). **F_S** = Frequency Scheduled (Normally 60 Hz). **B_i** = Frequency Bias for the Balancing Authority's Area (MW / 0.1 Hz). **T_{0b} =** Remaining Bilateral Payback for Inadvertent Interchange created prior to implementing automatic payback (MW). **I_{ME} =** Meter Error Correction (MW). $NI'_S = NI_S - \frac{II^{on/off\ peak}_{Primary}}{(-Y) * H}$ **NI_S =** Net Interchange Scheduled (MW). **Y** = B_i / B_S.	**E.B.1.** Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit $\in_1^2$ is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee. $AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \in_1^2 \text{ or } \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\in_1^2} \le 1$ The equation for ACE in the Western Interconnection is: $ACE = (NI_A - NI_S) - 10B(F_A - F_S) - I_{ME} + I_{ATEC}$ **Where:** **NI_A** is the algebraic sum of actual flows on all tie lines. **F_A** is the actual frequency. **F_S** is the scheduled frequency. F_S is normally 60 Hz but	Establishing a Regional Variance in BAL-001-01.1a in which an ACE equation for WECC is specified provides the following benefits from a Standards perspective: a) Locates in a single standard the definition of ACE for all Interconnections; b) Identifies a single ACE formula for all Interconnections with common terminology and uncommon differences (i.e., there is no longer a NERC ACE and a "control" ACE); and	Reducing the NERC ACE and "control" ACE to a single ACE, allows Operations to "control to the target." This means that control actions will directly affect the monitored, measured objective function. Since the amount of the adjustment during any one hour is limited by L_{10}, Balancing Authorities automatically limit the risk and the amount of the transaction.

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
H = Number of Hours used to payback Inadvertent Interchange Energy. The WECC Performance Work Group has set the value of H to 3. **B_S** = Frequency Bias for the Interconnection (MW / 0.1 Hz). $II_{primary}^{on/off\ peak}$ = is the Balancing Authority's accumulated primary inadvertent interchange in MWh. An On-Peak and Off-Peak accumulation accounting is required. Where: $II_{primary}^{on/off\ peak}$ **= last period's** $II_{primary}^{on/off\ peak}$ **+ (1-Y) * (II_{actual} - B_i * ΔTE/6)** **II_{actual}** is the hourly Inadvertent Interchange for the last hour. **ΔTE** is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where: **ΔTE = $TE_{end\ hour}$ – $TE_{begin\ hour}$ – TD_{adj} – (t)*(TE offset)** **TD_{adj}** is any operator adjustment to the control center Time Error to correct for differences with the time monitor. **t** is the number of minutes of Manual Time Error Correction that occurred	may be offset to effect manual time error corrections. **B** = Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz. I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero. $I_{ATEC} = \frac{PII_{accum}^{on/off\ peak}}{(-Y) * H}$ when operating in Automatic Time Error Correction control mode. I_{ATEC} shall be zero when operating in any other AGC mode. **NI_S** is the algebraic sum of scheduled flows on all tie lines. **Y** = B / B_S. **H** = Number of Hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3. **B_S** = Frequency Bias for the Interconnection (MW / 0.1 Hz). **P**rimary **I**nadvertent **I**nterchange **(PII_{hourly})** is **(1-Y) * (II_{actual} - B * ΔTE/6)** **II_{actual}** is the hourly Inadvertent Interchange for the last hour. **ΔTE** is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where: **ΔTE = $TE_{end\ hour}$ – $TE_{begin\ hour}$ – TD_{adj} – (t)*(TE_{offset})**	c) Eliminates consideration of exceptional circumstances governing multiple ACEs.	

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
during the hour. **TE offset** is 0.000 or +0.020 or -0.020.	**TD_{adj}** is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks. **t** is the number of minutes of Manual Time Error Correction that occurred during the hour. **TE_{offset}** is 0.000 or +0.020 or -0.020. **PII_{accum}** is the Balancing Authority's accumulated **PII_{hourly}** in MWh. An On-Peak and Off-Peak accumulation accounting is required. Where: $PII_{accum}^{on/off\ peak}$ **= last period's** $PII_{accum}^{on/off\ peak}$ **+** PII_{hourly}		
R1.1. The absolute value of the WECC Automatic Time Error Correction term is limited as follows: $\left\| \frac{II_{primary}^{on/off\ peak}}{(1\text{-}Y)\cdot H} \right\| \le L_{max}$ Where L_{max} is chosen by the BA and is bounded as follows: $0.20 * \|B_i\| \le L_{max} \le L_{10}$ L_{10} is the Balancing Authority CPS2 limit in MW. If the WECC Automatic Time Error Correction term is less than the upper limit, use the calculated WECC Automatic Time Error Correction term.	**E.B.2.** Each Balancing Authority shall limit the absolute value of I_{ATEC}, the Automatic Time Error Correction term as follows: $\left\| I_{ATEC} \right\| \le L_{max}$. **E.B.3.** Each Balancing Authority shall set L_{max} within the limits as follows: $0.20 * \|B\| \le L_{max} \le L_{10}$.	Provides clarity in requirements and actions to be taken by the Balancing Authorities. Relocating this requirement to BAL-001-0.1a consolidates all requirements affecting calculation of terms in the ACE equation.	Eliminates potential confusion regarding limitation of the ATEC term, which could affect the final ACE value, subsequent control of units, and associated impact on system frequency.

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
R1.2 Large accumulations of primary inadvertent point to an invalid implementation of ATEC, loose control, metering or accounting errors. A BA [Balancing Authority] in such a situation should identify the source of the error(s) and make the corrections, recalculate the primary inadvertent from the time of the error, adjust the accumulated primary inadvertent caused by the error(s), validate the implementation of ATEC, set L_{max} equal to $L_{10,}$ and continue to operate with ATEC reducing the accumulation as system parameters allow.	**R1.** Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PII_{accum}) for both the monthly On-Peak period and the monthly Off-Peak period are each individually less than or equal to: **1.1** For load-serving Balancing Authorities, 150% of the previous calendar year's integrated hourly Peak Demand, **1.2** For generation-only Balancing Authorities, 150% of the previous calendar year's integrated hourly peak generation.	FERC directed WECC to define large accumulations for PII_{accum}. As a result in Requirement R1 the large accumulation limit was set to 150% of previous year's peak demand or peak generation for generation only Balancing Authorities. The action required is that the Balancing Authority shall not permit the PII_{accum} to exceed the defined value, which is demonstrated at the end of each month. Requirement R2 contains the provision to recalculate. Since an upper limit is now defined, the list of possible actions to be taken was moved to the premise for Requirement R1.	The drafting team reviewed historical data to identify an appropriate amount to limit PII_{accum} and accommodate month end adjustments.
R2. Each BA [Balancing Authority] that is synchronously connected to the Western	**R3.** Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable	Resolve that the "out of service" duration is	Ninety 90 days was selected as a

Posting 5

Standard BAL-001-0.1a
Real Power Balancing Control Performance
Modification of NERC BAL-001-0.1a to add WECC Regional Variance
Version 5 will be balloted under the WECC Reliability Standards Development Procedures.

Document Title	WECC Regional Variance to NERC Standard BAL-001-0.1a
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1		Version 1 Posted 4/15/11-6/1/11	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Version 3 Posted 12/15/11	Addressed comments from Version 2 posting
4		Standing Committee Approval	
5		WECC Board Approval	

Regional Variance 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.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	07/16/2010
9. Notice of development / first 30-day notice	09/2/2010
10. New committee chair orientation meeting	08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 01/18/11 02/10/11 03/11–12/11 03/24/11 04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
16. Post first draft for 45-day comment period	04/15/2011
17. Meeting to answer comments, address impact statement and draft responses	06/2-3/2011 06/14/2011 06/23/2011

	06/29/2011
18. Post responses to comments received during 45-day comment period	06/29/2011
19. Meet to answer to comments, address impact statement and draft responses	08/8/2011 08/15/2011 08/30/2011 11/01/2011
20. Post Version 2 for a 30-day comment period	11/04/2011
21. Post consideration of comments of Version 2	12/15/2011
22. Post Version 3 for 30-day comment period	12/15/2011
23. Project WECC-0068 Version 3 Comments were due	01/16/2012
24. Met to answer to comments, address impact statement, draft responses	01/18/2012
25. Post responses to comments	02/13/2012
26. Post for Operating Committee approval	02/24/2012

Description of Current Draft:

On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC Standards.[1] Since the approval of BAL-004-WECC-1 the industry has commented that there is confusion concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as that used during Automatic Generation Control (AGC) mode. The use of two ACE equations came as a result of NERC's comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a) [2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation for control but should use raw ACE for CPS reporting.[3] The industry desires to use the same ACE equation for control and reporting because it provides better a measurement of control performance.

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).
[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).
[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

The purpose of this proposed WECC Regional Variance to BAL-001-01.a (WECC Variance) is to replace Requirements R1 and Section D. Compliance, Subsection 2. of BAL-001-0.1a with three new requirements. In Requirement E.B.1 of the WECC Variance, the drafting team proposes to replace the NERC ACE equation with an ACE equation that includes the ATEC term. Replacing the NERC raw ACE equation with the ATEC ACE equation through a Regional Variance will require Balancing Authorities in the Western Interconnection to use the ATEC ACE for control and CPS reporting purposes. Using the ATEC ACE equation for CPS reporting is more appropriate because, as discussed further below, it is a more accurate measure of how well a Balancing Authority is controlling to its control performance target.

The drafting team for Project WECC-0068 also requests withdrawal of the BAL-001-0.1a Appendix 2 Interpretation of Requirement R1and the BAL-003-0.1b Appendix 1 Interpretation of Requirement R3. By creating a Regional Variance that replaces Requirement R1, these interpretations are no longer needed. The drafting team revised the definition for Area Control Error (ACE) in the WECC Regional Definitions to closely align with NERC definition for ACE while at the same recognizing concept of ATEC.

In order to obtain a Regional Variance[4] to a NERC Reliability Standard, it must be demonstrated that:

- The variance is not inconsistent with or less stringent than the NERC reliability standard;
- Is necessitated by a physical difference; or
- Is an alternative methodology with the same reliability objective.

Replacing the NERC ACE equation with an ATEC ACE equation is an alternative methodology with the same reliability objective as the existing BAL-001-0.1a standard. It is a method of automatically scheduling Primary Inadvertent Interchange (PII) back to other Balancing Authorities. The inclusion of the Automatic Time Error Correction term in the ACE equation changes the Balancing Authority's control performance target. The current NERC ACE equation requires that Balancing Authorities control the frequency and Interchange within their Balancing Authority Area to a target point of zero, but the ATEC ACE allows the control to stay within a predefined range called L_{max} which is between 0.20 * |B| and $\pm L_{10}$. The proposed ACE equation, with an Automatic Time Error adjustment, works similarly to the NERC equation; however, the target point for control is adjusted by the ATEC adjustment. The ATEC component defines a new control point and is equivalent to making an interchange schedule that would automatically payback PII. The modification to the ACE equation is equivalent to making an adjustment because of a metering error. Since the amount of the adjustment during any one hour is limited by L_{max}, Balancing Authorities automatically limit the risk to the interconnection and the amount of the transaction.

[4] "Entity variance" means an aspect of a reliability standard that applies only within a particular entity or a subset of entities within a limited portion of a regional entity, such as a variance that would apply to a regional transmission organization or particular market or to a subset of bulk power system owners, operators or users. An entity variance may not be inconsistent with or less stringent than the reliability standards as it would otherwise exist without the entity variance. An entity variance shall be approved only through the NERC standards development procedure and shall be made part of the NERC reliability standards." (Rules of Procedure of the North American Electric Reliability Corporation, Section 200 — Definition of Terms, page 2.)

The addition of the I_{ATEC} component meets the standard of justification for a Regional Variance as an alternative methodology, with the same reliability objective as the NERC Reliability Standard. In addition, the proposed WECC variance to BAL-001-0.1a is consistent with — or more stringent than — the NERC BAL-001-0.1a Reliability Standard. The reasons the WECC Variance meets the standard of justification are:

1. The addition of I_{ATEC} to the ACE equation and adjustment to the control performance target used for controlling frequency and interchange does not place any additional risk to reliability because limits are set in the magnitude of the I_{ATEC} adjustment.
2. The Regional Variance allows the use of the same control performance target for control and reporting providing a better methodology for measuring performance.
3. It is another control methodology that achieves the same reliability objective as BAL-001-0.1a.

BAL-004-WECC-1 requires Balancing Authorities in the Western Interconnection to use ATEC ACE for control. As proposed in the WECC Variance, Balancing Authorities in the Western Interconnection that are operating synchronously to the Interconnection shall use the ATEC ACE, which automatically corrects time error. The ATEC component in the ACE equation has been effective in mitigating two main issues in the Western Interconnection.

1. It has been used to reduce the number of hours of Manual Time Error Corrections, or the amount of manual adjustments of timing errors that accumulate on clocks, which make certain interconnection scheduled frequency deviations.
2. Since time error is directly related to Inadvertent Interchange, the procedure has been used to reduce accumulated Inadvertent Interchange, or the difference between the actual and scheduled interchange.

The ATEC procedure requires Balancing Authorities in the Western Interconnection to determine their contribution to the Interconnection time error. The Balancing Authority does this by calculating its PII. BAL-001-0.1a Requirement E.B.1 requires that each Balancing Authority calculate its PII_{accum} and I_{ATEC} from its hourly Inadvertent Interchange. When the resulting I_{ATEC} is entered into Balancing Authority's ACE equation, I_{ATEC} continuously corrects for its portion of the time error automatically, as opposed to manually, as specified in the continent-wide standard on Time Error Correction BAL-004-1 Requirement R2. Although the maximum payback is bounded between limits, the continuous correction enables equitable payback of Primary Inadvertent Interchange.

The drafting team is proposing the same Violation Severity Levels for Requirement R1 of the WECC Variance as those in Requirement R1 of BAL-001-01.a because it is a measurement of how well a Balancing Authority is controlling to its control performance target.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Post draft standard for 45-day NERC comment period	02/01/2012
2. NERC comment period ends	03/27/2012
3. Operating Committee approves proposed standard	03/27/2012
4. DT completes review and consideration of industry comments to NERC posting	04/27/2012

Anticipated Actions	Anticipated Date
5. Post draft standard for WECC Board approval	05/01/2012
6. WECC Board approval	06/21/2012
7. Post draft standard for 15-day NERC comment period	06/25/2012
8. NERC 15-day comment period ends	07/2012
9. DT completes review and consideration of industry comments to NERC posting	07/2012
10. Submit NERC Board of Trustees approval request	08/2012
11. Receive NERC Board approval	08/2012

.

Implementation Plan

The proposed Implementation Plan is to make the WECC Regional Variance to BAL-001-0.1a and the proposed WECC Regional Reliability Standard BAL-004-WECC-2 effective on the first day of the second quarter, after regulatory approval. Since entities are already controlling with the ATEC ACE equation, but are using the NERC raw ACE equation for purposes of reporting CPS1, the transition to controlling and reporting using the ATEC ACE should be minimal. Additionally, it should not require much time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

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 definitions will be removed from the standard and added to the NERC Glossary.

Area Control Error: The instantaneous difference between a Balancing Authority's net actual and scheduled interchange, taking into account the effects of Frequency Bias, correction for meter error, and Automatic Time Error Correction (ATEC), if operating in the ATEC mode. ATEC is only applicable to Balancing Authorities in the Western Interconnection.

A. Introduction

1. **Title**: **Real Power Balancing Control Performance**

2. **Number**: BAL-001-0.1a

3. **Purpose**: To maintain Interconnection steady-state frequency within defined limits by balancing real power demand and supply in real-time.

4. **Applicability**:

   4.1. Balancing Authorities

5. **Effective Date:** The WECC Regional Variance to NERC Reliability Standard BAL-001-0.1a is to be effective on the first day of the second quarter, after regulatory approval.

B. Requirements

R1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit ε_1^2 is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \epsilon_1^2 \; or \; \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\epsilon_1^2} \le 1$$

The equation for ACE is:

$ACE = (NI_A - NI_S) - 10B\,(F_A - F_S) - I_{ME}$

where:

- NI_A is the algebraic sum of actual flows on all tie lines.
- NI_S is the algebraic sum of scheduled flows on all tie lines.
- B is the Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.
- F_A is the actual frequency.
- F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.
- I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

R2. Each Balancing Authority shall operate such that its average ACE for at least 90% of clock-ten-minute periods (6 non-overlapping periods per hour) during a calendar month is within a specific limit, referred to as L_{10}.

$$AVG_{10-\text{minute}}(ACE_i) \le L_{10}$$

where:

$L_{10} = 1.65 \in_{10} \sqrt{(-10B_i)(-10B_s)}$

ε_{10} is a constant derived from the targeted frequency bound. It is the targeted root-mean-square (RMS) value of ten-minute average Frequency Error based on frequency performance over a given year. The bound, ε_{10}, is the same for every Balancing Authority Area within an Interconnection, and B_s is the sum of the Frequency Bias Settings of the Balancing Authority Areas in the respective Interconnection. For Balancing Authority Areas with variable bias, this is equal to the sum of the minimum Frequency Bias Settings.

R3. Each Balancing Authority providing Overlap Regulation Service shall evaluate Requirement R1 (i.e., Control Performance Standard 1 or CPS1) and Requirement R2 (i.e., Control Performance Standard 2 or CPS2) using the characteristics of the combined ACE and combined Frequency Bias Settings.

R4. Any Balancing Authority receiving Overlap Regulation Service shall not have its control performance evaluated (i.e. from a control performance perspective, the Balancing Authority has shifted all control requirements to the Balancing Authority providing Overlap Regulation Service).

C. Measures

M1. Each Balancing Authority shall achieve, as a minimum, Requirement 1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-\text{month}}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement R1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B} \right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}} \right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error will be used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

The reporting Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}} [(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}} [n_{\text{one-minutesamplesin clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}} [(\text{CF}_{\text{clock-houraverage-month}})(n_{\text{one-minutesamplesin clock-houraverages}})]}{\sum_{\text{hours-in day}} [n_{\text{one-minutesamplesin clock-houraverages}}]}$$

The 12-month compliance factor becomes:

$$\text{CF}_{\text{12-month}} = \frac{\sum_{\text{i=1}}^{12} (CF_{\text{month-i}})(n_{(\text{one-minutesamplesin month})\text{-i}})]}{\sum_{\text{i=1}}^{12} [n_{(\text{one-minutesamplesin month})\text{-i}}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

M2. Each Balancing Authority shall achieve, as a minimum, Requirement R2 (CPS2) compliance of 90%. CPS2 relates to a bound on the ten-minute average of ACE. A compliance percentage is calculated as follows:

$$CPS2 = \left[1 - \frac{\text{Violations}_{\text{month}}}{\left(\text{Total Periods}_{\text{month}} - \text{Unavailabl e Periods}_{\text{month}}\right)}\right] * 100$$

The violations per month are a count of the number of periods that ACE clock-ten-minutes exceeded L_{10}. ACE clock-ten-minutes is the sum of valid ACE samples within a clock-ten-minute period divided by the number of valid samples.

Violation clock-ten-minutes

= 0 if

$$\left|\frac{\sum ACE}{n_{\text{samplesin10-minutes}}}\right| \leq L_{10}$$

= 1 if

$$\left|\frac{\sum ACE}{n_{\text{samplesin10-minutes}}}\right| > L_{10}$$

Each Balancing Authority shall report the total number of violations and unavailable periods for the month. L_{10} is defined in Requirement R2.

Since CPS2 requires that ACE be averaged over a discrete time period, the same factors that limit total periods per month will limit violations per month. The calculation of total periods per month and violations per month, therefore, must be discussed jointly.

A condition may arise which may impact the normal calculation of total periods per month and violations per month. This condition is a sustained interruption in the recording of ACE.

In order to ensure that the average ACE calculated for any ten-minute interval is representative of that ten-minute interval, it is necessary that at least half the ACE data samples are present for that interval. Should half or more of the ACE data be unavailable due to loss of telemetering or computer unavailability, that ten-minute interval shall be omitted from the calculation of CPS2.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Regional Reliability Organization

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar month.

1.3. Data Retention

The data that supports the calculation of CPS1 and CPS2 (Appendix 1-BAL-001-0) are to be retained in electronic form for at least a one-year period. If the CPS1 and CPS2 data for a Balancing Authority Area are undergoing a review to address a question that has been raised regarding the data, the data are to be saved beyond the normal retention period until the question is formally resolved. Each Balancing Authority shall retain for a rolling 12-month period the values of: one-minute average ACE (ACE_i), one-minute average Frequency Error, and, if using variable bias, one-minute average Frequency Bias.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance – CPS1

2.1. Level 1: The Balancing Authority Area's value of CPS1 is less than 100% but greater than or equal to 95%.

2.2. Level 2: The Balancing Authority Area's value of CPS1 is less than 95% but greater than or equal to 90%.

2.3. Level 3: The Balancing Authority Area's value of CPS1 is less than 90% but greater than or equal to 85%.

2.4. Level 4: The Balancing Authority Area's value of CPS1 is less than 85%.

3. Levels of Non-Compliance – CPS2

3.1. Level 1: The Balancing Authority Area's value of CPS2 is less than 90% but greater than or equal to 85%.

3.2. Level 2: The Balancing Authority Area's value of CPS2 is less than 85% but greater than or equal to 80%.

3.3. Level 3: The Balancing Authority Area's value of CPS2 is less than 80% but greater than or equal to 75%.

3.4. Level 4: The Balancing Authority Area's value of CPS2 is less than 75%.

E. Regional Variances

E.A. The ERCOT Control Performance Standard 2 Waiver approved November 21, 2002.

E.B. Regional Variance for the Western Electricity Coordinating Council

The following Interconnection-wide variance shall be applicable in the Western Interconnection and replaces, in their entirety, Requirement R1 and Section D.2. (i.e., under Compliance replace Levels of Non-Compliance – CPS1). Please note that the ACE equation is replaced in its entirety with the following equation identified in Requirement E.B.1.

Requirements and Measures

E.B.1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's

Frequency Error is less than a specific limit. This limit $\in_1^2$ is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \in_1^2 \; or \; \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\in_1^2} \le 1$$

The equation for ACE in the Western Interconnection is:

$$ACE = (NI_A - NI_S) - 10B(F_A - F_S) - I_{ME} + I_{ATEC}$$

Where:

NI_A is the algebraic sum of actual flows on all tie lines.

NI_S is the algebraic sum of scheduled flows on all tie lines.

F_A is the actual frequency.

F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.

B = Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.

I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

Rationale for E.B.1

Premise: When a Balancing Authority Area uses the ACE equation with an ATEC correction component for both control and assessing performance, it provides a more accurate measurement of the Control Performance methodology while at the same time achieving the same reliability objective as the existing BAL-001-0.1a standard.

Justification: Adding the ***I_{ATEC}*** term to the ACE equation reduces the number of manual time error corrections and PII_{accum}.

Goal: To establish an ACE equation that permits the implementation of Automatic Time Error Correction.

$I_{ATEC} = \frac{PII_{accum}^{on/off\ peak}}{(-Y) * H}$ when operating in Automatic Time Error Correction control mode.

I_{ATEC} shall be zero when operating in any other AGC mode.

Y = B / B_S.

H = Number of Hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3.

B_S = Frequency Bias for the Interconnection (MW / 0.1 Hz).

Primary **I**nadvertent **I**nterchange **(PII_{hourly})** is **$(1-Y) * (II_{actual} - B * \Delta TE/6)$**

II_{actual} is the hourly Inadvertent Interchange for the last hour.

Δ**TE** is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where:

$$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE_{offset})$$

TD_{adj} is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks.

t is the number of minutes of Manual Time Error Correction that occurred during the hour.

TE_{offset} is 0.000 or +0.020 or -0.020.

PII_{accum} is the Balancing Authority's accumulated **PII_{hourly}** in MWh. An On-Peak and Off-Peak accumulation accounting is required.

Where:

$$PII_{accum}^{on/off\ peak} = \text{last period's } PII_{accum}^{on/off\ peak} + PII_{hourly}$$

[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]

M.E.B.1. Each Balancing Authority shall achieve, as a minimum, Requirement E.B.1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-month}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement E.B.1.

The rating index $CF_{12\text{-}month}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B} \right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}} \right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error are used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

As part of its evidence each Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}} [(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}} [n_{\text{one-minutesamplesin clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}} [(\text{CF}_{\text{clock-houraverage-month}})(n_{\text{one-minutesamplesin clock-houraverages}})]}{\sum_{\text{hours-in day}} [n_{\text{one-minutesamplesin clock-houraverages}}]}$$

The 12-month compliance factor becomes:

$$\text{CF}_{\text{12-month}} = \frac{\sum_{\text{i=1}}^{12} (CF_{\text{month-i}})(n_{(\text{one-minutesamplesin month})\geq \text{i}})]}{\sum_{\text{i=1}}^{12} [n_{(\text{one-minutesamplesin month})\text{-i}}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of

samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

E.B.2. Each Balancing Authority shall limit the absolute value of I_{ATEC}, the Automatic Time Error Correction term as follows: *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*

$$|I_{ATEC}| \leq L_{max}.$$

Rationale for E.B.2

Premise: I_{ATEC} greater than L_{max} may result in a risk to reliability caused by large ATEC payback.

Justification: Balancing Authorities should not control their Balancing Authority Areas using an approach that puts system reliability at risk.

Goal: The goal of Requirement E.B.2 is to limit I_{ATEC} to L_{max} in order to reduce potential reliability risks to the interconnection caused by a large ATEC payback term.

M.E.B.2. Forms of acceptable evidence for Requirement E.B. 2 may include, but are not limited to:

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or
- Other archived data that demonstrates compliance.

E.B.3. Each Balancing Authority shall set L_{max} within the limits as follows:

$$0.20 * |B| \leq L_{max} \leq L_{10}.$$

[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]

M.E.B.3. Forms of acceptable evidence for Requirement E.B. 3 may include, but is not limited to:

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or
- Other archived data that demonstrates compliance.

Rationale for E.B.3

Premise: Operating within an L_{max} less than 0.20 * |B| may not provide sufficient correction for PII and operating with an L_{max} greater than L_{10} may result in potential reliability risks caused by a large ATEC payback term.

Justification: L_{max} should be limited to prevent Balancing Authorities from creating potential reliability risks caused by a large ATEC payback term.

Goal: The goal of Requirement E.B.3 is to develop a range for L_{max} where Balancing Authorities reduce potential reliability risks by limiting I_{ATEC} to L_{max}.

E.B. Compliance

1. Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain

specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of I_{ATEC} and L_{max} for the preceding calendar year (January – December), as well as the current calendar year.

Table of Compliance Elements

E #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
E.B.1	Real-time Operations	Medium	The Balancing Authority Area's value of CPS1 was less than 100% but greater than or equal to 95%.	The Balancing Authority Area's value of CPS1 was less than 95% but greater than or equal to 90%.	The Balancing Authority Area's value of CPS1 was less than 90% but greater than or equal to 85%.	The Balancing Authority Area's value of CPS1 was less than 85%.
E.B.2	Real-time Operations	Medium	N/A	N/A	N/A	The Balancing Authority Area's absolute value for I_{ATEC} was greater than L_{max}.
E.B.3	Operations Planning	Medium	N/A	N/A	N/A	The Balancing Authority did not set L_{max} to within the limits in E.B.3 (i.e., $0.20 * \|B\| \leq L_{max} \leq L_{10}$).

F. Associated Documents

Version History

Version	Date	Action	Change Tracking
0	February 8, 2005	BOT Approval	New
0	April 1, 2005	Effective Implementation Date	New
0	August 8, 2005	Removed “Proposed” from Effective Date	Errata
0	July 24, 2007	Corrected R3 to reference M1 and M2 instead of R1 and R2	Errata
0a	December 19, 2007	Added Appendix 2 – Interpretation of R1 approved by BOT on October 23, 2007	Revised
0a	January 16, 2008	In Section A.2., Added “a” to end of standard number In Section F, corrected automatic numbering from “2” to “1” and removed “approved” and added parenthesis to “(October 23, 2007)”	Errata
0	January 23, 2008	Reversed errata change from July 24, 2007	Errata
0.1a	October 29, 2008	Board approved errata changes; updated version number to “0.1a”	Errata
0.1a	May 13, 2009	Approved by FERC	
		WECC Regional Variance Retirement of Appendix 2 Interpretation of Requirement R1	

Standard BAL-001-0.1a
Real Power Balancing Control Performance
Modification of NERC BAL-001-0.1a to add WECC Regional Variance
Version 5 will be balloted under the WECC Reliability Standards Development Procedures.

Appendix 1-BAL-001-0
CPS1 and CPS2 Data

CPS1 DATA	Description	Retention Requirements
ε_1	A constant derived from the targeted frequency bound. This number is the same for each Balancing Authority Area in the Interconnection.	Retain the value of ε_1 used in CPS1 calculation.
ACE_i	The clock-minute average of ACE.	Retain the 1-minute average values of ACE (525,600 values).
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value(s) of B_i used in the CPS1 calculation.
F_A	The actual measured frequency.	Retain the 1-minute average frequency values (525,600 values).
F_S	Scheduled frequency for the Interconnection.	Retain the 1-minute average frequency values (525,600 values).

CPS2 DATA	Description	Retention Requirements
V	Number of incidents per hour in which the absolute value of ACE clock-ten-minutes is greater than L_{10}.	Retain the values of V used in CPS2 calculation.
ε_{10}	A constant derived from the frequency bound. It is the same for each Balancing Authority Area within an Interconnection.	Retain the value of ε_{10} used in CPS2 calculation.
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value of B_i used in the CPS2 calculation.
B_s	The sum of Frequency Bias of the Balancing Authority Areas in the respective Interconnection. For systems with variable bias, this is equal to the sum of the minimum Frequency Bias Setting.	Retain the value of B_s used in the CPS2 calculation. Retain the 1-minute minimum bias value (525,600 values).
U	Number of unavailable ten-minute periods per hour used in calculating CPS2.	Retain the number of 10-minute unavailable periods used in calculating CPS2 for the reporting period.

Standard BAL-001-0.1a
Real Power Balancing Control Performance
Modification of NERC BAL-001-0.1a to add WECC Regional Variance
Version 4

For Approval

Document Title	WECC Regional Variance to NERC Standard BAL-001-0.1a
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1		Version 1 Posted 4/15/11-6/1/11	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Version 3 Posted 12/15/11	Addressed comments from Version 2 posting
4		Standing Committee Approval	
5		WECC Board Approval	

Regional Variance 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.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	07/16/2010
9. Notice of development / first 30-day notice	09/2/2010
10. New committee chair orientation meeting	08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 01/18/11 02/10/11 03/11–12/11 03/24/11 04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
16. Post first draft for 45-day comment period	04/15/2011
17. Meeting to answer comments, address impact statement and draft responses	06/2-3/2011 06/14/2011

	06/23/2011 06/29/2011
18. Post responses to comments received during 45-day comment period	06/29/2011
19. Meet to answer to comments, address impact statement and draft responses	08/8/2011 08/15/2011 08/30/2011 11/01/2011
20. Post Version 2 for a 30-day comment period	11/04/2011
21. Post consideration of comments of Version 2	12/15/2011
22. Post Version 3 for 30-day comment period	12/15/2011
23. Project WECC-0068 Version 3 Comments were due	01/16/2012
24. Met to answer to comments, address impact statement, draft responses	01/18/2012
25. Post responses to comments	02/13/2012
26. Post for Operating Committee approval	02/24/2012

Description of Current Draft:

On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC Standards.[1] Since the approval of BAL-004-WECC-1 the industry has commented that there is confusion concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as that used during Automatic Generation Control (AGC) mode. The use of two ACE equations came as a result of NERC's comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a)[2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).

[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).

for control but should use raw ACE for CPS reporting.[3] The industry desires to use the same ACE equation for control and reporting because it provides better a measurement of control performance.

The purpose of this proposed WECC Regional Variance to BAL-001-01.a (WECC Variance) is to replace Requirements R1 and Section D. Compliance, Subsection 2. of BAL-001-0.1a with three new requirements. In Requirement E.B.1 of the WECC Variance, the drafting team proposes to replace the NERC ACE equation with an ACE equation that includes the ATEC term. Replacing the NERC raw ACE equation with the ATEC ACE equation through a Regional Variance will require Balancing Authorities in the Western Interconnection to use the ATEC ACE for control and CPS reporting purposes. Using the ATEC ACE equation for CPS reporting is more appropriate because, as discussed further below, it is a more accurate measure of how well a Balancing Authority is controlling to its control performance target.

The drafting team for Project WECC-0068 also requests withdrawal of the BAL-001-0.1a Appendix 2 Interpretation of Requirement R1and the BAL-003-0.1b Appendix 1 Interpretation of Requirement R3. By creating a Regional Variance that replaces Requirement R1, these interpretations are no longer needed. The drafting team revised the definition for Area Control Error (ACE) in the WECC Regional Definitions to closely align with NERC definition for ACE while at the same recognizing concept of ATEC.

In order to obtain a Regional Variance[4] to a NERC Reliability Standard, it must be demonstrated that:

- The variance is not inconsistent with or less stringent than the NERC reliability standard;
- Is necessitated by a physical difference; or
- Is an alternative methodology with the same reliability objective.

Replacing the NERC ACE equation with an ATEC ACE equation is an alternative methodology with the same reliability objective as the existing BAL-001-0.1a standard. It is a method of automatically scheduling Primary Inadvertent Interchange (PII) back to other Balancing Authorities. The inclusion of the Automatic Time Error Correction term in the ACE equation changes the Balancing Authority's control performance target. The current NERC ACE equation requires that Balancing Authorities control the frequency and Interchange within their Balancing Authority Area to a target point of zero, but ~~it~~the ATEC ACE allows the control to stay within a predefined range called L_{max} which is between 0.20 * |B| and $\pm L_{10}$. The proposed ACE equation, with an Automatic Time Error adjustment, works similarly to the NERC equation; however, the

[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

[4] "Entity variance" means an aspect of a reliability standard that applies only within a particular entity or a subset of entities within a limited portion of a regional entity, such as a variance that would apply to a regional transmission organization or particular market or to a subset of bulk power system owners, operators or users. An entity variance may not be inconsistent with or less stringent than the reliability standards as it would otherwise exist without the entity variance. An entity variance shall be approved only through the NERC standards development procedure and shall be made part of the NERC reliability standards." (Rules of Procedure of the North American Electric Reliability Corporation, Section 200 — Definition of Terms, page 2.)

target point for control is adjusted by the ATEC adjustment. The ATEC component defines a new control point and is equivalent to making an interchange schedule that would automatically payback PII. The modification to the ACE equation is equivalent to making an adjustment because of a metering error. Since the amount of the adjustment during any one hour is limited by L_{max}, Balancing Authorities automatically limit the risk to the interconnection and the amount of the transaction.

The addition of the I_{ATEC} component meets the standard of justification for a Regional Variance as an alternative methodology, with the same reliability objective as the NERC Reliability Standard. In addition, the proposed WECC variance to BAL-001-0.1a is consistent with — or more stringent than — the NERC BAL-001-0.1a Reliability Standard. The reasons the WECC Variance meets the standard of justification are:

1. The addition of I_{ATEC} to the ACE equation and adjustment to the control performance target used for controlling frequency and interchange does not place any ~~additional~~additional risk to reliability because limits are set in the magnitude of the I_{ATEC} adjustment.
2. The Regional Variance allows the use of the same control performance target for control and reporting providing a better methodology for measuring performance.
3. It is another control methodology that achieves the same reliability objective as BAL-001-0.1a.

BAL-004-WECC-1 requires Balancing Authorities in the Western Interconnection to use ATEC ACE for control. As proposed in the WECC Variance, Balancing Authorities in the Western Interconnection that are ~~required to operate~~operating synchronously to the Interconnection~~, using~~ shall use the ATEC ACE, which automatically corrects time error. The ATEC component in the ACE equation has been effective in mitigating two main issues in the Western Interconnection.

1. It has been used to reduce the number of hours of Manual Time Error Corrections, or the amount of manual adjustments of timing errors that accumulate on clocks, which make certain interconnection scheduled frequency deviations.
2. Since time error is directly related to Inadvertent Interchange, the procedure has been used to reduce accumulated Inadvertent Interchange, or the difference between the actual and scheduled interchange.

The ATEC procedure requires Balancing Authorities in the Western Interconnection to determine their contribution to the Interconnection time error. The Balancing Authority does this by calculating its PII. BAL-001-0.1a Requirement E.B.1 requires that each Balancing Authority calculate its PII_{accum} and I_{ATEC} from its hourly Inadvertent Interchange. When the resulting I_{ATEC} is entered into Balancing Authority's ACE equation, I_{ATEC} continuously corrects for its portion of the time error automatically, as opposed to manually, as specified in the continent-wide standard on Time Error Correction BAL-004-1 Requirement R2. Although the maximum payback is bounded between limits, the continuous correction enables equitable payback of Primary Inadvertent Interchange.

The drafting team is proposing the same Violation Severity Levels for Requirement R1 of the WECC Variance as those in Requirement R1 of BAL-001-01.a because it is a measurement of how well a Balancing Authority is controlling to its control performance target.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Post draft standard for 45-day NERC comment period	02/01/2012
2. NERC comment period ends	03/27/2012
3. Operating Committee approves proposed standard	03/27/2012
4. DT completes review and consideration of industry comments to NERC posting	04/27/2012
5. Post draft standard for WECC Board approval	05/01/2012
6. WECC Board approval	06/21/2012
7. Post draft standard for 15-day NERC comment period	06/25/2012
8. NERC 15-day comment period ends	07/2012
9. DT completes review and consideration of industry comments to NERC posting	07/2012
10. Submit NERC Board of Trustees approval request	08/2012
11. Receive NERC Board approval	08/2012

.

Implementation Plan

The proposed Implementation Plan is to make the WECC Regional Variance to BAL-001-0.1a and the proposed WECC Regional Reliability Standard BAL-004-WECC-2 effective on the first day of the second quarter, after regulatory approval. Since entities are already controlling with the ATEC ACE equation, but are using the NERC raw ACE equation for purposes of reporting CPS1, the transition to controlling and reporting using the ATEC ACE should be minimal. Additionally, it should not require much time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

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 definitions will be removed from the standard and added to the NERC Glossary.

Area Control Error: The instantaneous difference between a Balancing Authority's net actual and scheduled interchange, taking into account the effects of Frequency Bias, correction for meter error, and Automatic Time Error Correction (ATEC), if operating in the ATEC mode. ATEC is only applicable to Balancing Authorities in the Western Interconnection.

A. Introduction

1. **Title**: **Real Power Balancing Control Performance**

2. **Number**: BAL-001-0.1a

3. **Purpose**: To maintain Interconnection steady-state frequency within defined limits by balancing real power demand and supply in real-time.

4. **Applicability**:

   4.1. Balancing Authorities

5. **Effective Date:** The WECC Regional Variance to NERC Reliability Standard BAL-001-0.1a is to be effective on the first day of the second quarter, after regulatory approval.

B. Requirements

R1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit ε_1^2 is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \in_1^2 \; or \; \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\in_1^2} \le 1$$

Committee.

The equation for ACE is:

$ACE = (NI_A - NI_S) - 10B\,(F_A - F_S) - I_{ME}$

where:

- NI_A is the algebraic sum of actual flows on all tie lines.
- NI_S is the algebraic sum of scheduled flows on all tie lines.
- B is the Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.
- F_A is the actual frequency.
- F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.
- I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

R2. Each Balancing Authority shall operate such that its average ACE for at least 90% of clock-ten-minute periods (6 non-overlapping periods per hour) during a calendar

month is within a specific limit, referred to as L_{10}.

$$AVG_{10-\text{minute}}(ACE_i) \le L_{10}$$

where:

$L_{10}=1.65\in_{10}\sqrt{(-10B_i)(-10B_s)}$

ε_{10} is a constant derived from the targeted frequency bound. It is the targeted root-mean-square (RMS) value of ten-minute average Frequency Error based on frequency performance over a given year. The bound, ε_{10}, is the same for every Balancing Authority Area within an Interconnection, and B_s is the sum of the Frequency Bias Settings of the Balancing Authority Areas in the respective Interconnection. For Balancing Authority Areas with variable bias, this is equal to the sum of the minimum Frequency Bias Settings.

R3. Each Balancing Authority providing Overlap Regulation Service shall evaluate Requirement R1 (i.e., Control Performance Standard 1 or CPS1) and Requirement R2 (i.e., Control Performance Standard 2 or CPS2) using the characteristics of the combined ACE and combined Frequency Bias Settings.

R4. Any Balancing Authority receiving Overlap Regulation Service shall not have its control performance evaluated (i.e. from a control performance perspective, the Balancing Authority has shifted all control requirements to the Balancing Authority providing Overlap Regulation Service).

C. Measures

M1. Each Balancing Authority shall achieve, as a minimum, Requirement 1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-\text{month}}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement R1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}}\right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error will be used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

The reporting Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}}[(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}}[n_{\text{one-minutesamplesin clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}}[(\text{CF}_{\text{clock-houraverage-month}})(n_{\text{one-minutesamplesin clock-houraverages}})]}{\sum_{\text{hours-in day}}[n_{\text{one-minutesamplesin clock-houraverages}}]}$$

The 12-month compliance factor becomes:

$$\text{CF}_{\text{12-month}} = \frac{\sum_{\text{i=1}}^{12}(CF_{\text{month-i}})(n_{\text{(one-minutesamplesin month)-i}})]}{\sum_{\text{i=1}}^{12}[n_{\text{(one-minutesamplesin month)-i}}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at

least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

M2. Each Balancing Authority shall achieve, as a minimum, Requirement R2 (CPS2) compliance of 90%. CPS2 relates to a bound on the ten-minute average of ACE. A compliance percentage is calculated as follows:

$$CPS2 = \left[1 - \frac{\text{Violations}_{\text{month}}}{\left(\text{Total Periods}_{\text{month}} - \text{Unavailable Periods}_{\text{month}}\right)}\right] * 100$$

The violations per month are a count of the number of periods that ACE clock-ten-minutes exceeded L_{10}. ACE clock-ten-minutes is the sum of valid ACE samples within a clock-ten-minute period divided by the number of valid samples.

Violation clock-ten-minutes

= 0 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| \leq L_{10}$$

= 1 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| > L_{10}$$

Each Balancing Authority shall report the total number of violations and unavailable periods for the month. L_{10} is defined in Requirement R2.

Since CPS2 requires that ACE be averaged over a discrete time period, the same factors that limit total periods per month will limit violations per month. The calculation of total periods per month and violations per month, therefore, must be discussed jointly.

A condition may arise which may impact the normal calculation of total periods per month and violations per month. This condition is a sustained interruption in the recording of ACE.

In order to ensure that the average ACE calculated for any ten-minute interval is representative of that ten-minute interval, it is necessary that at least half the ACE data samples are present for that interval. Should half or more of the ACE data be unavailable due to loss of telemetering or computer unavailability, that ten-minute interval shall be omitted from the calculation of CPS2.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Regional Reliability Organization

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar month.

1.3. Data Retention

The data that supports the calculation of CPS1 and CPS2 (Appendix 1-BAL-001-0) are to be retained in electronic form for at least a one-year period. If the CPS1 and CPS2 data for a Balancing Authority Area are undergoing a review to address a question that has been raised regarding the data, the data are to be saved beyond the normal retention period until the question is formally resolved. Each Balancing Authority shall retain for a rolling 12-month period the values of: one-minute average ACE (ACE_i), one-minute average Frequency Error, and, if using variable bias, one-minute average Frequency Bias.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance – CPS1

2.1. Level 1: The Balancing Authority Area's value of CPS1 is less than 100% but greater than or equal to 95%.

2.2. Level 2: The Balancing Authority Area's value of CPS1 is less than 95% but greater than or equal to 90%.

2.3. Level 3: The Balancing Authority Area's value of CPS1 is less than 90% but greater than or equal to 85%.

2.4. Level 4: The Balancing Authority Area's value of CPS1 is less than 85%.

3. Levels of Non-Compliance – CPS2

3.1. Level 1: The Balancing Authority Area's value of CPS2 is less than 90% but greater than or equal to 85%.

3.2. Level 2: The Balancing Authority Area's value of CPS2 is less than 85% but greater than or equal to 80%.

3.3. Level 3: The Balancing Authority Area's value of CPS2 is less than 80% but greater than or equal to 75%.

3.4. Level 4: The Balancing Authority Area's value of CPS2 is less than 75%.

E. Regional Variances

E.A. The ERCOT Control Performance Standard 2 Waiver approved November 21, 2002.

E.B. Regional Variance for the Western Electricity Coordinating Council

The following Interconnection-wide variance shall be applicable in the Western Interconnection and replaces, in their entirety, Requirement R1 and Section D.2. (i.e., under Compliance replace Levels of Non-Compliance – CPS1). Please note that the ACE equation is replaced in its entirety with the following equation identified in Requirement E.B.1.

Requirements and Measures

E.B.1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit $\in_1^2$ is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \leq \in_1^2 \; or \; \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\in_1^2} \leq 1$$

The equation for ACE in the Western Interconnection is:

$$ACE = (NI_A - NI_S) - 10B(F_A - F_S) - I_{ME} + I_{ATEC}$$

Where:

NI_A is the algebraic sum of actual flows on all tie lines.

NI_S is the algebraic sum of scheduled flows on all tie lines.

F_A is the actual frequency.

F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.

B = Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.

I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

Rationale for E.B.1

Premise: When a Balancing Authority Area uses the ACE equation with an ATEC correction component for both control and assessing performance, it provides a more accurate measurement of the Control Performance methodology while at the same time achieving the same reliability objective as the existing BAL-001-0.1a standard.

Justification: Adding the ***I_{ATEC}*** term to the ACE equation reduces the number of manual time error corrections and PII_{accum}.

Goal: To establish an ACE equation that permits the implementation of Automatic Time Error Correction.

$I_{ATEC} = \frac{PII_{accum}^{on/off\ peak}}{(-Y) * H}$ when operating in Automatic Time Error Correction control mode.

I_{ATEC} shall be zero when operating in any other AGC mode.

Y = B / B_S.

H = Number of Hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3.

B_S = Frequency Bias for the Interconnection (MW / 0.1 Hz).

Primary **I**nadvertent **I**nterchange **(PII_{hourly})** is **(1-Y) * (II_{actual} - B * ΔTE/6)**

II_{actual} is the hourly Inadvertent Interchange for the last hour.

ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where:

$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE_{offset})$

TD_{adj} is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks.

t is the number of minutes of Manual Time Error Correction that occurred during the hour.

TE_{offset} is 0.000 or +0.020 or -0.020.

PII_{accum} is the Balancing Authority's accumulated **PII_{hourly}** in MWh. An On-Peak and Off-Peak accumulation accounting is required.

Where:

$PII_{accum}^{on/off\ peak}$ **= last period's** $PII_{accum}^{on/off\ peak}$ **+** PII_{hourly}

[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]

M.E.B.1. Each Balancing Authority shall achieve, as a minimum, Requirement E.B.1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-month}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement E.B.1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}}\right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error are used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

As part of its evidence each Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}}[(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}}[n_{\text{one-minutesamplesin clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}}[(\text{CF}_{\text{clock-houraverage-month}})(n_{\text{one-minutesamplesin clock-houraverages}})]}{\sum_{\text{hours-in day}}[n_{\text{one-minutesamplesin clock-houraverages}}]}$$

The 12-month compliance factor becomes:

$$CF_{12\text{-month}} = \frac{\sum_{i=1}^{12}(CF_{\text{month-i}})(n_{(\text{one-minute samples in month})\text{-i}})]}{\sum_{i=1}^{12}[n_{(\text{one-minute samples in month})\text{-i}}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

Rationale for E.B.2

Premise: I_{ATEC} greater than L_{max} may result in a risk to reliability caused by large ATEC payback.

Justification: Balancing Authorities should not control their Balancing Authority Areas using an approach that puts system reliability at risk.

Goal: The goal of Requirement E.B.2 is to limit I_{ATEC} to L_{max} in order to reduce potential reliability risks to the interconnection caused by a large ATEC payback term.

E.B.2. Each Balancing Authority shall limit the absolute value of I_{ATEC}, the Automatic Time Error Correction term as follows: *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*

$$|I_{ATEC}| \leq L_{max}.$$

M.E.B.2. Forms of acceptable evidence for Requirement E.B. 2 may include, but are not limited to:

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or
- Other archived data that demonstrates compliance.

Rationale for E.B.3

Premise: Operating within an L_{max} less than 0.20 * |B| may not provide sufficient correction for PII and operating with an L_{max} greater than L_{10} may result in potential reliability risks caused by a large ATEC payback term.

Justification: L_{max} should be limited to prevent Balancing Authorities from creating potential reliability risks caused by a large ATEC payback term.

Goal: The goal of Requirement E.B.3 is to develop a range for L_{max} where Balancing Authorities reduce potential reliability risks by limiting I_{ATEC} to L_{max}.

E.B.3. Each Balancing Authority shall set L_{max} within the limits as follows:

$$0.20 * |B| \leq L_{max} \leq L_{10}.$$

[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]

M.E.B.3. Forms of acceptable evidence for Requirement E.B. 3 may include, but is not limited to:

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or
- Other archived data that demonstrates compliance.

E.B. Compliance

1. Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of I_{ATEC} and L_{max} for the preceding calendar year (January – December), as well as the current calendar year.

Table of Compliance Elements

E #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
E.B.1	Real-time Operations	Medium	The Balancing Authority Area's value of CPS1 was less than 100% but greater than or equal to 95%.	The Balancing Authority Area's value of CPS1 was less than 95% but greater than or equal to 90%.	The Balancing Authority Area's value of CPS1 was less than 90% but greater than or equal to 85%.	The Balancing Authority Area's value of CPS1 was less than 85%.
E.B.2	Real-time Operations	Medium	N/A	N/A	N/A	The Balancing Authority Area's absolute value for I_{ATEC} was greater than L_{max}.
E.B.3	Operations Planning	Medium	N/A	N/A	N/A	The Balancing Authority did not set L_{max} to within the limits in E.B.3 (i.e., $0.20 * \|B\| \leq L_{max} \leq L_{10}$).

F. Associated Documents

Version History

Version	Date	Action	Change Tracking
0	February 8, 2005	BOT Approval	New
0	April 1, 2005	Effective Implementation Date	New
0	August 8, 2005	Removed “Proposed” from Effective Date	Errata
0	July 24, 2007	Corrected R3 to reference M1 and M2 instead of R1 and R2	Errata
0a	December 19, 2007	Added Appendix 2 – Interpretation of R1 approved by BOT on October 23, 2007	Revised
0a	January 16, 2008	In Section A.2., Added “a” to end of standard number In Section F, corrected automatic numbering from “2” to “1” and removed “approved” and added parenthesis to “(October 23, 2007)”	Errata
0	January 23, 2008	Reversed errata change from July 24, 2007	Errata
0.1a	October 29, 2008	Board approved errata changes; updated version number to “0.1a”	Errata
0.1a	May 13, 2009	Approved by FERC	
		WECC Regional Variance Retirement of Appendix 2 Interpretation of Requirement R1	

Standard BAL-001-0.1a
Real Power Balancing Control Performance
Modification of NERC BAL-001-0.1a to add WECC Regional Variance
Version 4
For Approval

Appendix 1-BAL-001-0
CPS1 and CPS2 Data

CPS1 DATA	Description	Retention Requirements
ε_1	A constant derived from the targeted frequency bound. This number is the same for each Balancing Authority Area in the Interconnection.	Retain the value of ε_1 used in CPS1 calculation.
ACE_i	The clock-minute average of ACE.	Retain the 1-minute average values of ACE (525,600 values).
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value(s) of B_i used in the CPS1 calculation.
F_A	The actual measured frequency.	Retain the 1-minute average frequency values (525,600 values).
F_S	Scheduled frequency for the Interconnection.	Retain the 1-minute average frequency values (525,600 values).

CPS2 DATA	Description	Retention Requirements
V	Number of incidents per hour in which the absolute value of ACE clock-ten-minutes is greater than L_{10}.	Retain the values of V used in CPS2 calculation.
ε_{10}	A constant derived from the frequency bound. It is the same for each Balancing Authority Area within an Interconnection.	Retain the value of ε_{10} used in CPS2 calculation.
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value of B_i used in the CPS2 calculation.
B_s	The sum of Frequency Bias of the Balancing Authority Areas in the respective Interconnection. For systems with variable bias, this is equal to the sum of the minimum Frequency Bias Setting.	Retain the value of B_s used in the CPS2 calculation. Retain the 1-minute minimum bias value (525,600 values).
U	Number of unavailable ten-minute periods per hour used in calculating CPS2.	Retain the number of 10-minute unavailable periods used in calculating CPS2 for the reporting period.

Standard BAL-001-0.1a
Real Power Balancing Control Performance
Modification of NERC BAL-001-0.1a to add WECC Regional Variance
Version 4

For Approval

Document Title	WECC Regional Variance to NERC Standard BAL-001-0.1a
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1		Version 1 Posted 4/15/11-6/1/11	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Version 3 Posted 12/15/11	Addressed comments from Version 2 posting
4		Standing Committee Approval	
5		WECC Board Approval	

Regional Variance 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.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	07/16/2010
9. Notice of development / first 30-day notice	09/2/2010
10. New committee chair orientation meeting	08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 01/18/11 02/10/11 03/11–12/11 03/24/11 04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
16. Post first draft for 45-day comment period	04/15/2011
17. Meeting to answer comments, address impact statement and draft responses	06/2-3/2011 06/14/2011

	06/23/2011 06/29/2011
18. Post responses to comments received during 45-day comment period	06/29/2011
19. Meet to answer to comments, address impact statement and draft responses	08/8/2011 08/15/2011 08/30/2011 11/01/2011
20. Post Version 2 for a 30-day comment period	11/04/2011
21. Post consideration of comments of Version 2	12/15/2011
22. Post Version 3 for 30-day comment period	12/15/2011
23. Project WECC-0068 Version 3 Comments were due	01/16/2012
24. Met to answer to comments, address impact statement, draft responses	01/18/2012
25. Post responses to comments	02/13/2012
26. Post for Operating Committee approval	02/24/2012

Description of Current Draft:

On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC Standards.[1] Since the approval of BAL-004-WECC-1 the industry has commented that there is confusion concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as that used during Automatic Generation Control (AGC) mode. The use of two ACE equations came as a result of NERC's comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a)[2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).

[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).

for control but should use raw ACE for CPS reporting.[3] The industry desires to use the same ACE equation for control and reporting because it provides better a measurement of control performance.

The purpose of this proposed WECC Regional Variance to BAL-001-01.a (WECC Variance) is to replace Requirements R1 and Section D. Compliance, Subsection 2. of BAL-001-0.1a with three new requirements. In Requirement E.B.1 of the WECC Variance, the drafting team proposes to replace the NERC ACE equation with an ACE equation that includes the ATEC term. Replacing the NERC raw ACE equation with the ATEC ACE equation through a Regional Variance will require Balancing Authorities in the Western Interconnection to use the ATEC ACE for control and CPS reporting purposes. Using the ATEC ACE equation for CPS reporting is more appropriate because, as discussed further below, it is a more accurate measure of how well a Balancing Authority is controlling to its control performance target.

The drafting team for Project WECC-0068 also requests withdrawal of the BAL-001-0.1a Appendix 2 Interpretation of Requirement R1and the BAL-003-0.1b Appendix 1 Interpretation of Requirement R3. By creating a Regional Variance that replaces Requirement R1, these interpretations are no longer needed. The drafting team revised the definition for Area Control Error (ACE) in the WECC Regional Definitions to closely align with NERC definition for ACE while at the same recognizing concept of ATEC.

In order to obtain a Regional Variance[4] to a NERC Reliability Standard, it must be demonstrated that:

- The variance is not inconsistent with or less stringent than the NERC reliability standard;
- Is necessitated by a physical difference; or
- Is an alternative methodology with the same reliability objective.

Replacing the NERC ACE equation with an ATEC ACE equation is an alternative methodology with the same reliability objective as the existing BAL-001-0.1a standard. It is a method of automatically scheduling Primary Inadvertent Interchange (PII) back to other Balancing Authorities. The inclusion of the Automatic Time Error Correction term in the ACE equation changes the Balancing Authority's control performance target. The current NERC ACE equation requires that Balancing Authorities control the frequency and Interchange within their Balancing Authority Area to a target point of zero, but the ATEC ACE allows the control to stay within a predefined range called L_{max} which is between 0.20 * |B| and $\pm L_{10}$. The proposed ACE equation, with an Automatic Time Error adjustment, works similarly to the NERC equation; however, the

[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

[4] "Entity variance" means an aspect of a reliability standard that applies only within a particular entity or a subset of entities within a limited portion of a regional entity, such as a variance that would apply to a regional transmission organization or particular market or to a subset of bulk power system owners, operators or users. An entity variance may not be inconsistent with or less stringent than the reliability standards as it would otherwise exist without the entity variance. An entity variance shall be approved only through the NERC standards development procedure and shall be made part of the NERC reliability standards." (Rules of Procedure of the North American Electric Reliability Corporation, Section 200 — Definition of Terms, page 2.)

target point for control is adjusted by the ATEC adjustment. The ATEC component defines a new control point and is equivalent to making an interchange schedule that would automatically payback PII. The modification to the ACE equation is equivalent to making an adjustment because of a metering error. Since the amount of the adjustment during any one hour is limited by L_{max}, Balancing Authorities automatically limit the risk to the interconnection and the amount of the transaction.

The addition of the I_{ATEC} component meets the standard of justification for a Regional Variance as an alternative methodology, with the same reliability objective as the NERC Reliability Standard. In addition, the proposed WECC variance to BAL-001-0.1a is consistent with — or more stringent than — the NERC BAL-001-0.1a Reliability Standard. The reasons the WECC Variance meets the standard of justification are:

1. The addition of I_{ATEC} to the ACE equation and adjustment to the control performance target used for controlling frequency and interchange does not place any additional risk to reliability because limits are set in the magnitude of the I_{ATEC} adjustment.
2. The Regional Variance allows the use of the same control performance target for control and reporting providing a better methodology for measuring performance.
3. It is another control methodology that achieves the same reliability objective as BAL-001-0.1a.

BAL-004-WECC-1 requires Balancing Authorities in the Western Interconnection to use ATEC ACE for control. As proposed in the WECC Variance, Balancing Authorities in the Western Interconnection that are operating synchronously to the Interconnection shall use the ATEC ACE, which automatically corrects time error. The ATEC component in the ACE equation has been effective in mitigating two main issues in the Western Interconnection.

1. It has been used to reduce the number of hours of Manual Time Error Corrections, or the amount of manual adjustments of timing errors that accumulate on clocks, which make certain interconnection scheduled frequency deviations.
2. Since time error is directly related to Inadvertent Interchange, the procedure has been used to reduce accumulated Inadvertent Interchange, or the difference between the actual and scheduled interchange.

The ATEC procedure requires Balancing Authorities in the Western Interconnection to determine their contribution to the Interconnection time error. The Balancing Authority does this by calculating its PII. BAL-001-0.1a Requirement E.B.1 requires that each Balancing Authority calculate its PII_{accum} and I_{ATEC} from its hourly Inadvertent Interchange. When the resulting I_{ATEC} is entered into Balancing Authority's ACE equation, I_{ATEC} continuously corrects for its portion of the time error automatically, as opposed to manually, as specified in the continent-wide standard on Time Error Correction BAL-004-1 Requirement R2. Although the maximum payback is bounded between limits, the continuous correction enables equitable payback of Primary Inadvertent Interchange.

The drafting team is proposing the same Violation Severity Levels for Requirement R1 of the WECC Variance as those in Requirement R1 of BAL-001-01.a because it is a measurement of how well a Balancing Authority is controlling to its control performance target.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Post draft standard for 45-day NERC comment period	02/01/2012
2. NERC comment period ends	03/27/2012
3. Operating Committee approves proposed standard	03/27/2012
4. DT completes review and consideration of industry comments to NERC posting	04/27/2012
5. Post draft standard for WECC Board approval	05/01/2012
6. WECC Board approval	06/21/2012
7. Post draft standard for 15-day NERC comment period	06/25/2012
8. NERC 15-day comment period ends	07/2012
9. DT completes review and consideration of industry comments to NERC posting	07/2012
10. Submit NERC Board of Trustees approval request	08/2012
11. Receive NERC Board approval	08/2012

.

Implementation Plan

The proposed Implementation Plan is to make the WECC Regional Variance to BAL-001-0.1a and the proposed WECC Regional Reliability Standard BAL-004-WECC-2 effective on the first day of the second quarter, after regulatory approval. Since entities are already controlling with the ATEC ACE equation, but are using the NERC raw ACE equation for purposes of reporting CPS1, the transition to controlling and reporting using the ATEC ACE should be minimal. Additionally, it should not require much time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

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 definitions will be removed from the standard and added to the NERC Glossary.

Area Control Error: The instantaneous difference between a Balancing Authority's net actual and scheduled interchange, taking into account the effects of Frequency Bias, correction for meter error, and Automatic Time Error Correction (ATEC), if operating in the ATEC mode. ATEC is only applicable to Balancing Authorities in the Western Interconnection.

A. Introduction

1. **Title**: **Real Power Balancing Control Performance**

2. **Number**: BAL-001-0.1a

3. **Purpose**: To maintain Interconnection steady-state frequency within defined limits by balancing real power demand and supply in real-time.

4. **Applicability**:

   4.1. Balancing Authorities

~~5. **Effective Date:** May 13, 2009~~

5. **Effective Date:** The WECC Regional Variance to NERC Reliability Standard BAL-001-0.1a is to be effective on the first day of the second quarter, after regulatory approval.

B. Requirements

R1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit ε_1^2 is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \epsilon_1^2 \quad or \quad \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\epsilon_1^2} \le 1$$

Committee.

The equation for ACE is:

$ACE = (NI_A - NI_S) - 10B (F_A - F_S) - I_{ME}$

where:

- NI_A is the algebraic sum of actual flows on all tie lines.
- NI_S is the algebraic sum of scheduled flows on all tie lines.
- B is the Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.
- F_A is the actual frequency.
- F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.
- I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

R2. Each Balancing Authority shall operate such that its average ACE for at least 90% of clock-ten-minute periods (6 non-overlapping periods per hour) during a calendar month is within a specific limit, referred to as L_{10}.

$$AVG_{10-\text{minute}}(ACE_i) \le L_{10}$$

where:

$$L_{10} = 1.65 \in_{10} \sqrt{(-10B_i)(-10B_s)}$$

ε_{10} is a constant derived from the targeted frequency bound. It is the targeted root-mean-square (RMS) value of ten-minute average Frequency Error based on frequency performance over a given year. The bound, ε_{10}, is the same for every Balancing Authority Area within an Interconnection, and B_s is the sum of the Frequency Bias Settings of the Balancing Authority Areas in the respective Interconnection. For Balancing Authority Areas with variable bias, this is equal to the sum of the minimum Frequency Bias Settings.

R3. Each Balancing Authority providing Overlap Regulation Service shall evaluate Requirement R1 (i.e., Control Performance Standard 1 or CPS1) and Requirement R2 (i.e., Control Performance Standard 2 or CPS2) using the characteristics of the combined ACE and combined Frequency Bias Settings.

R4. Any Balancing Authority receiving Overlap Regulation Service shall not have its control performance evaluated (i.e. from a control performance perspective, the Balancing Authority has shifted all control requirements to the Balancing Authority providing Overlap Regulation Service).

C. Measures

M1. Each Balancing Authority shall achieve, as a minimum, Requirement 1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-\text{month}}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement R1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}}\right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error will be used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

The reporting Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}}[(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}}[n_{\text{one-minutesamplesin clock-hour}}]}$$

$$\text{CF}_{\text{month}} = \frac{\sum_{\text{hours-in-day}}[(\text{CF}_{\text{clock-houraverage-month}})(n_{\text{one-minutesamplesin clock-houraverages}})]}{\sum_{\text{hours-in day}}[n_{\text{one-minutesamplesin clock-houraverages}}]}$$

The 12-month compliance factor becomes:

$$\text{CF}_{\text{12-month}} = \frac{\sum_{\text{i=1}}^{12}(CF_{\text{month-i}})(n_{(\text{one-minutesamplesin month})\text{-i}})]}{\sum_{\text{i=1}}^{12}[n_{(\text{one-minutesamplesin month})\text{-i}}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

M2. Each Balancing Authority shall achieve, as a minimum, Requirement R2 (CPS2) compliance of 90%. CPS2 relates to a bound on the ten-minute average of ACE. A compliance percentage is calculated as follows:

$$CPS2 = \left[1 - \frac{\text{Violations}_{\text{month}}}{\left(\text{Total Periods}_{\text{month}} - \text{Unavailable Periods}_{\text{month}}\right)}\right] * 100$$

The violations per month are a count of the number of periods that ACE clock-ten-minutes exceeded L_{10}. ACE clock-ten-minutes is the sum of valid ACE samples within a clock-ten-minute period divided by the number of valid samples.

Violation clock-ten-minutes

= 0 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| \leq L_{10}$$

= 1 if

$$\left|\frac{\sum ACE}{n_{\text{samples in 10-minutes}}}\right| > L_{10}$$

Each Balancing Authority shall report the total number of violations and unavailable periods for the month. L_{10} is defined in Requirement R2.

Since CPS2 requires that ACE be averaged over a discrete time period, the same factors that limit total periods per month will limit violations per month. The calculation of total periods per month and violations per month, therefore, must be discussed jointly.

A condition may arise which may impact the normal calculation of total periods per month and violations per month. This condition is a sustained interruption in the recording of ACE.

In order to ensure that the average ACE calculated for any ten-minute interval is representative of that ten-minute interval, it is necessary that at least half the ACE data samples are present for that interval. Should half or more of the ACE data be unavailable due to loss of telemetering or computer unavailability, that ten-minute interval shall be omitted from the calculation of CPS2.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Regional Reliability Organization~~.~~

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar month.

1.3. Data Retention

The data that supports the calculation of CPS1 and CPS2 (Appendix 1-BAL-001-0) are to be retained in electronic form for at least a one-year period. If the CPS1 and CPS2 data for a Balancing Authority Area are undergoing a review to address a question that has been raised regarding the data, the data are to be saved beyond the normal retention period until the question is formally resolved. Each Balancing Authority shall retain for a rolling 12-month period the values of: one-minute average ACE (ACE_i), one-minute average Frequency Error, and, if using variable bias, one-minute average Frequency Bias.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance – CPS1

2.1. Level 1: The Balancing Authority Area's value of CPS1 is less than 100% but greater than or equal to 95%.

2.2. Level 2: The Balancing Authority Area's value of CPS1 is less than 95% but greater than or equal to 90%.

2.3. Level 3: The Balancing Authority Area's value of CPS1 is less than 90% but greater than or equal to 85%.

2.4. Level 4: The Balancing Authority Area's value of CPS1 is less than 85%.

3. Levels of Non-Compliance – CPS2

3.1. Level 1: The Balancing Authority Area's value of CPS2 is less than 90% but greater than or equal to 85%.

3.2. Level 2: The Balancing Authority Area's value of CPS2 is less than 85% but greater than or equal to 80%.

3.3. Level 3: The Balancing Authority Area's value of CPS2 is less than 80% but greater than or equal to 75%.

3.4. Level 4: The Balancing Authority Area's value of CPS2 is less than 75%.

E. Regional ~~Differences~~Variances

~~1.~~**E.A.** The ERCOT Control Performance Standard 2 Waiver approved November 21, 2002.

E.B. Regional Variance for the Western Electricity Coordinating Council

The following Interconnection-wide variance shall be applicable in the Western Interconnection and replaces, in their entirety, Requirement R1 and Section D.2.

(i.e., under Compliance replace Levels of Non-Compliance – CPS1). Please note that the ACE equation is replaced in its entirety with the following equation identified in Requirement E.B.1.

Requirements and Measures

E.B.1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit $\in_1^2$ is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

$$AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \in_1^2 \; or \; \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\in_1^2} \le 1$$

The equation for ACE in the Western Interconnection is:

$$ACE = (NI_A - NI_S) - 10B(F_A - F_S) - I_{ME} + I_{ATEC}$$

Where:

NI_A is the algebraic sum of actual flows on all tie lines.

NI_S is the algebraic sum of scheduled flows on all tie lines.

F_A is the actual frequency.

F_S is the scheduled frequency. F_S is normally 60 Hz but may be offset to effect manual time error corrections.

B = Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz.

I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line

Rationale for E.B.1

Premise: When a Balancing Authority Area uses the ACE equation with an ATEC correction component for both control and assessing performance, it provides a more accurate measurement of the Control Performance methodology while at the same time achieving the same reliability objective as the existing BAL-001-0.1a standard.

Justification: Adding the ***I_{ATEC}*** term to the ACE equation reduces the number of manual time error corrections and PII_{accum}.

Goal: To establish an ACE equation that permits the implementation of Automatic Time Error Correction.

flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero.

$I_{ATEC} = \frac{PII_{accum}^{on/off\ peak}}{(-Y) * H}$ when operating in Automatic Time Error Correction control mode.

I_{ATEC} shall be zero when operating in any other AGC mode.

Y = B / B_S.

H = Number of Hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3.

B_S = Frequency Bias for the Interconnection (MW / 0.1 Hz).

Primary **I**nadvertent **I**nterchange **(PII_{hourly})** is **$(1-Y) * (II_{actual} - B * \Delta TE/6)$**

II_{actual} is the hourly Inadvertent Interchange for the last hour.

ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where:

$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE_{offset})$

TD_{adj} is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks.

t is the number of minutes of Manual Time Error Correction that occurred during the hour.

TE_{offset} is 0.000 or +0.020 or -0.020.

PII_{accum} is the Balancing Authority's accumulated **PII_{hourly}** in MWh. An On-Peak and Off-Peak accumulation accounting is required.

Where:

$PII_{accum}^{on/off\ peak}$ **= last period's** $PII_{accum}^{on/off\ peak}$ **+** PII_{hourly}

[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]

M.E.B.1. Each Balancing Authority shall achieve, as a minimum, Requirement E.B.1 (CPS1) compliance of 100%.

CPS1 is calculated by converting a compliance ratio to a compliance percentage as follows:

CPS1 = (2 - CF) * 100%

The frequency-related compliance factor, CF, is a ratio of all one-minute compliance parameters accumulated over 12 months divided by the target frequency bound:

$$CF = \frac{CF_{12-\text{month}}}{(\in_1)^2}$$

where: ε_1 is defined in Requirement E.B.1.

The rating index $CF_{12\text{-month}}$ is derived from 12 months of data. The basic unit of data comes from one-minute averages of ACE, Frequency Error and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for ACE and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} = \frac{\left(\frac{\sum ACE_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}\right)}{\text{-10B}}$$

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{samplingcyclesin clock-minute}}}{n_{\text{samplingcyclesin clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor (CF) becomes:

$$CF_{\text{clock-minute}} = \left[\left(\frac{ACE}{-10B}\right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}}\right]$$

Normally, sixty (60) clock-minute averages of the reporting Balancing Authority's ACE and of the respective Interconnection's Frequency Error are used to compute the respective hourly average compliance parameter.

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

As part of its evidence each Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages (CF clock-hour average-month) as well as the respective number of samples for each of the twenty-four (24) hours (one for each clock-hour, i.e., hour-ending (HE) 0100, HE 0200, ..., HE 2400).

$$\text{CF}_{\text{clock-houraverage-month}} = \frac{\sum_{\text{days-in-month}} [(\text{CF}_{\text{clock-hour}})(n_{\text{one-minutesamplesin clock-hour}})]}{\sum_{\text{days-in month}} [n_{\text{one-minutesamplesin clock-hour}}]}$$

$$CF_{month} = \frac{\sum_{hours\text{-}in\text{-}day}[(CF_{clock\text{-}hour\,average\text{-}month})(n_{one\text{-}minute\,samples\,in\,clock\text{-}hour\,averages})]}{\sum_{hours\text{-}in\,day}[n_{one\text{-}minute\,samples\,in\,clock\text{-}hour\,averages}]}$$

The 12-month compliance factor becomes:

$$CF_{12\text{-}month} = \frac{\sum_{i=1}^{12}(CF_{month\text{-}i})(n_{(one\text{-}minute\,samples\,in\,month)\text{-}i})]}{\sum_{i=1}^{12}[n_{(one\text{-}minute\,samples\,in\,month)\text{-}i}]}$$

In order to ensure that the average ACE and Frequency Deviation calculated for any one-minute interval is representative of that one-minute interval, it is necessary that at least 50% of both ACE and Frequency Deviation samples during that one-minute interval be present. Should a sustained interruption in the recording of ACE or Frequency Deviation due to loss of telemetering or computer unavailability result in a one-minute interval not containing at least 50% of samples of both ACE and Frequency Deviation, that one-minute interval shall be excluded from the calculation of CPS1.

E.B.2. Each Balancing Authority shall limit the absolute value of I_{ATEC}, the Automatic Time Error Correction term as follows: *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*

$$|I_{ATEC}| \leq L_{max}.$$

Rationale for E.B.2

Premise: I_{ATEC} greater than L_{max} may result in a risk to reliability caused by large ATEC payback.

Justification: Balancing Authorities should not control their Balancing Authority Areas using an approach that puts system reliability at risk.

Goal: The goal of Requirement E.B.2 is to limit I_{ATEC} to L_{max} in order to reduce potential reliability risks to the interconnection caused by a large ATEC payback term.

M.E.B.2. Forms of acceptable evidence for Requirement E.B. 2 may include, but are not limited to:

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or

Rationale for E.B.3

Premise: Operating within an L_{max} less than 0.20 * |B| may not provide sufficient correction for PII and operating with an L_{max} greater than L_{10} may result in potential reliability risks caused by a large ATEC payback term.

Justification: L_{max} should be limited to prevent Balancing Authorities from creating potential reliability risks caused by a large ATEC payback term.

Goal: The goal of Requirement E.B.3 is to develop a range for L_{max} where Balancing Authorities reduce potential reliability risks by limiting I_{ATEC} to L_{max}.

- Other archived data that demonstrates compliance.

E.B.3. Each Balancing Authority shall set L_{max} within the limits as follows:

$$0.20 * |B| \leq L_{max} \leq L_{10}.$$

[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]

M.E.B.3. Forms of acceptable evidence for Requirement E.B. 3 may include, but is not limited to:

- Dated Energy Management System (EMS) displays,
- WECC Interchange Tool, EMS application code, or
- Other archived data that demonstrates compliance.

E.B. Compliance

1. Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of I_{ATEC} and L_{max} for the preceding calendar year (January – December), as well as the current calendar year.

Table of Compliance Elements

E #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
E.B.1	Real-time Operations	Medium	The Balancing Authority Area's value of CPS1 was less than 100% but greater than or equal to 95%.	The Balancing Authority Area's value of CPS1 was less than 95% but greater than or equal to 90%.	The Balancing Authority Area's value of CPS1 was less than 90% but greater than or equal to 85%.	The Balancing Authority Area's value of CPS1 was less than 85%.
E.B.2	Real-time Operations	Medium	N/A	N/A	N/A	The Balancing Authority Area's absolute value for I_{ATEC} was greater than L_{max}.
E.B.3	Operations Planning	Medium	N/A	N/A	N/A	The Balancing Authority did not set L_{max} to within the limits in E.B.3 (i.e., $0.20 * \|B\| \leq L_{max} \leq L_{10}$).

F. Associated Documents

E.A. Appendix 2 – Interpretation of Requirement R1 (October 23, 2007).

Version History

Version	Date	Action	Change Tracking
0	February 8, 2005	BOT Approval	New
0	April 1, 2005	Effective Implementation Date	New
0	August 8, 2005	Removed "Proposed" from Effective Date	Errata
0	July 24, 2007	Corrected R3 to reference M1 and M2 instead of R1 and R2	Errata
0a	December 19, 2007	Added Appendix 2 – Interpretation of R1 approved by BOT on October 23, 2007	Revised
0a	January 16, 2008	In Section A.2., Added "a" to end of standard number In Section F, corrected automatic numbering from "2" to "1" and removed "approved" and added parenthesis to "(October 23, 2007)"	Errata
0	January 23, 2008	Reversed errata change from July 24, 2007	Errata
0.1a	October 29, 2008	Board approved errata changes; updated version number to "0.1a"	Errata
0.1a	May 13, 2009	Approved by FERC	
		WECC Regional Variance Retirement of Appendix 2 Interpretation of Requirement R1	

Appendix 1-BAL-001-0
CPS1 and CPS2 Data

CPS1 DATA	Description	Retention Requirements
ε_1	A constant derived from the targeted frequency bound. This number is the same for each Balancing Authority Area in the Interconnection.	Retain the value of ε_1 used in CPS1 calculation.
ACE_i	The clock-minute average of ACE.	Retain the 1-minute average values of ACE (525,600 values).
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value(s) of B_i used in the CPS1 calculation.
F_A	The actual measured frequency.	Retain the 1-minute average frequency values (525,600 values).
F_S	Scheduled frequency for the Interconnection.	Retain the 1-minute average frequency values (525,600 values).

CPS2 DATA	Description	Retention Requirements
V	Number of incidents per hour in which the absolute value of ACE clock-ten-minutes is greater than L_{10}.	Retain the values of V used in CPS2 calculation.
ε_{10}	A constant derived from the frequency bound. It is the same for each Balancing Authority Area within an Interconnection.	Retain the value of ε_{10} used in CPS2 calculation.
B_i	The Frequency Bias of the Balancing Authority Area.	Retain the value of B_i used in the CPS2 calculation.
B_s	The sum of Frequency Bias of the Balancing Authority Areas in the respective Interconnection. For systems with variable bias, this is equal to the sum of the minimum Frequency Bias Setting.	Retain the value of B_s used in the CPS2 calculation. Retain the 1-minute minimum bias value (525,600 values).
U	Number of unavailable ten-minute periods per hour used in calculating CPS2.	Retain the number of 10-minute unavailable periods used in calculating CPS2 for the reporting period.

Appendix 2

Interpretation of Requirement 1

Request: *Does the WECC Automatic Time Error Control Procedure (WATEC) violate Requirement 1 of BAL-001-0?*

Interpretation:
Requirement 1 of BAL-001 — Real Power Balancing Control Performance, is the definition of the area control error (ACE) equation and the limits established for Control Performance Standard 1 (CPS1).

BAL-001-0

R1. Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit ε12 is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee.

- The WATEC procedural documents ask Balancing Authorities to maintain raw ACE for CPS reporting and to control via WATEC-adjusted ACE.
- As long as Balancing Authorities use raw (unadjusted for WATEC) ACE for CPS reporting purposes, the use of WATEC for control is not in violation of BAL-001 Requirement 1.

Document Title	WECC Standard BAL-004-WECC-02
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1	4/15/2011	Version 1 Posted	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Version 3 Posted 12/15/11	Addressed comments from Version 2 posting
4		Standing Committee Approval	
5		WECC Board Approval	

WECC 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.

.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	07/16/2010
9. Notice of development / first 30-day notice	09/2/2010
10. New committee chair orientation meeting	08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 01/18/11 02/10/11 03/11–12/11 03/24/11 04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
16. Post first draft for 45-day comment period	04/15/2011
17. Meet to answer to comments, address impact statement and draft responses	06/2-3/2011 06/14/2011 06/23/2011 06/29/2011
18. Post responses to comments received during 45-day comment period	06/29/2011
19. Meet to answer to comments, address impact statement and	08/8/2011 08/15/2011

Completed Actions	Completion Date
draft responses	08/30/2011 11/01/2011
20. Post the Version 2 for a 30-day comment period	11/04/2011
21. Post consideration of comments of Version 2	12/15/2011
22. Post the third dart for 30-day comment period	12/15/2011
23. Project WECC-0068 Version 3 Comments were due	01/16/2012
24. Meeting to answer comments, address impact statement, draft responses	01/18/2012
25. Post responses to comments	02/13/2012
26. Post for Operating Committee approval	02/24/2012

Description of Current Draft:

On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC Standards.[1] In addition, WECC staff identified additional modifications to BAL-004-WECC-1 that would clarify the intent without changing the requirements. Finally, the industry has commented that there is confusion concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as that used during Automatic Generation Control (AGC) mode. This seems to conflict with NERC's comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a)[2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation for control but should use raw ACE for CPS reporting.[3] As part of this filing WECC has submitted a proposed regional variance to BAL-001-0.1a to address this conflict.

The purpose of the refinements to BAL-004-WECC-1 as proposed in WECC Regional Reliability Standard BAL-004-WECC-2 – Automatic Time Error Correction (BAL-004-WECC-2) is to implement the directives in FERC Order 723 and to make other clarifications to BAL-004-WECC-1 as the industry deems necessary, while maintaining the Western Interconnection's

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).

[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).

[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7,* pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

reliability. The FERC Order 723 directives are as follows:

1. "The Commission is concerned that the phrases 'large accumulation' and 'in such a situation' as used in Requirement R1.2 leaves to individual interpretation when a 'large' amount of primary inadvertent has accumulated. The ERO and WECC agree that the provision could benefit from further clarity. Accordingly, the Commission adopts its NOPR proposal and directs WECC to develop revisions to the provision so that a balancing authority will know with specificity the circumstances that trigger the actions required by Requirement R1.2."[4]
2. "Consistent with the NOPR, pursuant to section 215(d) (5) of the FPA, the Commission directs WECC to develop a modification to the regional Reliability Standard consistent with WECC's and NERC's explanation that the limit set forth in Requirement 2 of '24 hours per calendar quarter' is an accumulated total for the period, resulting from either a singular event or a cumulative time limit from a number of events."[5]
3. "[The Commission] direct[s] that the violation risk factors assigned to BAL-004-WECC-01, Requirements R1, R2, R3, and R4 be modified from 'lower' to 'medium.' The ERO and WECC must submit a filing within 60 days of the effective date of this Final Rule that includes the directed modifications."[6] These modifications were addressed in a compliance filing dated August 28, 2009. [7]
4. "The Commission adopts its NOPR proposal and directs the ERO and WECC to submit violation severity levels for each Requirement and sub-Requirement that has been assigned a violation risk factor. To allow adequate time for the development of the violation severity levels, the ERO and WECC must submit a filing within 120 days of the effective date of this Final Rule that includes the directed violation severity levels."[8] These modifications were addressed in a compliance filing date October 23, 2009.[9]
5. In response to Xcel comments, FERC referenced their approval, in Order No. 713, of an ERO interpretation stating that as long as Balancing Authorities use raw ACE for Control Performance Standard (CPS) reporting purposes and WECC ATEC (ATEC) ACE for control, it is not a violation of BAL-001-0.1a, Requirement 1.[10]. WECC Stakeholders believe it is more appropriate to use the ATEC ACE for control and CPS reporting. To clarify this difference, WECC has developed a regional variance BAL-001-0.1a.

The implementation of an ATEC ACE is part of a regional variance to BAL-001-0.1a associated with this posting. The purpose of this filing is to meet the directives of FERC Order 723 while refining for clarity the existing requirements of BAL-004-WECC-1. Refinements to BAL-004-WECC-1 include:

---

[4] Order 723 at ¶ 30.

[5] *Id* at ¶ 34.

[6] *Id* at ¶ 51.

[7] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 51 of Order No. 723 – Directed Modification of Violation Risk Factors for Regional Reliability Standard BAL-004-WECC-1, Automatic Time Error Correction, Docket No. RM08-12-000, filed August 28, 2009

[8] Order 723 at ¶ 54.

[9] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 54 of Order No. 723, Docket No. RM08-12-000, filed October 23, 2009

[10] Order 723 at ¶ 44-45.

1. A requirement that defines the large accumulation at 150% of previous year's peak demand or peak generation for generation-only Balancing Authorities. The action required is that the Balancing Authority shall not permit the PII_{accum} to exceed the defined value, which is demonstrated at the end of each month.
2. A clarification in response to the FERC order that the accumulated time for ATEC out of service shall not exceed 24 hours during a calendar quarter.

BAL-004-WECC-2 retains the requirement for Balancing Authorities to compute the Automatic Time Error Correction and Primary Inadvertent Interchange by 50 minutes after the hour and requires that Balancing Authorities have the ability to operate their Automatic Generation Control in other modes. In addition, Balancing Authorities are required to recalculate Primary Inadvertent Interchange when hourly and month-end adjustments are made.

In Version 3 in order to prevent the stranding of Secondary Inadvertent Interchange the drafting team added a Requirement R8 that restrictions the payback of Inadvertent Interchange to using ATEC rather than through bilateral and unilateral payback methods.

The proposed BAL-004-WECC-2 will replace the Automatic Time Error Correction definition in the NERC Glossary of Terms. The WECC definitions for Primary Inadvertent Interchange and Secondary Inadvertent Interchange will be retained in the *Glossary of Terms Used in NERC Reliability Standards*.

Development Plan:

Anticipated Actions	Anticipated Date
1. Post draft standard for 45-day NERC comment period	02/01/2012
2. NERC comment period ends	03/27/2012
3. Operating Committee approves proposed standard	03/27/2012
4. DT completes review and consideration of industry comments to NERC posting	04/27/2012
5. Post draft standard for WECC Board approval	05/01/2012
6. WECC Board approval	06/21/2012
7. Post draft standard for 15-day NERC comment period	06/25/2012
8. NERC 15-day comment period ends	07/2012
9. DT completes review and consideration of industry comments to NERC posting	07/2012
10. Submit NERC Board of Trustees approval request	08/2012
11. Receive NERC Board approval	08/2012

.

Implementation Plan

The Implementation Plan is to make the WECC Regional Variance to BAL-001-0.1a and BAL-004-WECC-2 effective on the first day of the second quarter, after regulatory approval in areas

where applicable. Since entities are already controlling their Balancing Authority Area with the ATEC ACE equation – but are reporting using the NERC raw ACE equation for reporting CPS1 – the transition to controlling and reporting using the ATEC ACE should be minimal. Additionally, it should not take much time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

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 definitions will be removed from the standard and added to the NERC Glossary. In addition the current definitions for "**Primary Inadvertent Interchange**" and "**Secondary Inadvertent Interchange"** will be retained in the Glossary of Terms Used in NERC Reliability Standards.*

Automatic Time Error Correction: The addition of a component to the ACE equation that modifies the control point for the purpose of continuously paying back Primary Inadvertent Interchange to correct accumulated time error.

A. Introduction

1. Title: **Automatic Time Error Correction**

2. Number: BAL-004-WECC-02

3. Purpose: To maintain Interconnection frequency and to ensure that Time Error Corrections and Primary Inadvertent Interchange (PII) payback are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection.

4. Applicability

4.1. Functional Entities

4.1.1 Balancing Authorities that operate synchronously in the Western Interconnection.

5. Effective Date: On the first day of the second quarter, after applicable regulatory approval has been received (or the Reliability Standard otherwise becomes effective the first day of the fourth quarter following NERC Board adoption where regulatory approval is not required).

6. Background:

In February 2003, the WECC Automatic Time Error Correction (ATEC) Procedure (Procedure) became effective for all Balancing Authorities in the Western Interconnection. The original intent of the Procedure was to minimize the number of Manual Time Error Corrections in the Western Interconnection. ATEC provides the added benefit of a superior approach over the current NERC Reliability Standard BAL-004-0 – Time Error Correction and the equitable payback of Inadvertent Interchange. In October 2006, the Procedure became a WECC Criterion. In May 2009, FERC issued Order No.723 that approved Regional Reliability Standard BAL-004-WECC-1 - Automatic Time Error Correction, as submitted by NERC. In addition, the Commission directed WECC to develop several clarifying modifications to BAL-004-WECC-1 using the FERC-approved Process for Developing and Approving WECC Standards. The Effective Date of the BAL-004-WECC-1 standard was July 1, 2009. BAL-004-WECC-1 required Balancing Authorities within the Western Interconnection to maintain Interconnection frequency within a predefined frequency profile and to ensure that Time Error Corrections were effectively conducted in a manner that did not adversely affect the reliability of the Interconnection. In September 2009, WECC received WECC Standards/Regional Criterion Request Form (Request) WECC-0068, which was a request for modification of BAL-004-WECC-1. In July 2010, the chair of the WECC Operating Committee assigned the Request to the Performance Work Group (PWG) for development.

B. Requirements and Measures

R1. Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PII_{accum}) for both the On-Peak period and the Off-Peak period are each individually less than or equal to:

1.1. For load-serving Balancing Authorities, 150% of the previous calendar year's integrated hourly Peak Demand,

1.2. For generation-only Balancing Authorities, 150% of the previous calendar year's integrated hourly peak generation.

[Violation Risk Factor Medium:] [Time Horizon: Operations Assessment]

M1. Forms of acceptable evidence of compliance with Requirement R1include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool (WIT),
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R2. Each Balancing Authority shall, upon discovery of an error in the calculation of PII_{hourly}, recalculate within 90 days, the value of PII_{hourly} and adjust the PII_{accum} from the time of the error. *[Violation Risk Factor: Medium] [Time Horizon:*

Rationale for R1:

Premise: Each Balancing Authority should ensure that the absolute value of its PII_{accum} for both the On-Peak period and the Off-Peak period each individually does not exceed 150% of the previous year's Peak Demand for load-serving Balancing Authorities and 150% of the previous year's peak generation for generation-only Balancing Authorities. The Balancing Authority is required to take action to keep each PII_{accum} period within the limit. For example, the Balancing Authorities actions may include:

- Identifying and correcting the source of any metering or accounting error(s) and recalculating the hourly Primary Inadvertent Interchange **(**PII_{hourly}) and the PII_{accum} from the time of the error;
- Validating the implementation of ATEC; or
- Setting L_{max} equal to $L_{10.}$until the PII_{accum} is below the limit in Requirement R1.

Justification: PII_{accum} may grow from month-end adjustments and metering errors, even with the inclusion of I_{ATEC} in the ACE equation.

Goal: To limit the amount of PII_{accum} that a Balancing Authority can have at the end of each month.

Rationale for R2:

Premise: When a Balancing Authority finds an error in the calculation of its PII, the Balancing Authority needs time to correct the error and recalculate PII and PII_{accum}.

Justification: The drafting team selected 90 days as a reasonable amount of time to correct an error and recalculate PII and $PII_{accum,}$ since recalculation of PII and PII_{accum} is not a real-time operations reliability issue.

Goal: To promote the timely correction of errors in the calculation of PII and PII_{accum}.

Operations Assessment]

M2. Forms of acceptable evidence of compliance with Requirement R2 include but are not limited to any one of the following:

- Data, screen shots from the WIT,
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R3. Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service. *[Violation Risk Factor: Medium] [Time Horizon: Same-day Operations]*

M3. Forms of acceptable evidence of compliance with Requirement R3 may include, but are not limited to:

- Dated archived files,
- Historical data,
- Other data that demonstrates the ATEC was out of service for less than 24 hours per calendar quarter.

Rationale for R3:

Premise: When a Balancing Authority is not participating in ATEC, payback of PII_{accum} is delayed.

Justification: The limit of 24 hours per quarter discourages a Balancing Authority from withdrawing ATEC participation, for example, for economic gain during selected hours. If the limits were increased to 60 hours, a Balancing Authority could technically withdraw ATEC participation for one hour from Monday to Friday.

Goal: To promote fair and timely payback of PII_{accum} balances.

R4. Each Balancing Authority shall compute the following by 50 minutes after each hour:

4.1. $PII_{\mathbf{hourly}}$,

4.2. PII_{accum},

4.3. Automatic Time Error Correction term (I_{ATEC}).

Rationale for R4:

Premise: $PII_{\mathbf{hourly}}$, PII_{accum}, and I_{ATEC} should be determined before the next scheduling hour begins.

Justification: To promote timely calculations 50 minutes was selected because it is before the next hour ramp begins and permits time to collect the data and resolve interchange metering values.

Goal: To promote the timely calculation of $PII_{\mathbf{hourly}}$, PII_{accum}, and I_{ATEC}.

[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]

M4. Forms of acceptable evidence of compliance with Requirement R4 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from internal Balancing Authority tool that demonstrate compliance, or
- Data from any other databases, spreadsheets, displays that demonstrate compliance.

R5. Each Balancing Authority shall be able to change its Automatic Generation Control operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error Control (used in ATEC mode), to correspond to current operating conditions. *[Violation Risk Factor: Medium] [Time Horizon: Real-Time Operations]*

M5. Forms of acceptable evidence of compliance with Requirement R5 include but are not limited to any one of the following:

- Screen shots from Energy Management System,
- Demonstration using an off-line system.

Rationale for R5:

Premise: The ACE equation, and hence the AGC mode, will contain any number of parameters based on system operating conditions. Various AGC modes are identified corresponding to those operating conditions, as well as the specific sets of parameters included in the ACE equation.

Justification: Changing to the proper operating mode, corresponding to current operating conditions, affords proper movement of generating units in response to those conditions. The addition of the ATEC term results in an additional AGC mode and a different set of parameters. The inability to correctly calculate the ATEC term would dictate that AGC not be operated in the ATEC mode.

Goal: To set the AGC mode and calculate ACE in a manner that corresponds to the system operating conditions and to accommodate changes in those conditions.

R6. Each Balancing Authority shall recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly Inadvertent Interchange or ΔTE. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M6. Forms of acceptable evidence of compliance with Requirement R6 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,

Rationale for R6:

Premise: Hourly adjustments to hourly Inadvertent Interchange (II) require a recalculation of the corresponding hourly PII value, the corresponding PII_{accum}, and all subsequent PII_{accum} for every hour up to the current hour.

Justification: As $PII_{\mathbf{hourly}}$ is corrected, then PII_{accum} should be recalculated.

Goal: To promote accurate, fair and timely payback of accumulated PII balances.

- Data, screen shots from an internal Balancing Authority tool that demonstrate compliance with, or
- Data from any other databases, spreadsheets, displays that demonstrate compliance.

R7. Each Balancing Authority shall make the same adjustment to the PII_{accum} as it did for any month-end meter reading adjustments to Inadvertent Interchange. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M7. Forms of acceptable evidence of compliance with Requirement R7 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from an internal Balancing Authority tool that demonstrate compliance,
- Production of data from any other databases, spreadsheets, displays that demonstrate compliance.

Rationale R7:

Premise: Month-end meter-reading adjustments are made, for example, when a Balancing Authority performs monthly comparisons of recorded month-end Net Actual Interchange (NI_A) values derived from hourly Actual Interchange Telemetered Values against month-end Actual Interchange Register Meter readings.

Justification: Month-end adjustments to II_{accum} are applied as 100% PII_{accum}. 100% was chosen for simplicity to bilaterally assign PII_{accum} to both Balancing Authorities, since the effect of this metering error on system frequency is not easily determined over the course of a month.

Goal: To provide a mechanism by which corresponding month-end II adjustments can be applied to PII_{accum}, when such adjustments cannot be attributed to any one particular hour or series of hours.

R8. Each Balancing Authority shall payback Inadvertent Interchange using ATEC rather than bilateral and unilateral payback. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M8. Forms of acceptable evidence of compliance with Requirement R8 include but are not limited to historical On-Peak and Off-Peak Inadvertent Interchange data, data from the WECC Interchange Tool, and ACE data.

Rationale R8:

Premise: ATEC includes automatic unilateral payback of Primary Inadvertent Interchange and Secondary Inadvertent Interchange.

Justification: Additional unilateral and bilateral exchanges disturb the balance and distribution between Primary Inadvertent Interchange and Secondary Inadvertent Interchange throughout the Interconnection; thereby stranding Secondary Inadvertent Interchange.

Goal: To not strand Secondary Inadvertent Interchange.

C. Compliance

1. Compliance Monitoring Process

1.1 Compliance Enforcement Authority

The Regional Entity shall serve as the Compliance Enforcement Authority.

For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

For responsible entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

1.2 Compliance Monitoring and Assessment Processes:

Compliance Audits

Self-Certifications

Spot Checking

Compliance Investigations

Self-Reporting

Complaints

1.3 Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of PII_{hourly}, PII_{accum} (On-Peak and Off-Peak), ΔTE and any month-end adjustments for the preceding calendar year (January – December), as well as the current calendar year.

Each Balancing Authority in the Western Interconnection shall retain the amount of time the Balancing Authority operated without ATEC for the preceding calendar year (January – December), as well as the current calendar year.

1.4 Additional Compliance Information

None

Table of Compliance Elements

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	Operations Assessment	Medium	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 150%, but was less than or equal to 160% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 160%, but was less than or equal to 170% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 170%, but was less than or equal to 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.
R2	Operations Assessment	Medium	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 90 days of the discovery of the error; but made the required recalculations and adjustments within 120 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 120 days of the discovery of the error; but made the required recalculations and adjustments within 150 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 150 days of the discovery of the error; but made the required recalculations and adjustments within 180 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust PII_{accum} within 180 days of the discovery of the error.

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R3	Real-Time Operations	Medium	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 24 hours, but less than or equal to 72 hours.	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 72 hours, but less than or equal to 120 hours.	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 120 hours, but less than or equal to 168 hours	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 168 hours.
R4	Operations Assessment	Medium	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within 50 minutes, but made the required calculations in less than or equal to two hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within two hours, but made the required calculations in less than or equal to four hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within four hours, but made the required calculations in less than or equal to six hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within six hours.
R5	Real-Time Operations	Medium	N/A	N/A	N/A	The Balancing Authority is not able to change its AGC operating mode between Flat Frequency (for blackout restoration; Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; or Tie Line Bias

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						plus Time Error control (used in ATEC mode).
R6	Operations Assessment	Medium	N/A	N/A	N/A	When making adjustments to hourly Inadvertent Interchange or ΔTE, the Balancing Authority did not recalculate the PII_{hourly} and the PII_{accum} for the On-Peak and Off-Peak periods.
R7	Operations Assessment	Medium	N/A	N/A	N/A	When making any month-end meter reading adjustments to Inadvertent Interchange, the Balancing Authority did not make the same adjustment to the PII_{accum}.
R8	Operations Assessment	Medium	N/A	N/A	N/A	The Balancing Authority paid back Inadvertent Interchange using bilateral and unilateral payback rather than

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						using ATEC.

Guidelines and Technical Basis

Requirement R1:

Requirement R2:

Requirement R3:

Requirement R4:

Requirement R5:

Requirement R6:

Requirement R7:

Requirement R8:

Document Title	WECC Standard BAL-004-WECC-02
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1	4/15/2011	Version 1 Posted	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Version 3 Posted 12/15/11	Addressed comments from Version 2 posting
4		Standing Committee Approval	
5		WECC Board Approval	

WECC 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.

.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	07/16/2010
9. Notice of development / first 30-day notice	09/2/2010
10. New committee chair orientation meeting	08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 01/18/11 02/10/11 03/11–12/11 03/24/11 04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
16. Post first draft for 45-day comment period	04/15/2011
17. Meet to answer to comments, address impact statement and draft responses	06/2-3/2011 06/14/2011 06/23/2011 06/29/2011
18. Post responses to comments received during 45-day comment period	06/29/2011
19. Meet to answer to comments, address impact statement and	08/8/2011 08/15/2011

Completed Actions	Completion Date
draft responses	08/30/2011 11/01/2011
20. Post the Version 2 for a 30-day comment period	11/04/2011
21. Post consideration of comments of Version 2	12/15/2011
22. Post the third dart for 30-day comment period	12/15/2011
23. Project WECC-0068 Version 3 Comments were due	01/16/2012
24. Meeting to answer comments, address impact statement, draft responses	01/18/2012
25. Post responses to comments	02/13/2012
26. Post for Operating Committee approval	02/24/2012

Description of Current Draft:

On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC Standards.[1] In addition, WECC staff identified additional modifications to BAL-004-WECC-1 that would clarify the intent without changing the requirements. Finally, the industry has commented that there is confusion concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability Corporation (NERC) reports shall be the same ACE equation as that used during Automatic Generation Control (AGC) mode. This seems to conflict with NERC's comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a)[2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation for control but should use raw ACE for CPS reporting.[3] As part of this filing WECC has submitted a proposed regional variance to BAL-001-0.1a to address this conflict.

The purpose of the refinements to BAL-004-WECC-1 as proposed in WECC Regional Reliability Standard BAL-004-WECC-2 – Automatic Time Error Correction (BAL-004-WECC-2) is to implement the directives in FERC Order 723 and to make other clarifications to BAL-004-WECC-1 as the industry deems necessary, while maintaining the Western Interconnection's

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).

[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).

[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7,* pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

reliability. The FERC Order 723 directives are as follows:

1. "The Commission is concerned that the phrases 'large accumulation' and 'in such a situation' as used in Requirement R1.2 leaves to individual interpretation when a 'large' amount of primary inadvertent has accumulated. The ERO and WECC agree that the provision could benefit from further clarity. Accordingly, the Commission adopts its NOPR proposal and directs WECC to develop revisions to the provision so that a balancing authority will know with specificity the circumstances that trigger the actions required by Requirement R1.2."[4]
2. "Consistent with the NOPR, pursuant to section 215(d) (5) of the FPA, the Commission directs WECC to develop a modification to the regional Reliability Standard consistent with WECC's and NERC's explanation that the limit set forth in Requirement 2 of '24 hours per calendar quarter' is an accumulated total for the period, resulting from either a singular event or a cumulative time limit from a number of events."[5]
3. "[The Commission] direct[s] that the violation risk factors assigned to BAL-004-WECC-01, Requirements R1, R2, R3, and R4 be modified from 'lower' to 'medium.' The ERO and WECC must submit a filing within 60 days of the effective date of this Final Rule that includes the directed modifications."[6] These modifications were addressed in a compliance filing dated August 28, 2009. [7]
4. "The Commission adopts its NOPR proposal and directs the ERO and WECC to submit violation severity levels for each Requirement and sub-Requirement that has been assigned a violation risk factor. To allow adequate time for the development of the violation severity levels, the ERO and WECC must submit a filing within 120 days of the effective date of this Final Rule that includes the directed violation severity levels."[8] These modifications were addressed in a compliance filing date October 23, 2009.[9]
5. In response to Xcel comments, FERC referenced their approval, in Order No. 713, of an ERO interpretation stating that as long as Balancing Authorities use raw ACE for Control Performance Standard (CPS) reporting purposes and WECC ATEC (ATEC) ACE for control, it is not a violation of BAL-001-0.1a, Requirement 1.[10]. WECC Stakeholders believe it is more appropriate to use the ATEC ACE for control and CPS reporting. To clarify this difference, WECC has developed a regional variance BAL-001-0.1a.

The implementation of an ATEC ACE is part of a regional variance to BAL-001-0.1a associated with this posting. The purpose of this filing is to meet the directives of FERC Order 723 while refining for clarity the existing requirements of BAL-004-WECC-1. Refinements to BAL-004-WECC-1 include:

[4] Order 723 at ¶ 30.

[5] *Id* at ¶ 34.

[6] *Id* at ¶ 51.

[7] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 51 of Order No. 723 – Directed Modification of Violation Risk Factors for Regional Reliability Standard BAL-004-WECC-1, Automatic Time Error Correction, Docket No. RM08-12-000, filed August 28, 2009

[8] Order 723 at ¶ 54.

[9] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 54 of Order No. 723, Docket No. RM08-12-000, filed October 23, 2009

[10] Order 723 at ¶ 44-45.

1. A requirement that defines the large accumulation at 150% of previous year's peak demand or peak generation for generation-only Balancing Authorities. The action required is that the Balancing Authority shall not permit the PII_{accum} to exceed the defined value, which is demonstrated at the end of each month.
2. A clarification in response to the FERC order that the accumulated time for ATEC out of service shall not exceed 24 hours during a calendar quarter.

BAL-004-WECC-2 retains the requirement for Balancing Authorities to compute the Automatic Time Error Correction and Primary Inadvertent Interchange by 50 minutes after the hour and requires that Balancing Authorities have the ability to operate their Automatic Generation Control in other modes. In addition, Balancing Authorities are required to recalculate Primary Inadvertent Interchange when hourly and month-end adjustments are made.

In Version 3 in order to prevent the stranding of Secondary Inadvertent Interchange the drafting team added a Requirement R8 that restrictions the payback of Inadvertent Interchange to using ATEC rather than through bilateral and unilateral payback methods.

The proposed BAL-004-WECC-2 will replace the Automatic Time Error Correction definition in the NERC Glossary of Terms. The WECC definitions for Primary Inadvertent Interchange and Secondary Inadvertent Interchange will be retained in the *Glossary of Terms Used in NERC Reliability Standards*.

Development Plan:

Anticipated Actions	Anticipated Date
1. Post draft standard for 45-day NERC comment period	02/01/2012
2. NERC comment period ends	03/27/2012
3. Operating Committee approves proposed standard	03/27/2012
4. DT completes review and consideration of industry comments to NERC posting	04/27/2012
5. Post draft standard for WECC Board approval	05/01/2012
6. WECC Board approval	06/21/2012
7. Post draft standard for 15-day NERC comment period	06/25/2012
8. NERC 15-day comment period ends	07/2012
9. DT completes review and consideration of industry comments to NERC posting	07/2012
10. Submit NERC Board of Trustees approval request	08/2012
11. Receive NERC Board approval	08/2012

.

Implementation Plan

The Implementation Plan is to make the WECC Regional Variance to BAL-001-0.1a and BAL-004-WECC-2 effective on the first day of the second quarter, after regulatory approval in areas

where applicable. Since entities are already controlling their Balancing Authority Area with the ATEC ACE equation – but are reporting using the NERC raw ACE equation for reporting CPS1 – the transition to controlling and reporting using the ATEC ACE should be minimal. Additionally, it should not take much time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

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 definitions will be removed from the standard and added to the NERC Glossary. In addition the current definitions for "**Primary Inadvertent Interchange**" and "**Secondary Inadvertent Interchange"** will be retained in the Glossary of Terms Used in NERC Reliability Standards.*

Automatic Time Error Correction: The addition of a component to the ACE equation that modifies the control point for the purpose of continuously paying back Primary Inadvertent Interchange to correct accumulated time error.

A. Introduction

1. Title: **Automatic Time Error Correction**

2. Number: BAL-004-WECC-02

3. Purpose: To maintain Interconnection frequency and to ensure that Time Error Corrections and Primary Inadvertent Interchange (PII) payback are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection.

4. Applicability

4.1. Functional Entities

4.1.1 Balancing Authorities that operate synchronously in the Western Interconnection.

5. Effective Date: On the first day of the second quarter, after applicable regulatory approval has been received (or the Reliability Standard otherwise becomes effective the first day of the fourth quarter following NERC Board adoption where regulatory approval is not required).

6. Background:

In February 2003, the WECC Automatic Time Error Correction (ATEC) Procedure (Procedure) became effective for all Balancing Authorities in the Western Interconnection. The original intent of the Procedure was to minimize the number of Manual Time Error Corrections in the Western Interconnection. ATEC provides the added benefit of a superior approach over the current NERC Reliability Standard BAL-004-0 – Time Error Correction ~~for assigning costs and providing for~~and the equitable payback of Inadvertent Interchange. In October 2006, the Procedure became a WECC Criterion. In May 2009, FERC issued Order No.723 that approved Regional Reliability Standard BAL-004-WECC-1 - Automatic Time Error Correction, as submitted by NERC. In addition, the Commission directed WECC to develop several clarifying modifications to BAL-004-WECC-1 using the FERC-approved Process for Developing and Approving WECC Standards. The Effective Date of the BAL-004-WECC-1 standard was July 1, 2009. BAL-004-WECC-1 required Balancing Authorities within the Western Interconnection to maintain Interconnection frequency within a predefined frequency profile and to ensure that Time Error Corrections were effectively conducted in a manner that did not adversely affect the reliability of the Interconnection. In September 2009, WECC received WECC Standards/Regional Criterion Request Form (Request) WECC-0068, which was a request for modification of BAL-004-WECC-1. In July 2010, the chair of the WECC Operating Committee assigned the Request to the Performance Work Group (PWG) for development.

B. Requirements and Measures

R1. Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PII_{accum}) for both the ~~monthly~~ On-Peak period and the ~~monthly~~ Off-Peak period are each individually less than or equal to:

1.1. For load-serving Balancing Authorities, 150% of the previous calendar year's integrated hourly Peak Demand,

1.2. For generation-only Balancing Authorities, 150% of the previous calendar year's integrated hourly peak generation.

[Violation Risk Factor Medium:] [Time Horizon: Operations Assessment]

M1. Forms of acceptable evidence of compliance with Requirement R1include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool (WIT),
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R2. Each Balancing Authority shall, upon discovery of an error in the calculation of PII_{hourly}, recalculate within 90 days, the value of PII_{hourly} and adjust the PII_{accum} from the time of the error. *[Violation Risk*

Rationale for R1:

Premise: Each Balancing Authority should ensure that the absolute value of its PII_{accum} for both the On-Peak period and the Off-Peak period each individually does not exceed 150% of the previous year's Peak Demand for load-serving Balancing Authorities and 150% of the previous year's peak generation for generation-only Balancing Authorities. The Balancing Authority is required to take action to keep each PII_{accum} period within the limit. For example, the Balancing Authorities actions may include:

- Identifying and correcting the source of any metering or accounting error(s) and recalculating the hourly Primary Inadvertent Interchange **(**PII_{hourly}) and the PII_{accum} from the time of the error;
- Validating the implementation of ATEC; or
- Setting L_{max} equal to $L_{10.}$until the PII_{accum} is below the limit in Requirement R1.

Justification: PII_{accum} may grow from month-end adjustments and metering errors, even with the inclusion of I_{ATEC} in the ACE equation.

Goal: To limit the amount of PII_{accum} that a Balancing Authority can have at the end of each month.

Rationale for R2:

Premise: When a Balancing Authority finds an error in the calculation of its PII, the Balancing Authority needs time to correct the error and recalculate PII and PII_{accum}.

Justification: The drafting team selected 90 days as a reasonable amount of time to correct an error and recalculate PII and $PII_{accum,}$ since recalculation of PII and PII_{accum} is not a real-time operations reliability issue.

Goal: To promote the timely correction of errors in the calculation of PII and PII_{accum}.

Factor: Medium] [Time Horizon: Operations Assessment]

M2. Forms of acceptable evidence of compliance with Requirement R2 include but are not limited to any one of the following:

- Data, screen shots from the WIT,
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R3. Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service. *[Violation Risk Factor: Medium] [Time Horizon: Same-day Operations]*

M3. Forms of acceptable evidence of compliance with Requirement R3 may include, but are not limited to:

- Dated archived files,
- Historical data,
- Other data that demonstrates the ATEC was out of service for less than 24 hours per calendar quarter.

Rationale for R3:

Premise: When a Balancing Authority is not participating in ATEC, payback of PII_{accum} is delayed.

Justification: The limit of 24 hours per quarter discourages a Balancing Authority from withdrawing ATEC participation, for example, for economic gain during selected hours. If the limits were increased to 60 hours, a Balancing Authority could technically withdraw ATEC participation for one hour from Monday to Friday.

Goal: To promote fair and timely payback of PII_{accum} balances.

R4. Each Balancing Authority shall compute the following by 50 minutes after each hour:

- **4.1.** $PII_{\mathbf{hourly}}$,
- **4.2.** PII_{accum},
- **4.3.** Automatic Time Error Correction term (I_{ATEC}).

Rationale for R4:

Premise: $PII_{\mathbf{hourly}}$, PII_{accum}, and I_{ATEC} should be determined before the next scheduling hour begins.

Justification: To promote timely calculations 50 minutes was selected because it is before the next hour ramp begins and permits time to collect the data and resolve interchange metering values.

Goal: To promote the timely calculation of $PII_{\mathbf{hourly}}$, PII_{accum}, and I_{ATEC}.

[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]

M4. Forms of acceptable evidence of compliance with Requirement R4 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from internal Balancing Authority tool that demonstrate compliance, or
- Data from any other databases, spreadsheets, displays that demonstrate compliance.

R5. Each Balancing Authority shall be able to change its Automatic Generation Control operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error Control (used in ATEC mode), to correspond to current operating conditions. *[Violation Risk Factor: Medium] [Time Horizon: Real-Time Operations]*

M5. Forms of acceptable evidence of compliance with Requirement R5 include but are not limited to any one of the following:

- Screen shots from Energy Management System,
- Demonstration using an off-line system.

Rationale for R5:

Premise: The ACE equation, and hence the AGC mode, will contain any number of parameters based on system operating conditions. Various AGC modes are identified corresponding to those operating conditions, as well as the specific sets of parameters included in the ACE equation.

Justification: Changing to the proper operating mode, corresponding to current operating conditions, affords proper movement of generating units in response to those conditions. The addition of the ATEC term results in an additional AGC mode and a different set of parameters. The inability to correctly calculate the ATEC term would dictate that AGC not be operated in the ATEC mode.

Goal: To set the AGC mode and calculate ACE in a manner that corresponds to the system operating conditions and to accommodate changes in those conditions.

R6. Each Balancing Authority shall recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly Inadvertent Interchange or ΔTE. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M6. Forms of acceptable evidence of compliance with Requirement R6 include but are not limited to any one of the following:

Rationale for R6:

Premise: Hourly adjustments to hourly Inadvertent Interchange (II) require a recalculation of the corresponding hourly PII value, the corresponding PII_{accum}, and all subsequent PII_{accum} for every hour up to the current hour.

Justification: As $PII_{\mathbf{hourly}}$ is corrected, then PII_{accum} should be recalculated.

Goal: To promote accurate, fair and timely payback of accumulated PII balances.

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from an internal Balancing Authority tool that demonstrate compliance with, or
- Data from any other databases, spreadsheets, displays that demonstrate compliance.

R7. Each Balancing Authority shall make the same adjustment to the PII_{accum} as it did for any month-end meter reading adjustments to Inadvertent Interchange. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M7. Forms of acceptable evidence of compliance with Requirement R7 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from an internal Balancing Authority tool that demonstrate compliance,
- Production of data from any other databases, spreadsheets, displays that demonstrate compliance.

Rationale R7:

Premise: Month-end meter-reading adjustments are made, for example, when a Balancing Authority performs monthly comparisons of recorded month-end Net Actual Interchange (NI_A) values derived from hourly Actual Interchange Telemetered Values against month-end Actual Interchange Register Meter readings.

Justification: Month-end adjustments to II_{accum} are applied as 100% PII_{accum}. 100% was chosen for simplicity to bilaterally assign PII_{accum} to both Balancing Authorities, since the effect of this metering error on system frequency is not easily determined over the course of a month.

Goal: To provide a mechanism by which corresponding month-end II adjustments can be applied to PII_{accum}, when such adjustments cannot be attributed to any one particular hour or series of hours.

R8. Each Balancing Authority shall payback Inadvertent Interchange using ATEC rather than bilateral and unilateral payback. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M8. Forms of acceptable evidence of compliance with Requirement R8 include but are not limited to historical On-Peak and Off-Peak Inadvertent Interchange data, data from

Rationale R8:

Premise: ATEC includes automatic unilateral payback of Primary Inadvertent Interchange and Secondary Inadvertent Interchange.

Justification: Additional unilateral and bilateral exchanges disturb the balance and distribution between Primary Inadvertent Interchange and Secondary Inadvertent Interchange throughout the Interconnection; thereby stranding Secondary Inadvertent Interchange.

Goal: To not strand Secondary Inadvertent Interchange.

the WECC Interchange Tool, and ACE data.

C. Compliance

1. Compliance Monitoring Process

1.1 Compliance Enforcement Authority

The Regional Entity shall serve as the Compliance Enforcement Authority.

For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

For responsible entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

1.2 Compliance Monitoring and Assessment Processes:

Compliance Audits

Self-Certifications

Spot Checking

Compliance Investigations

Self-Reporting

Complaints

1.3 Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain the values of PII_{hourly}, PII_{accum} (On-Peak and Off-Peak), ΔTE and any month-end adjustments for the preceding calendar year (January – December), as well as the current calendar year.

Each Balancing Authority in the Western Interconnection shall retain the amount of time the Balancing Authority operated without ATEC for the preceding calendar year (January – December), as well as the current calendar year.

1.4 Additional Compliance Information

None

Table of Compliance Elements

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	Operations Assessment	Medium	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 150%, but was less than or equal to 160% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 160%, but was less than or equal to 170% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 170%, but was less than or equal to 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.
R2	Operations Assessment	Medium	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 90 days of the discovery of the error; but made the required recalculations and adjustments within 120 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 120 days of the discovery of the error; but made the required recalculations and adjustments within 150 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 150 days of the discovery of the error; but made the required recalculations and adjustments within 180 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust PII_{accum} within 180 days of the discovery of the error.

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R3	Real-Time Operations	Medium	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 24 hours, but less than or equal to 72 hours.	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 72 hours, but less than or equal to 120 hours.	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 120 hours, but less than or equal to 168 hours	The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 168 hours.
R4	Operations Assessment	Medium	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within 50 minutes, but made the required calculations in less than or equal to two hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within two hours, but made the required calculations in less than or equal to four hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within four hours, but made the required calculations in less than or equal to six hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within six hours.
R5	Real-Time Operations	Medium	N/A	N/A	N/A	The Balancing Authority is not able to change its AGC operating mode between Flat Frequency (for blackout restoration; Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; or Tie Line Bias

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						plus Time Error control (used in ATEC mode).
R6	Operations Assessment	Medium	N/A	N/A	N/A	When making adjustments to hourly Inadvertent Interchange or ΔTE, the Balancing Authority did not recalculate the PII_{hourly} and the PII_{accum} for the On-Peak and Off-Peak periods.
R7	Operations Assessment	Medium	N/A	N/A	N/A	When making any month-end meter reading adjustments to Inadvertent Interchange, the Balancing Authority did not make the same adjustment to the PII_{accum}.
R8	Operations Assessment	Medium	N/A	N/A	N/A	The Balancing Authority paid back Inadvertent Interchange using bilateral and unilateral payback rather than

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						using ATEC.

Guidelines and Technical Basis

Requirement R1:

Requirement R2:

Requirement R3:

Requirement R4:

Requirement R5:

Requirement R6:

Requirement R7:

Requirement R8:

Document Title	WECC Standard BAL-004-WECC-02
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	
Stored/filed	Physical location: Web URL:
Previous name/number	(if any)
Status	( ) in effect ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by _____ ( ) other _____ ( ) obsolete/archived)

Version Control

Version	Date	Action	Change Highlights
1	4/15/2011	Version 1 Posted	Addressed FERC Order 723
2		Version 2 Posted 11/4/11	Addressed comments from Version 1 posting
3		Version 3 Posted 12/15/11	Addressed comments from Version 2 posting
4		Standing Committee Approval	
5		WECC Board Approval	

WECC 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.

.

Development Steps Completed:

Completed Actions	Completion Date
1. Request received	09/26/2009
2. Requested deemed Complete/Valid/Team Site created	10/06/2009
3. Pre-SRRC announcement	10/16/2009
4. SRRC notified	10/26/2009
5. SRRC assigned the Request to Standing Committee 6. Due to lack of manpower/resources this Request was placed on hold until July 2010 by Mr. Don Watkins, OC chair	11/2009
7. Assigned to the Performance Work Group by Mr. Hulls, incoming OC chair	07/16/2010
8. Drafting team (DT) announced / notice sent to DT members	07/16/2010
9. Notice of development / first 30-day notice	09/2/2010
10. New committee chair orientation meeting	08/18/2010
11. First DT meeting	11/10/2010
12. Notice of Concurrence sent by DT (see step 3) 13. New meeting announcement / also included in first meeting minutes	11/10/2010
14. DT meetings completed	12/15/10 01/18/11 02/10/11 03/11–12/11 03/24/11 04/11/11
15. Complete first draft and Complete Quality Control Checklist	04/13/2011
~~1.~~16. Post ~~Draft Standard~~first draft for ~~initial industry comments~~45-day comment period	~~November 14, 2006~~04/15/2011
~~2.~~17. ~~Drafting Team~~Meet to ~~review and respond~~answer to ~~initial industry~~ comments, address impact statement and draft responses	~~January 30, 2007~~06/2-3/2011 06/14/2011 06/23/2011 06/29/2011
18. Post responses to comments received during 45-day comment period	06/29/2011

Completed Actions	Completion Date
~~3.~~19. ~~Drafting Team posted a second draft for industry comments~~Meet to answer to comments, address impact statement and draft responses	~~March 13, 2007~~08/8/2011 08/15/2011 08/30/2011 11/01/2011
20. Post the Version 2 for a 30-day comment period	11/04/2011
21. Post consideration of comments of Version 2	12/15/2011
22. Post the third dart for 30-day comment period	12/15/2011
23. Project WECC-0068 Version 3 Comments were due	01/16/2012
~~4.~~24. ~~Drafting Team posted a revised second draft for industry comments~~Meeting to answer comments, address impact statement, draft responses	~~April 12, 2007~~01/18/2012
25. Post responses to comments	02/13/2012
~~5.~~26. ~~Drafting Team posted a third draft~~Post for Operating Committee approval	~~May 14, 2007~~02/24/2012
~~6. WECC Operating Committee approved proposed standard~~	~~June 14, 2007~~
~~7. Drafting Team posted the ATEC Standard for Board approval~~	~~June 22, 2007~~
~~8. WECC Board of Directors approved proposed standard~~	~~July 27, 2007~~
~~9. WECC submits ATEC Standard to NERC for posting~~	~~August 7, 2008~~
~~10. NERC posts the ATEC Standard for 45 days~~	~~September 21, 2007~~
~~11. NERC Board Approval~~	~~March 26, 2008~~

Description of Current Draft:

~~The Automatic Time Error Correction (ATEC) component is now included in the NI'$_s$ term instead of as a separate term in the ACE equation. This only changes the order of the terms in the ATEC ACE equation, not the calculated ACE.~~

~~**Future**~~

On May 21, 2009, the Federal Energy Regulatory Commission (Commission or FERC) issued a Final Rule approving WECC Regional Reliability Standard BAL-004-WECC-1 – Automatic Time Error Correction (BAL-004-WECC-1) and directing WECC to make several clarifying modifications to the standard using the FERC-approved Process for Developing and Approving WECC Standards.[1] In addition, WECC staff identified additional modifications to BAL-004-WECC-1 that would clarify the intent without changing the requirements. Finally, the industry has commented that there is confusion concerning BAL-004-WECC-1 Requirement R3 that requires that the Area Control Error (ACE) equation used for North American Electric Reliability

[1] *Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction*, Order No. 723, 127 FERC Stats. & Regs. ¶ 61,176, 74 Fed. Reg. ¶ 25,422 (2009) (hereafter Order 723).

Corporation (NERC) reports shall be the same ACE equation as that used during Automatic Generation Control (AGC) mode. This seems to conflict with NERC's comments in response to the Notice of Proposed Rulemaking regarding the interpretation of NERC Reliability Standard BAL-001-0.1a – Real Power Balancing Control Performance (BAL-001-0.1a)[2] wherein NERC stated that entities may use an Automatic Time Error Correction (ATEC) ACE equation for control but should use raw ACE for CPS reporting.[3] As part of this filing WECC has submitted a proposed regional variance to BAL-001-0.1a to address this conflict.

The purpose of the refinements to BAL-004-WECC-1 as proposed in WECC Regional Reliability Standard BAL-004-WECC-2 – Automatic Time Error Correction (BAL-004-WECC-2) is to implement the directives in FERC Order 723 and to make other clarifications to BAL-004-WECC-1 as the industry deems necessary, while maintaining the Western Interconnection's reliability. The FERC Order 723 directives are as follows:

1. "The Commission is concerned that the phrases 'large accumulation' and 'in such a situation' as used in Requirement R1.2 leaves to individual interpretation when a 'large' amount of primary inadvertent has accumulated. The ERO and WECC agree that the provision could benefit from further clarity. Accordingly, the Commission adopts its NOPR proposal and directs WECC to develop revisions to the provision so that a balancing authority will know with specificity the circumstances that trigger the actions required by Requirement R1.2."[4]
2. "Consistent with the NOPR, pursuant to section 215(d) (5) of the FPA, the Commission directs WECC to develop a modification to the regional Reliability Standard consistent with WECC's and NERC's explanation that the limit set forth in Requirement 2 of '24 hours per calendar quarter' is an accumulated total for the period, resulting from either a singular event or a cumulative time limit from a number of events."[5]
3. "[The Commission] direct[s] that the violation risk factors assigned to BAL-004-WECC-01, Requirements R1, R2, R3, and R4 be modified from 'lower' to 'medium.' The ERO and WECC must submit a filing within 60 days of the effective date of this Final Rule that includes the directed modifications."[6] These modifications were addressed in a compliance filing dated August 28, 2009. [7]
4. "The Commission adopts its NOPR proposal and directs the ERO and WECC to submit violation severity levels for each Requirement and sub-Requirement that has been assigned a violation risk factor. To allow adequate time for the development of the

[2] *Modification of Interchange and Transmission Loading Relief Reliability Standards; and Electric Reliability Organization Interpretation of Specific Requirements of Four Reliability Standards*, Notice of Proposed Rulemaking, 123 FERC Stats. & Regs. ¶ 61,064, 73 Fed. Reg. ¶ 22,856 (2008).

[3] *Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking regarding Interchange and Transmission Loading Relief under RM08-7*, pgs 9-10, FERC Docket No. RM08-7-000, filed June 12, 2008.

[4] Order 723 at ¶ 30.

[5] *Id* at ¶ 34.

[6] *Id* at ¶ 51.

[7] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 51 of Order No. 723 – Directed Modification of Violation Risk Factors for Regional Reliability Standard BAL-004-WECC-1, Automatic Time Error Correction, Docket No. RM08-12-000, filed August 28, 2009

violation severity levels, the ERO and WECC must submit a filing within 120 days of the effective date of this Final Rule that includes the directed violation severity levels."[8] These modifications were addressed in a compliance filing date October 23, 2009.[9]

5. In response to Xcel comments, FERC referenced their approval, in Order No. 713, of an ERO interpretation stating that as long as Balancing Authorities use raw ACE for Control Performance Standard (CPS) reporting purposes and WECC ATEC (ATEC) ACE for control, it is not a violation of BAL-001-0.1a, Requirement 1.[10]. WECC Stakeholders believe it is more appropriate to use the ATEC ACE for control and CPS reporting. To clarify this difference, WECC has developed a regional variance BAL-001-0.1a.

The implementation of an ATEC ACE is part of a regional variance to BAL-001-0.1a associated with this posting. The purpose of this filing is to meet the directives of FERC Order 723 while refining for clarity the existing requirements of BAL-004-WECC-1. Refinements to BAL-004-WECC-1 include:

1. A requirement that defines the large accumulation at 150% of previous year's peak demand or peak generation for generation-only Balancing Authorities. The action required is that the Balancing Authority shall not permit the PII_{accum} to exceed the defined value, which is demonstrated at the end of each month.
2. A clarification in response to the FERC order that the accumulated time for ATEC out of service shall not exceed 24 hours during a calendar quarter.

BAL-004-WECC-2 retains the requirement for Balancing Authorities to compute the Automatic Time Error Correction and Primary Inadvertent Interchange by 50 minutes after the hour and requires that Balancing Authorities have the ability to operate their Automatic Generation Control in other modes. In addition, Balancing Authorities are required to recalculate Primary Inadvertent Interchange when hourly and month-end adjustments are made.

In Version 3 in order to prevent the stranding of Secondary Inadvertent Interchange the drafting team added a Requirement R8 that restrictions the payback of Inadvertent Interchange to using ATEC rather than through bilateral and unilateral payback methods.

The proposed BAL-004-WECC-2 will replace the Automatic Time Error Correction definition in the NERC Glossary of Terms. The WECC definitions for Primary Inadvertent Interchange and Secondary Inadvertent Interchange will be retained in the *Glossary of Terms Used in NERC Reliability Standards*.

Development Plan:

Anticipated Actions	Anticipated Date
1. ~~Request FERC Approval~~Post draft standard for 45-day NERC comment period	~~May 2008~~02/01/2012
2. ~~Request Canadian Regulatory Approval~~NERC comment	~~2008~~03/27/2012

[8] Order 723 at ¶ 54.

[9] Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 54 of Order No. 723, Docket No. RM08-12-000, filed October 23, 2009

[10] Order 723 at ¶ 44-45.

period ends	
3. Operating Committee approves proposed standard	03/27/2012
4. DT completes review and consideration of industry comments to NERC posting	04/27/2012
5. Post draft standard for WECC Board approval	05/01/2012
6. WECC Board approval	06/21/2012
7. Post draft standard for 15-day NERC comment period	06/25/2012
8. NERC 15-day comment period ends	07/2012
9. DT completes review and consideration of industry comments to NERC posting	07/2012
10. Submit NERC Board of Trustees approval request	08/2012
11. Receive NERC Board approval	08/2012

.

Implementation Plan

The Implementation Plan is to make the WECC Regional Variance to BAL-001-0.1a and BAL-004-WECC-2 effective on the first day of the second quarter, after regulatory approval in areas where applicable. Since entities are already controlling their Balancing Authority Area with the ATEC ACE equation – but are reporting using the NERC raw ACE equation for reporting CPS1 – the transition to controlling and reporting using the ATEC ACE should be minimal. Additionally, it should not take much time to implement the limits to a Balancing Authority's Accumulated Primary Inadvertent Interchange.

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 definitions will be removed from the standard and added to the ~~Glossary.~~NERC Glossary. In addition the current definitions for "**Primary Inadvertent Interchange**" and "**Secondary Inadvertent Interchange"** will be retained in the Glossary of Terms Used in NERC Reliability Standards.*

Automatic Time Error Correction: ~~A frequency~~ The addition of a component to the ACE equation that modifies the control ~~automatic action that a Balancing Authority uses to offset its frequency contribution to support the Interconnection's scheduled frequency.~~

point for the purpose of continuously paying back Primary Inadvertent Interchange~~: The component of area (n) inadvertent interchange caused by the regulating deficiencies of the area (n).~~ to correct accumulated time error.

~~**Secondary Inadvertent Interchange:** The component of area (n) inadvertent interchange caused by the regulating deficiencies of area (i).~~

A. Introduction

1. Title: **Automatic Time Error Correction**

2. Number: BAL-004-WECC-~~01~~02

3. Purpose: To maintain Interconnection frequency ~~**within a predefined frequency profile under all conditions (i.e. normal and abnormal), and**~~ and to ensure that Time Error Corrections and Primary Inadvertent Interchange (PII) payback are effectively conducted in a manner that does not adversely affect the reliability of the Interconnection.

4. Applicability~~:~~

4.1. Functional Entities

~~**1.**~~ **4.1.1** Balancing Authorities ~~**(BA)**~~ that operate synchronously ~~**to**~~in the Western Interconnection.

5. Effective Date: On the first day of the ~~**first**~~second quarter, after applicable regulatory approval~~.~~ has been received (or the Reliability Standard otherwise becomes effective the first day of the fourth quarter following NERC Board adoption where regulatory approval is not required).

~~**B. Requirements**~~

~~**R1.** Each BA that operates synchronously to the Western Interconnection shall continuously operate utilizing Automatic Time Error Correction (ATEC) in its Automatic Generation Control (AGC) system. [Risk Factor: Lower]~~

$$ACE_{ATEC} = (NI_A - NI'_S) - 10B_i(F_A - F_S) - T_{0b} + I_{ME}$$

~~**Where:**~~

~~NI_A = Net Interchange Actual (MW).~~

~~F_A = Frequency Actual (Hz).~~

~~F_S = Frequency Scheduled (Normally 60 Hz).~~

~~B_i = Frequency Bias for the Balancing Authority's Area (MW / 0.1 Hz).~~

~~T_{0b} = Remaining Bilateral Payback for Inadvertent Interchange created prior to implementing automatic payback (MW).~~

~~I_{ME} = Meter Error Correction (MW).~~

$$NI'_S = NI_S - \frac{II^{on/off\ peak}_{Primary}}{(-Y)*H}$$

~~NI_S = Net Interchange Scheduled (MW).~~

~~$Y = B_i / B_S$.~~

~~H = Number of Hours used to payback Inadvertent Interchange Energy. The WECC Performance Work Group has set the value of H to 3.~~

~~B_S = Frequency Bias for the Interconnection (MW / 0.1 Hz).~~

~~$II_{primary}^{on/off\ peak}$ = is the Balancing Authority's accumulated primary inadvertent interchange in MWh. An On-Peak and Off-Peak accumulation accounting is required.~~

~~Where:~~

~~$$II_{primary}^{on/off\ peak} = \text{last period's } II_{primary}^{on/off\ peak} + (1\text{-}Y) * (II_{actual} - B_i * \Delta TE/6)$$~~

~~II_{actual} is the hourly Inadvertent Interchange for the last hour.~~

~~ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor.~~

~~Where:~~

~~$\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE\ offset)$~~

~~TD_{adj} is any operator adjustment to the control center Time Error to correct for differences with the time monitor.~~

~~**t** is the number of minutes of Manual Time Error Correction that occurred during the hour.~~

~~**TE offset** is 0.000 or +0.020 or -0.020.~~

~~**R1.1.** The absolute value of the WECC Automatic Time Error Correction term is limited as follows:~~

$$\left| \frac{II_{primary}^{on/off\ peak}}{(1\text{-}Y) \cdot H} \right| \leq L_{max}$$

~~Where L_{max} is chosen by the Balancing Authority and is bounded as follows:~~

~~$0.20 * |B_i| \leq L_{max} \leq L_{10}$~~

~~L_{10} is the Balancing Authority CPS2 limit in MW. If the WECC Automatic Time Error Correction term is less than the upper limit, use the calculated WECC Automatic Time Error Correction term.~~

~~**R1.2.** Large accumulations of primary inadvertent point to an invalid implementation of ATEC, loose control, metering or accounting errors. A BA in such a situation should identify the source of the error(s) and make the corrections, recalculate the primary inadvertent from the time of the error, adjust the accumulated primary inadvertent caused by the error(s), validate the implementation of ATEC, set L_{max} equal to L_{10} and continue to operate with ATEC reducing the accumulation as system parameters allow.~~

~~**R2.** Each BA that is synchronously connected to the Western Interconnection and operates in any AGC operating mode other than ATEC shall notify all other BAs of its operating mode through the designated Interconnection communication system. Each BA while synchronously connected to the Western Interconnection will be allowed to~~

~~have ATEC out of service for a maximum of 24 hours per calendar quarter, for reasons including maintenance and testing. [Risk Factor: Lower]~~

~~**BAs in the Western Interconnection**~~**6. Background:**

In February 2003, the WECC Automatic Time Error Correction (ATEC) Procedure (Procedure) became effective for all Balancing Authorities in the Western Interconnection. The original intent of the Procedure was to minimize the number of Manual Time Error Corrections in the Western Interconnection. ATEC provides the added benefit of a superior approach over the current NERC Reliability Standard BAL-004-0 – Time Error Correction and the equitable payback of Inadvertent Interchange. In October 2006, the Procedure became a WECC Criterion. In May 2009, FERC issued Order No.723 that approved Regional Reliability Standard BAL-004-WECC-1 - Automatic Time Error Correction, as submitted by NERC. In addition, the Commission directed WECC to develop several clarifying modifications to BAL-004-WECC-1 using the FERC-approved Process for Developing and Approving WECC Standards. The Effective Date of the BAL-004-WECC-1 standard was July 1, 2009. BAL-004-WECC-1 required Balancing Authorities within the Western Interconnection to maintain Interconnection frequency within a predefined frequency profile and to ensure that Time Error Corrections were effectively conducted in a manner that did not adversely affect the reliability of the Interconnection. In September 2009, WECC received WECC Standards/Regional Criterion Request Form (Request) WECC-0068, which was a request for modification of BAL-004-WECC-1. In July 2010, the chair of the WECC Operating Committee assigned the Request to the Performance Work Group (PWG) for development.

B. Requirements and Measures

R1. Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PII_{accum}) for both the On-Peak period and the Off-Peak period are each individually less than or equal to:

1.1. For load-serving Balancing Authorities, 150% of the previous calendar year's integrated hourly Peak Demand,

1.2. For generation-only Balancing Authorities, 150% of the previous calendar year's integrated hourly peak generation.

[Violation Risk Factor Medium:] [Time Horizon: Operations Assessment]

M1. Forms of acceptable evidence of compliance with Requirement R1include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool (WIT),
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R2. Each Balancing Authority shall, upon discovery of an error in the calculation of PII_{hourly}, recalculate within 90 days, the value of PII_{hourly} and adjust the PII_{accum} from the time of the error. *[Violation Risk Factor: Medium] [Time Horizon:*

Rationale for R1:

Premise: Each Balancing Authority should ensure that the absolute value of its PII_{accum} for both the On-Peak period and the Off-Peak period each individually does not exceed 150% of the previous year's Peak Demand for load-serving Balancing Authorities and 150% of the previous year's peak generation for generation-only Balancing Authorities. The Balancing Authority is required to take action to keep each PII_{accum} period within the limit. For example, the Balancing Authorities actions may include:

- Identifying and correcting the source of any metering or accounting error(s) and recalculating the hourly Primary Inadvertent Interchange **(**PII_{hourly}) and the PII_{accum} from the time of the error;
- Validating the implementation of ATEC; or
- Setting L_{max} equal to L_{10} until the PII_{accum} is below the limit in Requirement R1.

Justification: PII_{accum} may grow from month-end adjustments and metering errors, even with the inclusion of I_{ATEC} in the ACE equation.

Goal: To limit the amount of PII_{accum} that a Balancing Authority can have at the end of each month.

Rationale for R2:

Premise: When a Balancing Authority finds an error in the calculation of its PII, the Balancing Authority needs time to correct the error and recalculate PII and PII_{accum}.

Justification: The drafting team selected 90 days as a reasonable amount of time to correct an error and recalculate PII and PII_{accum}, since recalculation of PII and PII_{accum} is not a real-time operations reliability issue.

Goal: To promote the timely correction of errors in the calculation of PII and PII_{accum}.

Operations Assessment]

M2. Forms of acceptable evidence of compliance with Requirement R2 include but are not limited to any one of the following:

- Data, screen shots from the WIT,
- Data, screen shots from the internal Balancing Authority tool, or
- Production of data from any other databases, spreadsheets, displays.

R3. Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service. *[Violation Risk Factor: Medium] [Time Horizon: Same-day Operations]*

M3. Forms of acceptable evidence of compliance with Requirement R3 may include, but are not limited to:

- Dated archived files,
- Historical data,
- Other data that demonstrates the ATEC was out of service for less than 24 hours per calendar quarter.

R4. Each Balancing Authority shall compute the following by 50 minutes after each hour:

4.1. PII_{hourly},

4.2. PII_{accum},

4.3. Automatic Time Error Correction term (I_{ATEC}).

[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]

M4. Forms of acceptable evidence of compliance with Requirement R4 include but are not limited to any one of the following:

Rationale for R3:

Premise: When a Balancing Authority is not participating in ATEC, payback of PII_{accum} is delayed.

Justification: The limit of 24 hours per quarter discourages a Balancing Authority from withdrawing ATEC participation, for example, for economic gain during selected hours. If the limits were increased to 60 hours, a Balancing Authority could technically withdraw ATEC participation for one hour from Monday to Friday.

Goal: To promote fair and timely payback of PII_{accum} balances.

Rationale for R4:

Premise: PII_{hourly}, PII_{accum}, and I_{ATEC} should be determined before the next scheduling hour begins.

Justification: To promote timely calculations 50 minutes was selected because it is before the next hour ramp begins and permits time to collect the data and resolve interchange metering values.

Goal: To promote the timely calculation of PII_{hourly}, PII_{accum}, and I_{ATEC}.

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from internal Balancing Authority tool that demonstrate compliance, or
- Data from any other databases, spreadsheets, displays that demonstrate compliance.

~~R3.~~**R5.** Each Balancing Authority shall be able to change ~~their AGC~~its Automatic Generation Control operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error ~~control~~Control (used in ATEC mode~~). The ACE used for NERC reports shall be the same ACE as the AGC~~), to correspond to current operating ~~mode in use. [~~conditions. *[Violation ~~Risk Factor: Lower]~~Risk Factor: Medium] [Time Horizon: Real-Time Operations]*

~~Regardless~~

M5. Forms of acceptable evidence of compliance with Requirement R5 include but are not limited to any one of the ~~AGC operating mode each BA in the Western Interconnection~~following:

- Screen shots from Energy Management System,
- Demonstration using an off-line system.

R6. Each Balancing Authority shall ~~compute its~~ recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly ~~Primary~~ Inadvertent Interchange ~~when hourly checkout is complete. If hourly checkout is not complete by 50 minutes after the hour, compute Primary~~ or ΔTE. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

Developed as: **WECC-0068**
Adopted by NERC Board of Trustees:
Mandatory Effective Date:

Rationale for R5:

Premise: The ACE equation, and hence the AGC mode, will contain any number of parameters based on system operating conditions. Various AGC modes are identified corresponding to those operating conditions, as well as the specific sets of parameters included in the ACE equation.

Justification: Changing to the proper operating mode, corresponding to current operating conditions, affords proper movement of generating units in response to those conditions. The addition of the ATEC term results in an additional AGC mode and a different set of parameters. The inability to correctly calculate the ATEC term would dictate that AGC not be operated in the ATEC mode.

Goal: To set the AGC mode and calculate ACE in a manner that corresponds to the system operating conditions and to accommodate changes in those conditions.

Rationale for R6:

Premise: Hourly adjustments to hourly Inadvertent Interchange (II) require a recalculation of the corresponding hourly PII value, the corresponding PII_{accum}, and all subsequent PII_{accum} for every hour up to the current hour.

Justification: As PII_{hourly} is corrected, then PII_{accum} should be recalculated.

Goal: To promote accurate, fair and timely payback of accumulated PII balances.

M6. Forms of acceptable evidence of compliance with Requirement R6 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from an internal Balancing Authority tool that demonstrate compliance with, or
- Data from any other databases, spreadsheets, displays that demonstrate compliance.

R7. Each Balancing Authority shall make the same adjustment to the PII_{accum} as it did for any month-end meter reading adjustments to Inadvertent Interchange ~~with best available~~. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M7. Forms of acceptable evidence of compliance with Requirement R7 include but are not limited to any one of the following:

- Data, screen shots from the WECC Interchange Tool that demonstrate compliance,
- Data, screen shots from an internal Balancing Authority tool that demonstrate compliance,
- Production of data~~. This hourly value shall be added to the appropriate accumulated Primary~~ from any other databases, spreadsheets, displays that demonstrate compliance.

Rationale R7:

Premise: Month-end meter-reading adjustments are made, for example, when a Balancing Authority performs monthly comparisons of recorded month-end Net Actual Interchange (NI_A) values derived from hourly Actual Interchange Telemetered Values against month-end Actual Interchange Register Meter readings.

Justification: Month-end adjustments to II_{accum} are applied as 100% PII_{accum}. 100% was chosen for simplicity to bilaterally assign PII_{accum} to both Balancing Authorities, since the effect of this metering error on system frequency is not easily determined over the course of a month.

Goal: To provide a mechanism by which corresponding month-end II adjustments can be applied to PII_{accum}, when such adjustments cannot be attributed to any one particular hour or series of hours.

~~**R4.**~~**R8.** Each Balancing Authority shall payback Inadvertent Interchange ~~balance for either On-Peak or Off-Peak periods. [Risk Factor: Lower~~using ATEC rather than bilateral and unilateral payback. *[Violation Risk Factor:*

Rationale R8:

Premise: ATEC includes automatic unilateral payback of Primary Inadvertent Interchange and Secondary Inadvertent Interchange.

Justification: Additional unilateral and bilateral exchanges disturb the balance and distribution between Primary Inadvertent Interchange and Secondary Inadvertent Interchange throughout the Interconnection; thereby stranding Secondary Inadvertent Interchange.

Goal: To not strand Secondary Inadvertent Interchange.

Developed as: **WECC-0068**
Adopted by NERC Board of Trustees:
Mandatory Effective Date:

Medium] [Time Horizon: Operations Assessment]

R4.1. Each BA in the Western Interconnection shall use the change in Time Error distributed by the Interconnection Time Monitor.

All corrections to any previous hour Primary

R4.2. **M8**. Forms of acceptable evidence of compliance with Requirement R8 include but are not limited to historical On-Peak and Off-Peak Inadvertent Interchange shall be added to the appropriate On- or Off-Peak accumulated Primary Inadvertent Interchange.

R4.3. Month end Inadvertent Adjustments are 100% Primary Inadvertent Interchange and shall be added to the appropriate On- or Off-Peak accumulated Primary Inadvertentdata, data from the WECC Interchange, unless such adjustments can be pinpointed to specific hours in which case R4.2 applies.

R4.4. Each BA in the Western Interconnection shall synchronize its Time Error to the nearest 0.001 seconds of the system Time Error by comparing its reading at the designated time each day to the reading broadcast by the Interconnection Time Monitor. Any difference shall be applied as an adjustment to its current Time Error.

C. Measures

M1. For Requirement R1, a BA shall provide upon request a document showing that it is correctly calculating its hourly Primary Inadvertent Interchange number that is used to calculate its accumulated Primary Inadvertent Interchange and how it is used in its ACE equation for Automatic Time Error Correction.

M2. For Requirement R2, a BA shall record the date, time, reason, and notification [to other BAs within the Western Interconnection] for any time it is not operating utilizing Automatic Time Error Correction (ATEC) in its AGC system.

M3. For Requirement R3, a BA in the Western Interconnection must be able to demonstrate its ability to change its AGC operating mode when requested or during compliance audits and readiness reviews.

M4. For Requirement R4, a BA in the Western Interconnection must record its hourly Primary Inadvertent Interchange Tool, and keep an accurate record of its accumulation of Primary Inadvertent Interchange for both On-Peak and Off-Peak accounts. These records must be available for review when requested or during compliance audits and readiness reviews.ACE data.

D.C. Compliance

1. Compliance Monitoring Process

1.1 Compliance Enforcement Authority

The Regional Entity shall serve as the Compliance Enforcement Authority.

For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

For responsible entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

~~1.1.~~ **1.2 Compliance Monitoring ~~Responsibility~~and Assessment Processes:**

~~Regional Entity~~

Compliance ~~Monitoring Period and Reset time Frame~~Audits

~~The reporting period for ATEC is one calendar quarter, starting on the first second of the quarter and ending on the final second of the quarter.~~

~~The Performance-reset Period is one calendar quarter.~~

~~1.2. Data Retention~~

Self-Certifications

Spot Checking

Compliance Investigations

Self-Reporting

Complaints

1.3 Evidence Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each Balancing Authority in the Western Interconnection shall retain **~~its hourly calculation of total and Primary Inadvertent Interchange calculated hourly, as well as the amount of Primary Inadvertent paid back hourly~~**the values of PII_{hourly}, PII_{accum} (On-Peak and Off-Peak), ΔTE and any month-end adjustments for the preceding calendar year (January – December**~~) plus~~**), as well as the current calendar year.

Each Balancing Authority in the Western Interconnection shall retain ~~its total accumulated Inadvertent and total Primary Inadvertent, updated hourly, for On- and Off-Peak for the preceding calendar year (January – December) plus the current year.~~

~~Each Balancing Authority in the Western Interconnection shall retain its record of the amount of time it~~ the amount of time the Balancing Authority operated without ATEC **~~and the notification to the Interconnection of these times for the~~** for the preceding calendar year (January – December**~~) plus~~**), as well as the current calendar year.

~~The Compliance Monitor shall retain audit data for three calendar years.~~

~~1.3.~~ **1.4 Additional Compliance Information**

~~The Compliance Monitor shall use quarterly data to monitor compliance. The Compliance Monitor may also use periodic audits (on site, per a schedule), with spot reviews and investigations initiated in response to a complaint to assess performance.~~

~~The Balancing Authority in the Western Interconnection shall have the following documentation available for its Compliance Monitor to inspect during a scheduled, on-site review or within five business days of a request as part of a triggered investigation:~~

~~1.3.1. Source data for calculating Primary Inadvertent.~~

~~1.3.2. Data showing On- and Off-Peak Primary Inadvertent accumulations.~~

~~1.3.3. Data showing hourly payback of Primary Inadvertent.~~

~~1.3.4. Documentation on number of times not on ATEC and reasons for going off ATEC.~~

~~2. Violation Severity Levels~~

~~2.1. Lower:~~ ~~Time not in ATEC Mode greater than one day and less than or equal to three days, or if a Balancing Authority in the Western Interconnection operates without ATEC and does not notify other Balancing Authorities in the Western Interconnection 2 times in quarter.~~

~~2.2. Moderate:~~ ~~Time not in ATEC Mode greater than three days and less than or equal to five days, or if a Balancing Authority in the Western Interconnection operates without ATEC and does not notify other Balancing Authorities in the Western Interconnection 3 times in quarter.~~

~~2.3. High:~~ ~~Time not in ATEC Mode greater than five days and less than or equal to seven days, or if a Balancing Authority in the Western Interconnection operates without ATEC and does not notify other Balancing Authorities in the Western Interconnection 4 times in quarter.~~

~~**2.4. Severe:** Time not in ATEC Mode greater than seven days, or if a Balancing Authority in the Western Interconnection operates without ATEC and does not notify other Balancing Authorities in the Western Interconnection more than 4 times in quarter or Balancing Authority in the Western Interconnection cannot change AGC operating mode or Balancing Authority in the Western Interconnection incorrectly calculates Primary Inadvertent.~~

~~**Version History**~~

None

Table of Compliance Elements

~~Version R #~~	~~DateTime Horizon~~	~~Action VRF~~	~~Change Tracking~~Violation Severity Levels			
~~1~~	~~February 4, 2003~~	~~Effective Date.~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
~~1~~	~~October 17, 2006~~	~~Created Standard from Procedure.~~	~~Errata~~			
~~1~~	~~February 6, 2007~~	~~Changed the Standard Version from 0 to 1 in the Version History Table.~~	~~Errata~~			
~~1~~R1	~~February 6, 2007~~Operations Assessment	Medium	~~The upper limit bounds to the amount of Automatic Time Error Correction term was inadvertently omitted during the Standard Translation. The bound was added to the requirement R1.4.~~Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 150%, but was less than or equal to 160%	~~Errata~~Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 160%, but was less than or equal to 170% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 170%, but was less than or equal to 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.	Following the conclusion of each month each Balancing Authority's absolute value of PII_{accum} for either the On-Peak period or Off-Peak period exceeded 180% of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.

~~Version~~R #	~~Date~~Time Horizon	~~Action~~ VRF	~~Change Tracking~~Violation Severity Levels			
~~1~~	~~February 4, 2003~~	~~Effective Date.~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
			of the previous calendar year's Peak Demand or peak generation for generation-only Balancing Authorities.			
~~1~~R2	~~February 6, 2007~~Operations Assessment	Medium	~~The statement "The Time Monitor may declare offsets in 0.001 second increments" was moved from TEoffset to TDadj and offsets was corrected to adjustments.~~The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 90 days of the discovery of the error; but made the required recalculations and adjustments within 120 days.	~~Errata~~The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 120 days of the discovery of the error; but made the required recalculations and adjustments within 150 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust the PII_{accum} within 150 days of the discovery of the error; but made the required recalculations and adjustments within 180 days.	The Balancing Authority did not recalculate PII_{hourly} and adjust PII_{accum} within 180 days of the discovery of the error.
~~1~~R3	~~February 6, 2007~~Real-Time	Medium	~~The reference to seconds was deleted from the TE offset~~	~~Errata~~The Balancing Authority operated during a calendar	The Balancing Authority operated during a calendar	The Balancing Authority operated during a calendar

~~Version~~ R #	~~Date~~Time Horizon	~~Action~~ VRF	~~Change Tracking~~Violation Severity Levels			
~~1~~	~~February 4, 2003~~	~~Effective Date~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
	Operations		~~term.~~The Balancing Authority operated during a calendar quarter without ATEC in service for more than an accumulated 24 hours, but less than or equal to 72 hours.	quarter without ATEC in service for more than an accumulated 72 hours, but less than or equal to 120 hours.	quarter without ATEC in service for more than an accumulated 120 hours, but less than or equal to 168 hours	quarter without ATEC in service for more than an accumulated 168 hours.
~~1~~R4	~~June 19, 2007~~Operations Assessment	Medium	~~The standard number BAL-STD-004-1 was changed to BAL-004-WECC-01 to be consistent with the NERC Regional Reliability Standard Numbering Convention.~~ The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within 50 minutes, but made the required calculations in less than or equal to two hours.	~~Errata~~The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within two hours, but made the required calculations in less than or equal to four hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within four hours, but made the required calculations in less than or equal to six hours.	The Balancing Authority did not compute PII_{hourly}, PII_{accum}, and I_{ATEC} within six hours.

~~Version~~ R #	~~Date~~Time Horizon	~~Action~~ VRF	~~Change Tracking~~Violation Severity Levels			
~~1~~	~~February 4, 2003~~	~~Effective Date.~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
R5	Real-Time Operations	Medium	N/A	N/A	N/A	The Balancing Authority is not able to change its AGC operating mode between Flat Frequency (for blackout restoration; Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; or Tie Line Bias plus Time Error control (used in ATEC mode).
R6	Operations Assessment	Medium	N/A	N/A	N/A	When making adjustments to hourly Inadvertent Interchange or ΔTE, the Balancing Authority did not recalculate the PII_{hourly} and the PII_{accum} for the On-Peak and Off-Peak periods.
R7	Operations	Medium	N/A	N/A	N/A	When making any month-end meter

~~Version~~R #	~~Date~~Time Horizon	~~Action~~ VRF	~~Change Tracking~~Violation Severity Levels			
~~1~~	~~February 4, 2003~~	~~Effective Date.~~	~~New~~Lower VSL	Moderate VSL	High VSL	Severe VSL
	Assessment					reading adjustments to Inadvertent Interchange, the Balancing Authority did not make the same adjustment to the PII_{accum}.
R8	Operations Assessment	Medium	N/A	N/A	N/A	The Balancing Authority paid back Inadvertent Interchange using bilateral and unilateral payback rather than using ATEC.

Guidelines and Technical Basis

Requirement R1:

Requirement R2:

Requirement R3:

Requirement R4:

Requirement R5:

Requirement R6:

Requirement R7:

Requirement R8:

FERC Directives for BAL-004-WECC-1 Automatic Time Error Correction
January 18, 2012

Received From	FERC Order 723[1] Snapshot WECC-0068 Mod. To BAL-004-WECC-1	The BAL-004-WECC-2 and Variance to BAL-001-0.1a Completed Actions
FERC	P 30. As explained in the NOPR, the Commission is concerned that the phrases "large accumulation" and "in such a situation," as used in Requirement R1.2, leaves to individual interpretation when a "large" amount of primary inadvertent has accumulated. The ERO and WECC agree that the provision should be clarified. Accordingly, the Commission adopts its NOPR proposal and directs WECC to develop revisions to the provision so that a Balancing Authority will know specifically which circumstances trigger the actions required by Requirement R1.2.	See BAL-004-WECC-2 in Requirement R1 where the term "large accumulation is eliminated and replaced with a quantifiable maximum limit for each Balancing Authority to be within by the end of each month.
FERC	P 34. Consistent with the NOPR, pursuant to Section 215(d) (5) of the FPA, the Commission directs WECC to develop a modification to the Regional Reliability Standard consistent with WECC's and NERC's explanation that the limit set forth in Requirement 2 of "24 hours per calendar quarter" is an accumulated total for the period – resulting from either a singular event or a cumulative time limit from a number of events.	See BAL-004-WECC-2 Requirement R3, which has been revised to specify an accumulation over the period.
FERC	P 44. FERC requires that Balancing Authorities use Raw ACE for CPS	See BAL-001-0.1a. Section E.B is a Regional Variance for WECC that

[1] 127 FERC ¶ 61,176 UNITED STATES OF AMERICA FEDERAL ENERGY REGULATORY COMMISSION, 18 CFR Part 40, Docket No. RM08-12-000; Order No.723, Western Electricity Coordinating Council Regional Reliability Standard Regarding Automatic Time Error Correction (Issued May 21, 2009)

Received From	FERC Order 723[1] Snapshot WECC-0068 Mod. To BAL-004-WECC-1	The BAL-004-WECC-2 and Variance to BAL-001-0.1a Completed Actions
	reporting and WATEC ACE for control. The Interconnect prefers to use the WATEC ACE for control and CPS reporting. Develop a Regional Variance to BAL-001-0.1a to resolve the issue.	replaces Requirement R1 and Section D Compliance 2. This Regional Variance establishes a single ACE equation for use in WECC for all NERC standards referencing ACE. Furthermore, the Drafting Team for WECC-0068 requests withdrawal of BAL-001-0.1a Appendix 2 Interpretation of Requirement 1 and BAL-003-0.1b Appendix 1 Interpretation of Requirement R3.
FERC	P 51. FERC adopts its NOPR proposal and directs that the violation risk factors assigned to BAL-004-WECC-01, Requirements R1, R2, R3, and R4, be modified from "lower" to "medium." The ERO and WECC must submit a filing that includes the directed modifications within 60 days of the effective date of this Final Rule.	NERC and WECC, in their compliance filing of August 28, 2009,[2] adjusted the Violation Risk Factors to medium as directed. Likewise, the corresponding requirements in BAL-001-0.1a E.B.1, BAL-004-WECC-2 Requirements R3, R4, and R5 have been assigned Violation Risk Factors of Medium.
FERC	P 54. The Commission adopts its NOPR proposal and directs the ERO and WECC to submit violation severity levels for each Requirement and sub-Requirement that has been assigned a violation risk factor. To allow adequate time for the development of the violation severity levels, the ERO and WECC must submit a filing that includes the directed violation severity levels within 120 days of the effective date of this Final Rule.	NERC and WECC in its compliance filing of October 23, 2009[3] adjusted the violation severity levels as directed. The drafting team has established similar violation severity levels for each requirement in both BAL-001-01.1a E.B and BAL-004-WECC-2.

[2] *Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 51 of Order No. 723 – Directed Modification of Violation Risk Factors for Regional Reliability Standard BAL-004-WECC-1, Automatic Time Error Correction*, Docket No. RM08-12-000, filed August 28, 2009.

[3] *Compliance Filing of the North American Electric Reliability Corporation in response to Paragraphs 26 and 54 of Order No. 723*, Docket No. RM08-12-000, filed October 23, 2009.

The Project WECC-0068 (BAL-004-WECC-2 and Regional Variance to BAL-001-0.1a)
Drafting Team Completed Actions
January 18, 2012

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
R1. Each BA that operates synchronously to the Western Interconnection shall continuously operate utilizing Automatic Time Error Correction (ATEC) in its Automatic Generation Control (AGC) system. [Risk Factor: Lower] $ACE_{ATEC} = (NI_A - NI'_S) - 10B_i(F_A - F_S) - T_{0b} + I_{ME}$ **Where:** **NI_A =** Net Interchange Actual (MW). **F_A =** Frequency Actual (Hz). **F_S** = Frequency Scheduled (Normally 60 Hz). **B_i =** Frequency Bias for the Balancing Authority's Area (MW / 0.1 Hz). **T_{0b} =** Remaining Bilateral Payback for Inadvertent Interchange created prior to implementing automatic payback (MW). **I_{ME}** = Meter Error Correction (MW). $NI'_S = NI_S - \frac{II^{on/off\ peak}_{Primary}}{(-Y) * H}$ **NI_S =** Net Interchange Scheduled (MW). **Y** = B_i / B_S.	**E.B.1.** Each Balancing Authority shall operate such that, on a rolling 12-month basis, the average of the clock-minute averages of the Balancing Authority's Area Control Error (ACE) divided by 10B (B is the clock-minute average of the Balancing Authority Area's Frequency Bias) times the corresponding clock-minute averages of the Interconnection's Frequency Error is less than a specific limit. This limit $\in_1^2$ is a constant derived from a targeted frequency bound (separately calculated for each Interconnection) that is reviewed and set as necessary by the NERC Operating Committee. $AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right] \le \in_1^2 \text{ or } \frac{AVG_{Period}\left[\left(\frac{ACE_i}{-10B_i}\right)_1 * \Delta F_1\right]}{\in_1^2} \le 1$ The equation for ACE in the Western Interconnection is: $ACE = (NI_A - NI_S) - 10B(F_A - F_S) - I_{ME} + I_{ATEC}$ **Where:** **NI_A** is the algebraic sum of actual flows on all tie lines. **F_A** is the actual frequency. **F_S** is the scheduled frequency. F_S is normally 60 Hz but	Establishing a Regional Variance in BAL-001-01.1a in which an ACE equation for WECC is specified provides the following benefits from a Standards perspective: a) Locates in a single standard the definition of ACE for all Interconnections; b) Identifies a single ACE formula for all Interconnections with common terminology and uncommon differences (i.e., there is no longer a NERC ACE and a "control" ACE); and	Reducing the NERC ACE and "control" ACE to a single ACE, allows Operations to "control to the target." This means that control actions will directly affect the monitored, measured objective function. Since the amount of the adjustment during any one hour is limited by L_{10}, Balancing Authorities automatically limit the risk and the amount of the transaction.

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
H = Number of Hours used to payback Inadvertent Interchange Energy. The WECC Performance Work Group has set the value of H to 3. **B_S** = Frequency Bias for the Interconnection (MW / 0.1 Hz). $II_{primary}^{on/off\ peak}$ = is the Balancing Authority's accumulated primary inadvertent interchange in MWh. An On-Peak and Off-Peak accumulation accounting is required. Where: $II_{primary}^{on/off\ peak}$ **= last period's** $II_{primary}^{on/off\ peak}$ **+ (1-Y) * (II_{actual} - B_i * ΔTE/6)** **II_{actual}** is the hourly Inadvertent Interchange for the last hour. **ΔTE** is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where: **ΔTE = $TE_{end\ hour}$ – $TE_{begin\ hour}$ – TD_{adj} – (t)*(TE offset)** **TD_{adj}** is any operator adjustment to the control center Time Error to correct for differences with the time monitor. **t** is the number of minutes of Manual Time Error Correction that occurred	may be offset to effect manual time error corrections. **B** = Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz. I_{ME} is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NI_A) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero. $I_{ATEC} = \frac{PII_{accum}^{on/off\ peak}}{(-Y) * H}$ when operating in Automatic Time Error Correction control mode. I_{ATEC} shall be zero when operating in any other AGC mode. **NI_S** is the algebraic sum of scheduled flows on all tie lines. **Y** = B / B_S. **H** = Number of Hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3. **B_S** = Frequency Bias for the Interconnection (MW / 0.1 Hz). **P**rimary **I**nadvertent **I**nterchange **(PII_{hourly})** is **(1-Y) * (II_{actual} - B * ΔTE/6)** **II_{actual}** is the hourly Inadvertent Interchange for the last hour. **ΔTE** is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where: **ΔTE = $TE_{end\ hour}$ – $TE_{begin\ hour}$ – TD_{adj} – (t)*(TE_{offset})**	c) Eliminates consideration of exceptional circumstances governing multiple ACEs.	

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
during the hour. **TE offset** is 0.000 or +0.020 or -0.020.	**TD_{adj}** is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks. **t** is the number of minutes of Manual Time Error Correction that occurred during the hour. **TE_{offset}** is 0.000 or +0.020 or -0.020. **PII_{accum}** is the Balancing Authority's accumulated **PII_{hourly}** in MWh. An On-Peak and Off-Peak accumulation accounting is required. Where: $PII_{accum}^{on/off\ peak}$ **= last period's** $PII_{accum}^{on/off\ peak}$ **+** PII_{hourly}		
R1.1. The absolute value of the WECC Automatic Time Error Correction term is limited as follows: $\left\| \frac{II_{primary}^{on/off\ peak}}{(1\text{-}Y)\cdot H} \right\| \le L_{max}$ Where L_{max} is chosen by the BA and is bounded as follows: $0.20 * \|B_i\| \le L_{max} \le L_{10}$ L_{10} is the Balancing Authority CPS2 limit in MW. If the WECC Automatic Time Error Correction term is less than the upper limit, use the calculated WECC Automatic Time Error Correction term.	**E.B.2.** Each Balancing Authority shall limit the absolute value of I_{ATEC}, the Automatic Time Error Correction term as follows: $\left\| I_{ATEC} \right\| \le L_{max}$. **E.B.3.** Each Balancing Authority shall set L_{max} within the limits as follows: $0.20 * \|B\| \le L_{max} \le L_{10}$.	Provides clarity in requirements and actions to be taken by the Balancing Authorities. Relocating this requirement to BAL-001-0.1a consolidates all requirements affecting calculation of terms in the ACE equation.	Eliminates potential confusion regarding limitation of the ATEC term, which could affect the final ACE value, subsequent control of units, and associated impact on system frequency.

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
R1.2 Large accumulations of primary inadvertent point to an invalid implementation of ATEC, loose control, metering or accounting errors. A BA [Balancing Authority] in such a situation should identify the source of the error(s) and make the corrections, recalculate the primary inadvertent from the time of the error, adjust the accumulated primary inadvertent caused by the error(s), validate the implementation of ATEC, set L_{max} equal to $L_{10,}$ and continue to operate with ATEC reducing the accumulation as system parameters allow.	**R1.** Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PII_{accum}) for both the On-Peak period and the Off-Peak period are each individually less than or equal to: **1.1** For load-serving Balancing Authorities, 150% of the previous calendar year's integrated hourly Peak Demand, **1.2** For generation-only Balancing Authorities, 150% of the previous calendar year's integrated hourly peak generation.	FERC directed WECC to define large accumulations for PII_{accum}. As a result in Requirement R1 the large accumulation limit was set to 150% of previous year's peak demand or peak generation for generation only Balancing Authorities. The action required is that the Balancing Authority shall not permit the PII_{accum} to exceed the defined value, which is demonstrated at the end of each month. Requirement R2 contains the provision to recalculate. Since an upper limit is now defined, the list of possible actions to be taken was moved to the premise for Requirement R1.	The drafting team reviewed historical data to identify an appropriate amount to limit PII_{accum} and accommodate month end adjustments.
R2. Each BA [Balancing Authority] that is synchronously connected to the Western	**R3.** Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable	Resolve that the "out of service" duration is	

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
Interconnection, and operates in any AGC operating mode other than ATEC, shall notify all other BAs of its operating mode through the designated Interconnection communication system. Each BA, while synchronously connected to the Western Interconnection, will be allowed to have ATEC out of service for a maximum of 24 hours per calendar quarter, for reasons including maintenance and testing. [Risk Factor: Lower]	exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service.	an accumulation over the specified period. Also recognizes that extremely short interruptions in ATEC need not be communicated to the Interconnection. For example, computer maintenance processes could result in momentary interruptions (e.g., system upgrades) that do not require notifying neighboring Balancing Authorities.	
R3. BAs in the Western Interconnection shall be able to change their AGC operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error control (used in ATEC mode). The ACE used for NERC reports shall be the same ACE as the AGC operating mode in use. [Risk Factor: Lower]	**R5.** Each Balancing Authority shall be able to change its Automatic Generation Control operating mode between Flat Frequency (for blackout restoration); Flat Tie Line (for loss of frequency telemetry); Tie Line Bias; and Tie Line Bias plus Time Error Control (used in ATEC mode), to correspond to current operating conditions.	Removed reference to NERC report because with the adoption of a WECC regional variance to BAL-001-0.1a such a requirement is not necessary.	Changing to the proper operating mode, corresponding to current operating conditions, affords proper movement of generating units in response to those conditions. The addition of the ATEC term results in an additional AGC mode and a different set of

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
			parameters. The inability to correctly calculate the ATEC term would dictate that AGC not be operated in the ATEC mode.
R4. Regardless of the AGC operating mode, each BA in the Western Interconnection shall compute its hourly Primary Inadvertent Interchange when hourly checkout is complete. If hourly checkout is not complete by 50 minutes after the hour, compute Primary Inadvertent Interchange with best available data. This hourly value shall be added to the appropriate accumulated Primary Inadvertent Interchange balance for either On-Peak or Off-Peak periods. [Risk Factor: Lower]	**R4.** Each Balancing Authority shall compute the following by 50 minutes after each hour: **4.1.** $PII_{\mathbf{hourly}}$, **4.2.** PII_{accum}, **4.3.** Automatic Time Error Correction term (I_{ATEC}). **R6.** Each Balancing Authority shall recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly Inadvertent Interchange or ΔTE.	The drafting team clarified the previous requirement and adopted the NERC requirement format.	To promote timely calculations, 50 minutes was selected because it is before the next hour ramp begins, and permits time to collect the data and resolve interchange metering values. As hourly PII is corrected, then PII_{accum} should be recalculated.
R4.1 Each BA in the Western Interconnection shall use the change in Time Error distributed by the Interconnection Time Monitor.		This adjustment is included as part of equation in Requirement E.B.1. as ΔTE.	
R4.2 All corrections to any previous hour Primary Inadvertent Interchange shall be added to the appropriate On-Peak or Off-	**R2**. Each Balancing Authority shall, upon discovery of an error in the calculation of PII_{hourly}, recalculate within 90 days, the value of PII_{hourly} and adjust the PII_{accum} from the time of the	The drafting team clarified the previous requirement and	The drafting team selected 90 days as a reasonable amount

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
Peak accumulated Primary Inadvertent Interchange.	error. **R6.** Each Balancing Authority shall recalculate the PII_{hourly} and PII_{accum} for the On-Peak and Off-Peak periods whenever adjustments are made to hourly Inadvertent Interchange or ΔTE.	adopted the NERC requirement format.	of time to correct an error and recalculate PII_{hourly} and $PII_{accum,}$ since recalculation of PII_{hourly} and PII_{accum} is not a real-time operations reliability issue.
R4.3 Month-end Inadvertent Adjustments are 100% Primary Inadvertent Interchange and shall be added to the appropriate On-Peak or Off-Peak accumulated Primary Inadvertent Interchange, unless such adjustments can be pinpointed to specific hours in which case R4.2 applies.	**R7.** Each Balancing Authority shall make the same adjustment to the PII_{accum} as it did for any month-end meter reading adjustments to Inadvertent Interchange.	The drafting team clarified the previous requirement and adopted the NERC requirement format.	Month-end adjustments to II are applied as 100% PII_{accum}. 100% was chosen for simplicity to bilaterally assign PII to both Balancing Authorities, since the effect of this metering error on system frequency is not easily determined over the course of a month.
R4.4 Each BA in the Western Interconnection shall synchronize its Time Error to the nearest 0.001 seconds of the system Time Error by comparing its reading at the designated time each day to the reading broadcast by the Interconnection Time Monitor. Any difference shall be applied as an adjustment to its current Time Error.		The requirement was deleted because the Interconnection Time Monitor is responsible for monitoring and calculating Time Error. Balancing Authorities are no	

Standard BAL-004-WECC-01 — Automatic Time Error Correction	WECC Standard BAL-004-WECC-02 — Automatic Time Error Correction and WECC Regional Variance to Standard BAL-001-0.1a — Real Power Balancing Control Performance	Reason for Difference	Reliability Justification for Completed Actions
		longer responsible for Time Error monitoring, so the requirement was removed.	
	R8. Each Balancing Authority shall payback Inadvertent Interchange using ATEC rather than bilateral and unilateral payback.	Added new requirement to prevent stranded Secondary Inadvertent Interchange.	
Definitions of Terms Used in Regional Standard **Area Control Error:** Means the instantaneous difference between net actual and scheduled interchange, taking into account the effects of Frequency Bias including correction for meter error. **Automatic Time Error Correction:** A frequency control automatic action that a Balancing Authority uses to offset its frequency contribution, to support the Interconnection's scheduled frequency. **Primary Inadvertent Interchange:** The component of area (n) inadvertent interchange caused by the regulating deficiencies of the area (n). **Secondary Inadvertent Interchange:** The component of area (n) inadvertent interchange caused by the regulating deficiencies of area (i).	**Revised Definitions of Terms Used in Standard** **Area Control Error**: The instantaneous difference between a Balancing Authority's net actual and scheduled interchange, taking into account the effects of Frequency Bias, correction for meter error, and Automatic Time Error Correction (ATEC), if operating in the ATEC mode. ATEC is only applicable to Balancing Authorities in the Western Interconnection. **Automatic Time Error Correction:** The addition of a component to the ACE equation that modifies the control point for the purpose of continuously paying back Primary Inadvertent Interchange to correct accumulated time error.	The Automatic Time Error Correction definition was modified to more accurately define Automatic Time Error Correction. The current definitions for Primary Inadvertent Interchange and Secondary Inadvertent Interchange were retained.	

Comment Report Form for Project WECC-0068 Modification of BAL-004-WECC-1 Posting 5

The Project WECC-0068 (Regional Variance to BAL-001-0.1a — Real Power Balancing Control Performance and refinements to BAL-004-WECC-2 — Automatic Time Error Correction) Drafting Team thanks everyone who submitted comments on the WECC Regional Variance to the NERC BAL-001- 0.1a — Real Power Balancing Control Performance and to BAL-004-WECC-2 — Automatic Time Error Correction. These standards were posted for a 30-day public comment period from February 23, 2012 through March 25, 2012. WECC distributed the notice for the posting on February 23, 2012. The Standard Drafting Team asked stakeholders to provide feedback through a special Standard Comment Form on the minor revisions that were non-substantive in nature. WECC received a comment from one company representing two of the 10 Industry Segments, as shown in the table on the following page.

In this "Consideration of Comments" document, stakeholder's comments have been organized so that it is easier to see the responses associated with each stakeholder. All comments received on the standard can be viewed in their original format at:

http://www.wecc.biz/Standards/Development/WECC-0068/Lists/WECC0068%20Modification%20to%20BAL004WECC1%20Posting%20of%20Ve/AllItems.aspx

If you feel that your comment has been overlooked, please let WECC know immediately. WECC's goal is to give every comment serious consideration in this process. If you feel there has been an error or omission, please contact the Director of Standards, Steve Rueckert, at steve@wecc.biz. In addition, there is a WECC Reliability Standards Appeals Process.[1]

[1] The appeals process is described in the Process for Developing and Approving WECC Standards: http://www.wecc.biz/library/WECC%20Documents/Business%20and%20Governance%20Documents/WECC%20Reliability%20Standards%20Development%20Procedures.pdf

Comment Report Form for Project WECC-0068 Modification of BAL-004-WECC-1

The Industry Segments are:

1 — Transmission Owners
2 — RTOs, ISOs
3 — Load-serving Entities
4 — Transmission-dependent Utilities
5 — Electric Generators
6 — Electricity Brokers, Aggregators, and Marketers
7 — Large Electricity End Users
8 — Small Electricity End Users
9 — Federal, State, Provincial Regulatory or other Government Entities
10 — Regional Reliability Organizations, Regional Entities

Commenter		Organization	Industry Segment									
			1	2	3	4	5	6	7	8	9	10
1.	Greg Travis	Idaho Power Co	✓		✓							
2.												

Index to Questions, Comments, and Responses

Comment Report Form for Project WECC-0068 Modification of BAL-004-WECC-1

1. **This comment window is confined solely to the change made in R1 of BAL-004-WECC-02. Do you agree with the change? If you do not agree with the change in R1 of BAL-004-WECC-02, please explain your answer and provide specific remedial language. The team thanks you for your participation.**

Summary Consideration:

Commenter	Yes	No	Comment
Greg Travis, Idaho Power Co	Yes		
Response: Thank you.			

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Consideration of Comments

WECC's Proposed Regional Variance to NERC Standard BAL-001-0.1a Real Power Balancing Control Performance

The Regional Standards Group thanks all commenters who submitted comments on the proposed regional variance to NERC Standard BAL-001-0.1a. This standard was posted for a 45-day public comment period from January 23 – March 9, 2012. Stakeholders were asked to provide feedback on the standard through a special electronic comment form. There were six sets of comments, including comments from eight different people from six entities representing five of the 10 Industry Segments as shown in the table on the following pages.

All comments submitted may be reviewed in their original format on the standard's project page:

http://www.nerc.com/filez/regional_standards/regional_reliability_standards_under_development.html

If you feel that your comment has been overlooked, please let us know immediately. The goal is to give every comment serious consideration in this process! If you feel there has been an error or omission, you can contact the Vice President of Standards and Training, Herb Schrayshuen, at 404-446-2560 or at herb.schrayshuen@nerc.net. In addition, there is a NERC Reliability Standards Appeals Process.[1]

[1] The appeals process is in the Reliability Standards Development Procedures: http://www.nerc.com/standards/newstandardsprocess.html.

Index to Questions, Comments, and Responses

The Industry Segments are:

1 — Transmission Owners
2 — RTOs, ISOs
3 — Load-serving Entities
4 — Transmission-dependent Utilities
5 — Electric Generators
6 — Electricity Brokers, Aggregators, and Marketers
7 — Large Electricity End Users
8 — Small Electricity End Users
9 — Federal, State, Provincial Regulatory or other Government Entities
10 — Regional Reliability Organizations, Regional Entities

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
1.	Group	Chris Higgins	Bonneville Power Administration	X		X		X	X				
	Additional Member	**Additional Organization**	**Region**	**Segment Selection**									
	1. James	Murphy	WECC	1									
2.	Group	Nicholas L. Hall	Constellation Energy Control and Dispatch					X					
	Additional Member	**Additional Organization**	**Region**	**Segment Selection**									
	1. Brenda Powell	Constellation Energy Commodities Group	WECC	5									
3.	Individual	Janet Smith, Regulatory Affairs Supervisor	Arizona Public Service Company	X		X		X	X				
4.	Individual	Chris Chavez for Mike Gentry	Salt River Project	X		X		X	X				
5.	Individual	Sandra Shaffer	PacifiCorp	X		X		X	X				
6.	Individual	Howard Illian	Energy Mark, Inc.								X		

1. **Do you agree the proposed standard (variance) is being developed in a fair and open process, using the associated Regional Reliability Standards Development Procedure?**

Summary Consideration: Five of the six commenters agreed the WECC Variance to BAL-001-0.1a was developed in a fair and open process. The Process for Developing and Approving WECC Standards was followed until February 29, 2012, and the Reliability Standards Development Procedures were followed after March 1, 2012. All drafting team meetings and different versions of the WECC Variance to BAL-001-0.1a (WECC Variance) were accordingly posted and noticed on the WECC website at http://www.wecc.biz/Standards/Development/WECC-0068/default.aspx. The commenter, who did not agree that the process was fair and open, argues that the drafting team failed to present information that would argue against previous FERC rulings. With the creation of the WECC Variance to BAL-001-0.1a and BAL-004-WECC-2, the drafting team believes that it is making refinements and clarifications to address issues raised by FERC, such as defining large accumulations of inadvertent, and to address confusion in the industry that developed when FERC ruled on BAL-004-WECC-1, BAL-001-0.1a Appendix 2 Interpretation of Requirement R1, and BAL-003-0.1b Appendix 1 Interpretation of Requirement R3. The drafting team's technical report titled "Consolidation of NERC and Control ACEs – Using the Same ACE for Control and NERC Reporting" (Technical Report) provides justification for the WECC Variance. Once the WECC Variance and BAL-004-WECC-2 are approved, the drafting team has recommended that the interpretations be retired. The drafting team recognizes that the continent-wide NERC standards development process may have to be followed in order to retire the interpretations.

Organization	Yes or No	Question 1 Comment
Bonneville Power Administration	Yes	
Constellation Energy Control and Dispatch	Yes	
Arizona Public Service Company	Yes	
Salt River Project	Yes	
PacifiCorp	Yes	

Organization	Yes or No	Question 1 Comment
Energy Mark, Inc.	No	Comment 1: The information presented fails to create a sufficient record necessary to support the variance requested. The variance as presented fails to address the issues that resulted in the previous rule, ie. the reasons that the NERC Resources Subcommittee issued its original interpretation requiring the use of the ACE Equation as defined by NERC. This proposed standard (variance) fails to include any discussion of these issues. The information also fails to present any new information that would counter the previous ruling by the Federal Energy Regulatory Commission (FERC) that rejected the variance request in 2008. Therefore, the record presented for justification for approval of this standard is deficient because it fails to address any of the issues previously raised that were determined to be adequate grounds for rejection of this variance at that time. Comment 2: At a minimum, a record should be created to address the issues resulted in rejection of this variance previously.

Response: In developing the WECC Variance to BAL-001-0.1a, the standard drafting team followed the Process for Developing and Approving WECC Standards until February 29, 2012 and the Reliability Standards Development Procedures after March 1, 2012. All drafting team meetings and different versions of the WECC Variance were accordingly posted and noticed on the WECC website at http://www.wecc.biz/Standards/Development/WECC-0068/default.aspx. The drafting team's technical report titled "Consolidation of NERC and Control ACEs – Using the Same ACE for Control and NERC Reporting" (Technical Report) provides justification for the WECC Variance. The Technical Report was posted for industry comment with the second posting of the WECC Variance (November 4 – December 5, 2011), and all commenters agreed with the conclusions in the report. In addition, a Mapping Document and Issues Table detailing how the drafting team addressed each FERC directive were included with all WECC postings. The public postings, public meetings, and Technical Report provide the record and justification necessary to approve the WECC Variance and BAL-004-WECC-2.

With the creation of the WECC Variance and BAL-004-WECC-2, the drafting team believes that it is making refinements and clarifications to address confusion in the industry that developed when FERC ruled on BAL-004-WECC-1, BAL-001-0.1a Appendix 2 Interpretation of Requirement R1 and BAL-003-0.1b Appendix 1 Interpretation of Requirement R3. The drafting team recognizes that the continent-wide NERC standards development process may have to be followed in order to retire the NERC interpretations.

2. Does the proposed standard (variance) pose an adverse impact to reliability or commerce in a neighboring region or interconnection?

Summary Consideration: Five of the six commenters agreed the WECC Variance to BAL-001-0.1a did not pose an adverse impact to reliability or commerce in a neighboring region or Interconnection. Since the WECC Variance applies to only Western Interconnection, it cannot adversely impact other regions or Interconnections. The dissenting commenter felt the WECC Variance sets precedence with respect to the definition of Tie-line Bias Control. The drafting team notes that the proposed ACE equation contains the interchange and frequency components (Tie-Line Bias control components) of the NERC ACE equation as well as providing time error corrections that are considered an acceptable adjustment. The drafting team's Technical Report provides justification for the WECC Variance and documents improvement in the WECC frequency profile since the use of Automatic Time Error Correction. The main reason for the WECC Variance is to achieve a more accurate indication of actual control performance by coordinating performance measurements and control objectives.

Organization	Yes or No	Question 2 Comment
Bonneville Power Administration	No	
Constellation Energy Control and Dispatch	No	
Arizona Public Service Company	No	
Salt River Project	No	
PacifiCorp	No	
Energy Mark, Inc.	Yes	Comment 3: The proposed standard sets a precedence with respect to the definition of Tie-line Bias Control that is detrimental to reliability for all interconnections. Time Error Correction (TEC) is available as part of Tie-line Bias Frequency Control which is

Organization	Yes or No	Question 2 Comment
		use by the North American interconnections to coordinate the control among the BAs that make up the multi-BA interconnections. Although the NERC Operating Committee has determined that TEC is a commercial service, the continuation of this service remains open for discussion. Rules governing Tie-line Bias Frequency Control are described by Cohn (1967): 1) The requirement that all portions of the interconnection be included in one area or another, so that the sum of all area generation, loads and losses is the same as total system generation load and losses; 2) The need to have the algebraic sum of all area net interchange schedules equal to zero; 3) The use of a common scheduled frequency for all areas; 4) The absence of metering or computational errors. An additional basic requirement is that all BAs on the interconnection use a common ACE Equation as defined below as: ACE = (NIA - NIS) - 10B (FA - FS) – IME where: o NIA is the algebraic sum of actual flows on all tie lines. o NIS is the algebraic sum of scheduled flows on all tie lines. o B is the Frequency Bias Setting (MW/0.1 Hz) for the Balancing Authority. The constant factor 10 converts the frequency setting to MW/Hz. o FA is the actual frequency. o FS is the scheduled frequency. FS is normally 60 Hz but may be offset to effect manual time error corrections. o IME is the meter error correction factor typically estimated from the difference between the integrated hourly average of the net tie line flows (NIA) and the hourly net interchange demand measurement (megawatt-hour). This term should normally be very small or zero. The last term in the ACE Equation corrects for metering errors as required by the basic rules. It is acceptable to modify the ACE Equation as long as the four basic rules stated by Cohn are followed. The proposed variance fails to follow these four basic rules. As a consequence, implementation of the proposed variance will fail to meet the requirements necessary to qualify as Tie-line Bias Control. Comment 4: The variance as proposed will not be in compliance with Standard BAL-003-0.1b - Frequency Response and Bias; Requirement R3. Each Balancing Authority shall operate its Automatic Generation Control (AGC) on Tie Line Frequency Bias, unless such operation is adverse to system or Interconnection reliability. Comment 5: The variance as proposed will not be in compliance with Standard BAL-005-0.1b - Automatic Generation Control,

Organization	Yes or No	Question 2 Comment
		Requirements R6. The Balancing 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. and 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. Comment 6: This proposed variance seeks to implement a commercial service in a manner that fails to meet the reliability requirements in current reliability standards. This alone should be sufficient grounds for the rejection of this variance.

Response: The drafting team disagrees with the statements made by the commenter.

Concerning the proposed WECC Variance setting precedence with respect to the definition of Tie Line Bias control that is detrimental to reliability, the drafting team believes the proposed ACE equation is not detrimental because it contains the Interchange and frequency components (the Tie-Line Bias control components) thus meeting Tie Line Bias control requirements.

Concerning compliance with BAL-003 and BAL-005 the drafting team conducted a review of the NERC Reliability Standards including Standard BAL-005-0.1b Requirement R6 to determine if there were any conflicts and adverse impacts with the proposed WECC Variance. The drafting team does not believe that implementation of the WECC Variance would result in a violation of the NERC requirements identified by the commenter because the proposed WECC Variance still contains the Net Actual Interchange, Net Schedule Interchange and Frequency Bias obligation component of the traditional Tie Line Bias Control mode.

The drafting team disagrees with comment 6 and believes the proposed WECC Variance meets or exceeds the current NERC frequency control requirements. As shown in the Technical Report the implementation of Automatic Time Error Correction (ATEC) into the ACE equation reduces frequency error and provides better frequency control, over time. In addition, since the Western Interconnection has been using the ATEC ACE to control with since 2003 and BAL-004-WECC-1 has been in effect since July 1, 2009, Balancing Authorities operating in the Western Interconnection have not observed negative reliability impacts due to ATEC. On the contrary, as shown in the Technical Report, the Western Interconnection Balancing Authorities observed an improvement in the

Organization	Yes or No	Question 2 Comment
		frequency error profile until the Reliability-based Control (RBC) Field Trial began. The improvement in the frequency error profile attests to better control of the Interconnection frequency thus providing justification for the WECC Variance and BAL-004-WECC-2.

3. Does the proposed standard (variance) pose a serious and substantial threat to public health, safety, welfare, or national security?

Summary Consideration: Five of the six commenters agreed the WECC Variance did not pose a serious and substantial threat to public health, safety, welfare, or national security. The dissenting commenter did not feel the WECC Variance was developed with discussion nor was there a formal record. All meetings notes, technical papers, and public postings are publically available on the WECC website under Standards, WECC Under Development. The development record is clearly displayed at http://www.wecc.biz/Standards/Development/WECC-0068/default.aspx. **As described in the Technical Report there is improvement in frequency control and in the assessment of control performance while maintaining the ability to respond to frequency events. Based upon the results contained in the Technical Report, the drafting team does not believe there is a compelling reliability concern to implement the many design and control theory refinements suggested by the dissenting commenter.**

Organization	Yes or No	Question 3 Comment
Bonneville Power Administration	No	
Constellation Energy Control and Dispatch	No	
Arizona Public Service Company	No	
Salt River Project	No	
PacifiCorp	No	
Energy Mark, Inc.	Yes	Comment 7: The proposed variance poses a serious and substantial threat to reliability of the interconnection because it is being recommended for implementation without the presentation of any discussion or formal record with respect to its impact on the reliability of the interconnection. Comment 8: The

Organization	Yes or No	Question 3 Comment
		proposed variance requests a change in the definition of Area Control Error (ACE) without providing a record to indicate the impact that this change will have on reliability. ACE is the basic measure used to determine performance for reliability purposes. ACE is used in multiple reliability standards and requirements as a basic measure to indicate the performance of the Balancing Authority. This variance is proposed without the creation of any record indicating the impact that this change in the definition of ACE will have on these other reliability standards. Comment 9: ACE is used in the calculation of the CPS1 requirement. This CPS1 requirement as implemented provides the guarantee that: if all Balancing Authorities on an interconnection comply with the CPS1 requirement, then the Root Mean Square of the Frequency Error for that interconnection will be less than Epsilon 1. If the proposed variance is implemented, this guarantee will no longer be a result of compliance with the CPS1 requirement. Therefore, implementation of the proposed variance will be detrimental to reliability because it will invalidate other reliability measurements based upon ACE. There is no discussion in the record, either qualitive or quantative, indicating the impact of this change in the ACE definition on CPS1.Comment 10: ACE is used in the calculation of the CPS2 requirement. This CPS2 requirement is the only requirement addressed with respect to the impact that the ACE definition has on compliance. The discussion of the impact on the implementation of this variance was qualitive only. The record fails to include any discussion of the quantitive impact of this variance on the quantitive effect on CPS2. Comment 11: A new requirement, Balancing Authority ACE Limit (BAAL), is under field trial on all of the North American interconnections. This new requirement uses ACE as one of the basic parameters in its calculation. BAAL also comes with a reliability guarantee; If all Balancing Authorities are within their BAAL then the interconnection will have a frequency error less than the BAAL frequency limit. Implementation of the proposed variance will also invalidate this guarantee. Therefore, implementation of the proposed variance will be detrimental to reliability because it will invalidate other reliability measurements based upon ACE. There is no discussion in the record, either qualitive or quantative, indicating the impact of this

Organization	Yes or No	Question 3 Comment
		change in the ACE definition on BAAL. Comment 12: ACE is used in the calculation of the Recovery Criterion in Standard BAL-002-0 - Disturbance Control Performance requirement R4. If the proposed variance is implemented, this required recovery will be affected. Therefore, implementation of the proposed variance could be detrimental to reliability because it will change other reliability measurements based upon ACE. There is no discussion in the record, either qualitive or quantative, indicating the impact of this change in the ACE definition on the Disturbance Control Standard. Comment 13: This request for a variance fails to meet the requirement that it demonstrate that the variance is not inconsistent with or less stringent than the NERC reliability standard. Comments 8 through 12 above provide evidence that this requirement is less stringent than the NERC reliability requirements indicated in the above comments 8 through 12. Comment 14: In its request the drafting team indicated that, "Replacing the NERC ACE equation with an ATEC ACE equation is an alternative methodology with the same reliability objective as the existing BAL-001-0.1a standard." Although the alternative methodology has the same reliability objective as the existing standard, this fact does not relieve the alternative methodology from having a sound technical basis consistent with the maintenance of reliability. This proposed alternative methodology contains many technical errors and misrepresentations that make it unsuitable for implementation as currently defined. Comment 15: The justification for the change in the ACE Equation to implement ATEC begins with the concept of Primary Inadvertent Interchange and Secondary Inadvertent Interchange. This concept as developed by Nathan Cohn fails to have a sound technical basis. This can be easily demonstrated. A careful reading of the technical paper upon which the ATEC methodology is based reveals the following quotation. "A primary component of over-generation or under-generation in one area is matched by the sum of related (N-1) secondary components of under-generation and over-generation respectively in other areas. Similarly, a primary component of export or import in one area is matched by the sum of related (N-1) secondary components of import or export respectively in other areas." If this statement is true then all Primary Inadvertent must be exactly matched by Secondary

Organization	Yes or No	Question 3 Comment
		Inadvertent. The counter example is easily provided by considering an hour that has inadvertent but no time error change. In this case all inadvertent for the hour is defined as Primary Inadvertent. Therefore, the basis for the Primary Inadvertent / Secondary Inadvertent calculation presented in the Cohn technical paper is incorrect in its development. Therefore, the stated methodology lacks a sound technical basis for acceptance. In addition, the concept of "stranded inadvertent" is refuted by this example. Inadvertent cannot be stranded without validation of the concept of Primary Inadvertent Interchange and Secondary Inadvertent Interchange. However, minor modifications in the suggested methodology would correct the technical errors and make it appropriate for implementation. This commentor fails to understand why technically competent parties continue to ignor the obvious technical errors in this methodology and resist correcting them. Comment 16: Although Cohn is mistaken in his analysis of Primary Inadvertent Interchange and Secondary Inadvertent Interchange, he does provide a valid way to concurrently correct time error and payback inadvertent interchange. The method he ultimately recommends is mathematically equivalent to the independent payback of traditional inadvertent interchange and the independent correction of time error with both methods using the same period over which the payback and correction are implemented. This concurrent TEC and inadvertent payback is performed with a single process simply because Cohn choses to implement both as schedules represented with MW offsets as opposed to the traditional method of providing inadvertent payback with MW offsets and TEC with frequency offsets. He also choses to implement both with the same implementation period (H). Since the concept of "stranded inadvertent" is not valid, there is no reason to assume that the inadvertent payback implementation period and the TEC implementation period should be the same. Comment 17: The inadvertent payback and TEC are implemented over the same period in the proposed variance. This period is defined as H in the standard and is set at 3 hours. There is no justification offered and no discussion with respect to how this parameter was determined. Therefore, there is no record to support the setting of this parameter. Comment 18: The setting of Lmax and limiting the Time Error and Inadvertent

Organization	Yes or No	Question 3 Comment
		Payback adjustment to less than this value is the reason that the method suggested is not compatible with Tie-line Bias Control. When the PII payback is limited to this value, the resulting interchange schedules fail to meet the criteria that they balance and unilateral scheduled interchange results. This unilateral interchange is the reason that the method suggested does not conform to appropriate Tie-line Bias control methodology. If this single limitation is removed from the standard, it will conform to Tie-line Bias Control and can easily be modified to be compatible with all of the ACE based reliability requirements. Comment 19: The justification for the PII limit is based upon the amount of scheduled payback within the Lmax limit. However, one of the reliability effects of the limit is based upon the difference between the Lmax limit and the scheduled payback without the limit since this is the amount of unilateral payback that is required by the limit. There has been no attempt to evaluate this difference and determine its affect qualitively and quantitively on the other reliability measure based upon the current definition of ACE. Comment 20: Experience on the Eastern Interconnection has demonstrated that TEC has an impact on reliability. This is the reason that NERC is investigating the elimination of TEC. These investigations have revealed the following: 1) time error correction in any form detrimentally impacts reliability because it requires an offset in scheduled frequency from 60 Hz moving the operating point closer to the underfrequency and overfrequency relay limits; 2) setting the frequency offset to values smaller than the 20 mHz value currently in use will reduce the detrimental reliability effects. Comment 21: It has also been demonstrated that a reduction in the equivalent frequency offset used for time error correction will result in a reduction the the probability risk associated with TEC. The proposed variance sets Lmax above the value equivalent to the current 20 mHz offset of frequency. As a result, the proposed method could create greater reliability risk than the current 20 mHz offset and put the interconnection at greater reliability risk than the current manual method. As recommended above, a lower reliability risk associated with a smaller frequency offset can be achieved by setting H to a value significantly greater than 3 hours. For example, a 20 mHz offset results in a maximum rate of correction

Organization	Yes or No	Question 3 Comment
		of 1.2 seconds per hour and a 10 mHz offset results in a maximum rate of correction of 0.6 seconds per hour. If H were set at 24 hours, then the proposed method would result in a 0.4167 seconds per hour correction rate assuming a maximum time error of 10 seconds (10/24), significantly reducing the reliability risk due to frequency offset. Comment 22: By considering the choice of how quickly to implement the payback of inadvertent and the correction of time error, those selecting the value of the H parameter are also determining the risk that the payback terms will exceed reliability limits with respect to the magnitude of additional transmission flows required to implement the TEC and inadvertent payback. Choosing a small value for H insures that the effective frequency offset for TEC and the effective inadvertent payback will be large and have a correspondingly large reliability risk. Choosing a large value for H insures that the effective frequency offset for TEC and the effective inadvertent payback will be small and have a correspondingly small reliability risk. As an alternative to setting a value for Lmax, the drafting team could choose a large value for H and eliminate the need to set a value for Lmax while reducing the reliability impact of the frequency offset for TEC and the reliability impact on transmission loading for inadvertent payback. Comment 23: Since there is no advantage in using the same H value for both TEC and inadvertent payback, the standard should be modified to allow separate H values to be used for TEC and inadvertent payback allowing each to be set independently based upon the effect the implementation period has on reliability associated with each. The use of 24 hours for TEC and a value between 24 and 168 hours for Inadvertent Interchange Payback should provide acceptable values for two automatically calculated values without contributing detrimentally to reliability. Comment 24: When TEC and Inadvertent Interchange Payback are separated into two separate calculations, the advantage of representing them both as MW values is eliminated. This allows the correction of one of the other problems associated with implementation of the proposed variance; the inability to represent the scheduled frequency correctly. Since scheduled frequency is used not only in the ACE Equation but also in the CPS1 and BAAL calculations, it is necessary to calculate the frequency offset explicitly for these two

Organization	Yes or No	Question 3 Comment
		reliability measures. This is more easily achieved when the calculation for TEC is performed in the frequency domain and the calculation for Inadvertent Interchange Payback is performed in the MW domain. This is the final and necessary step required to modify the proposed method into a method that is fully compatible with Tie-line Bias control and the reliability measures that are based upon ACE. Comment 25: The resulting ACE Equation would then include two additional terms; 1) a term that would provide a balanced set of schedules for the interconnection that would be based upon the Inadvertent Interchange account of each Balancing Authority divided by the Hi value used for Inadvertent Interchange Payback, and 2) a term that would provide the same frequency offset for all Balancing Authorities on the interconnection that would be based on the Time Error divided by the Ht value used for TEC.

Organization	Yes or No	Question 3 Comment
		Response: The drafting team does not believe the proposed WECC Variance poses a serious and substantial threat to public health, safety, welfare, or national security. Concerning the impact on other NERC standards and reliability, the drafting team conducted a review of all NERC Reliability Standards to determine if there were any conflicts and adverse impacts due to the proposed WECC Variance. The proposed WECC Variance adjusts the ACE equation and ACE definition referenced in all NERC Reliability Standards. The drafting team did not identify conflicts with other NERC reliability requirements. As shown in the Technical Report, the implementation of ATEC into the ACE equation (1) reduces frequency error and provides better frequency control; (2) provides a more accurate CPS measurement for the assessment of control performance; and (3) does not reduce Interconnection reliability during frequency (DCS) events. Concerning the implementation, ATEC design, and ATEC theory comments; Balancing Authorities operating in the Western Interconnection have been using the ATEC ACE to control with since 2003 and BAL-004-WECC-1 has been in effect since July 1, 2009. During this time, Western Interconnection Balancing Authorities have not observed adverse impacts on reliability. On the contrary, as shown in the Technical Report, the Western Interconnection Balancing Authorities observed an improvement in the frequency error profile for Epsilon 1 and 10 until the beginning of the RBC Field Trial in 2010. The improvement in the frequency error profile over many years attests to better control of the Interconnection frequency. The establishment of values for H, L_{max}, and other ATEC parameters implemented when including the ATEC component in the ACE equation depends upon the design objectives. The value of H was set to three hours for ATEC control to ensure timely and equitable payback of Inadvertent Interchange. The values for L_{max} are set in a range to allow Balancing Authorities to meet existing NERC CPS2 requirements while facilitating the expeditious reduction of Primary Inadvertent Interchange. Since the current implementation of ATEC is achieving the design objectives without any adverse impacts to reliability, the drafting team does not believe there is a compelling reason to implement at this time the commenter's many design and control theory suggestions. Concerning the comments on BAAL, Balancing Authorities in the Western Interconnection are participating in the RBC Field Trial with ATEC in affect. Comments regarding effects of the field trial on the WECC Variance are beyond the scope of WECC Standards Request. Approval of the WECC Variance should be considered on its own merits irrespective of the outcome of the field trial.

4. Does the proposed standard (variance) pose a serious and substantial burden on competitive markets within the interconnection that is not necessary for reliability?

Summary Consideration: Five of the six commenters agreed the WECC Variance to BAL-001-0.1a did not pose a serious and substantial burden on competitive markets within the Interconnection that is not necessary for reliability. The WECC Variance combined with BAL-004-WECC-2 provides the benefit of managing Inadvertent Interchange through a timely and equitable process. The WECC Variance does not prevent any entity from competing in any competitive market. As shown in the Technical Report, inclusion of ATEC in the ACE equation reduces frequency error and provides better frequency control, not a reduction in reliability.

Organization	Yes or No	Question 4 Comment
Bonneville Power Administration	No	
Constellation Energy Control and Dispatch	No	
Arizona Public Service Company	No	
Salt River Project	No	
PacifiCorp	No	
Energy Mark, Inc.	Yes	Comment 26: The delivery of Time Error Correction and Inadvertent Interchange Payback services results in a reduction in reliability of the interconnection as the result of the delivery of commercial services.
Response: The drafting team believes the proposed WECC Variance does not pose a serious and substantial burden on competitive markets within the Interconnection that is not necessary for reliability. The drafting team disagrees with the statements made by the commenter because the WECC Variance combined with BAL-004-WECC-2 provides the benefit of managing Inadvertent Interchange		

Organization	Yes or No	Question 4 Comment
		through a timely and equitable process. The WECC Variance does not prevent any entity from competing in any competitive market or from delivering commercial services. As shown in the Technical Report, the implementation of ATEC into the ACE equation reduces frequency error and provides better frequency control. The report shows that the frequency profile for the Western Interconnection improved until the beginning of the Reliability-based Control Field Trial. The improvement in the frequency error profile attests to better control of the Interconnection frequency.

5. Does the proposed regional standard (variance) meet at least one of the following criteria?

- **The proposed standard (variance) has more specific criteria for the same requirements covered in a continent-wide standard**
- **The proposed standard (variance) has requirements that are not included in the corresponding continent-wide reliability standard**
- **The proposed regional difference is necessitated by a physical difference in the bulk power system.**

Summary Consideration: Five of the six commenters agreed the WECC Variance to BAL-001-0.1a met the criteria for a regional standard (variance). Since one commenting entity provides Balancing Authority control services in multiple Interconnections, it had concerns about the implementation plan. However, the commenter is already controlling with the proposed ACE equation in the Western Interconnection, and the drafting team felt the transition to the proposed WECC Variance would not take longer than the time outlined in the implementation plan. One dissenting commenter felt the WECC Variance was less stringent than current NERC requirements. The Technical Report shows an improved frequency profile, implying more stringent control than the current NERC requirements.

Organization	Yes or No	Question 5 Comment
Bonneville Power Administration	Yes	
Constellation Energy Control and Dispatch	Yes	The proposed variance does meet these criteria, yet still poses some concerns, as follows: CECD agrees that a variance reconciling control ACE and NERC reporting ACE brings important clarity and consistency to this standard for Balancing Authorities in the Western Interconnection. However, CECD has some concerns about the Implementation Plan proposed in the Variance Request. The Variance Request assumes that the transition to calculating and reporting CPS performance using ATEC ACE would be a minimally invasive process, with little impact. However, this assumption has not been verified. The WECC assumption fails to recognize that no Balancing Authority is currently equipped to calculate and report CPS according to ATEC adjusted ACE, as WECC and NERC previously considered this activity a violation of BAL-001. Thus, all Balancing Authorities in the Western Interconnection will have

Organization	Yes or No	Question 5 Comment
		to reconfigure various elements of their energy management systems to accommodate this variance. The time and effort required to make these modifications is not clear, and the proposed Implementation plan provides only a brief window for making these modifications. The implementation plan is particularly problematic for entities with Balancing Authority assets in multiple interconnections since this variance will require the energy management system in use to employ several separate and distinct mechanisms for calculating CPS and NERC ACE, depending on the interconnection in which a particular asset is located. The drafting team should take these concerns into consideration and revise the Implementation Plan, allowing for a more flexible time-frame and/or process for Balancing Authorities to make this change. The issue resolved by this variance poses no significant risk to reliability and a Balancing Authority should not risk violation of this standard because of an overly aggressive implementation.
Response: During the first posting of the WECC Variance to BAL-001-0.1a, a commenter expressed concerns about the time needed to make required modifications for using only one ACE for controlling and reporting. The drafting team members reviewed their own ATEC implementations and agreed that some time will be needed for implementation. The drafting team believes that three to six months identified in the implementation plan is sufficient time to modify the CPS statistics gathering and reporting algorithms to reference ACE with ATEC since Balancing Authorities in WECC are already using ATEC in their EMS, particularly if entities begin making plans for such changes in advance of FERC's approval.		
Arizona Public Service Company	Yes	
Salt River Project	Yes	
PacifiCorp	Yes	
Energy Mark, Inc.	No	Comment 27: The proposed variance results in all ACE based measures being less stringent from a reliability perspective than the current standard interpretation. This is inconsistent with the requirement that regional standards be more stringent than

Organization	Yes or No	Question 5 Comment
		the NERC continent wide standard. It therefore fails to meet the requirements to be considered as a regional standard. Comment 28: It might be acceptable to claim that the only way to achieve the desired result is the proposed variance, but these comments provide methods that are totally compatible with the NERC continent wide standards that could be implemented in place of the proposed variance. Therefore, the issue in not technical, the issue is whether or not it is worth the effort to conform with the continent wide standard. This question should have only one answer, comply with the continent wide standards.

Response: The drafting team believes the proposed WECC Variance meets the standard of justification for a Regional Variance as an alternative methodology, with the same reliability objective as the NERC Reliability Standard BAL-001-0.1a. In addition, the proposed WECC Variance to BAL-001-0.1a is consistent with — or more stringent than — the NERC BAL-001-0.1a Reliability Standard. The reasons the WECC Variance meets the standard of justification are:

1. The addition of I_{ATEC} to the ACE equation and adjustment to the control performance target used for controlling frequency and interchange improves the frequency error profile over time. As shown in the Technical Report, the Western Interconnection observed an improvement in the frequency error profile until the beginning of the Reliability-based Control Field Trial. The improvement in the frequency error profile attests to better control of Interconnection frequency.
2. The addition of I_{ATEC} to the ACE equation and adjustment to the control performance target provides better frequency control by providing frequency control closer to the targeted frequency bounds that epsilon 1 ($\in_1$) and epsilon 10 ($\in_{10}$) are based upon.
3. The Regional Variance provides a better CPS measurement for the assessment of control performance by allowing the use of the same control performance target for control and reporting. The Control Performance measurement (CPS1 and CPS2) is a measurement of the how close the Balancing Authority performs to the control performance target.
4. The proposed ACE equation allows the same Balancing Authority response to frequency events (DCS) as the old ACE equation.
5. It identifies a maximum (absolute value) ceiling for Accumulated Primary Inadvertent Interchange for each of the On-Peak and Off-Peak periods.

END OF REPORT

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Consideration of Comments

BAL-004-WECC-02 Automatic Time Error Correction
Attachment W

The Regional Standards Group thanks all commenters who submitted comments on the Regional Reliability Standard BAL-004-WECC-02. This standard was posted for a 45-day public comment period from January 23, 2012 through March 9, 2012. Stakeholders were asked to provide feedback on the standard through a special electronic comment form. There were five sets of comments, including comments from seven different people from five entities representing four of the 10 Industry Segments as shown in the table on the following pages.

All comments submitted may be reviewed in their original format on the standard's project page:

http://www.nerc.com/filez/regional_standards/regional_reliability_standards_under_development.html

If you feel that your comment has been overlooked, please let us know immediately. The goal is to give every comment serious consideration in this process! If you feel there has been an error or omission, you can contact the Vice President of Standards and Training, Herb Schrayshuen, at 404-446-2560 or at herb.schrayshuen@nerc.net. In addition, there is a NERC Reliability Standards Appeals Process.[1]

[1] The appeals process is in the Reliability Standards Development Procedures: http://www.nerc.com/standards/newstandardsprocess.html.

Index to Questions, Comments, and Responses

The Industry Segments are:

1 — Transmission Owners
2 — RTOs, ISOs
3 — Load-serving Entities
4 — Transmission-dependent Utilities
5 — Electric Generators
6 — Electricity Brokers, Aggregators, and Marketers
7 — Large Electricity End Users
8 — Small Electricity End Users
9 — Federal, State, Provincial Regulatory or other Government Entities
10 — Regional Reliability Organizations, Regional Entities

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
1.	Group	Chris Higgins	Bonneville Power Administration	X		X		X	X				
	Additional Member	**Additional Organization**	**Region**	**Segment Selection**									
	1. James	Murphy	WECC	1									
2.	Group	Nicholas L. Hall	Constellation Energy					X					
	Additional Member	**Additional Organization**	**Region**	**Segment Selection**									
	1. Brenda Powell	Constellation Energy Commodities Group	WECC	5									
3.	Individual	Chris Chavez	Salt River Project	X		X		X	X				
4.	Individual	Sandra Shaffer	PacifiCorp	X		X		X	X				
5.	Individual	John Canavan	NorthWestern Energy	X									

1. **Do you agree the proposed standard is being developed in a fair and open process, using the associated Regional Reliability Standards Development Procedure?**

Summary Consideration: All commenters agreed the BAL-004-WECC-2 Standard was developed in a fair and open process. In developing the BAL-004-WECC-2 Regional Reliability Standard the Process for Developing and Approving WECC Standards was followed until February 29, 2012 and the Reliability Standards Development Procedures were followed after March 1, 2012.

Organization	Yes or No	Question 1 Comment
Bonneville Power Administration	Yes	
Constellation Energy	Yes	
Salt River Project	Yes	
PacifiCorp	Yes	
NorthWestern Energy	Yes	

2. Does the proposed standard pose an adverse impact to reliability or commerce in a neighboring region or interconnection?

Summary Consideration: The commenters do not believe the standard poses an adverse impact to reliability or commerce.

Organization	Yes or No	Question 2 Comment
Bonneville Power Administration	No	
Constellation Energy	No	
Salt River Project	No	
PacifiCorp	No	
NorthWestern Energy	No	

3. Does the proposed standard pose a serious and substantial threat to public health, safety, welfare, or national security?

Summary Consideration: The commenters do not believe the standard poses a serious and substantial threat to public health, safety, welfare, or national security.

Organization	Yes or No	Question 3 Comment
Bonneville Power Administration	No	
Constellation Energy	No	
Salt River Project	No	
PacifiCorp	No	
NorthWestern Energy	No	

4. Does the proposed standard pose a serious and substantial burden on competitive markets within the interconnection that is not necessary for reliability?

Summary Consideration: The commenters do not believe the BAL-004-WECC-2 Standard poses a serious and substantial burden on competitive markets within the interconnection that is not necessary for reliability.

Organization	Yes or No	Question 4 Comment
Bonneville Power Administration	No	
Constellation Energy	No	
Salt River Project	No	
PacifiCorp	No	
NorthWestern Energy	No	

5. **Does the proposed regional reliability standard meet at least one of the following criteria?**
   - **The proposed standard has more specific criteria for the same requirements covered in a continent-wide standard**
   - **The proposed standard has requirements that are not included in the corresponding continent-wide reliability standard**
   - **The proposed regional difference is necessitated by a physical difference in the bulk power system.**

Summary Consideration: Four of the five commenters agreed with the standard drafting team that the proposed BAL-004-WECC-2 Standard met the criteria for a Regional Reliability Standard; i.e., the BAL-004-WECC-2 – Automatic Time Error Correction Standard contains automatic time-error correction requirements that are not contained in the NERC BAL-004-1 — Time Error Correction Standard. The other commenters expressed concern that, if controlling practices resulted in a value near the limit for Accumulated Primary Inadvertent Interchange and the Balancing Authority also experienced a meter reading error; they could incur a violation of Requirement R1. The drafting team reviewed the historical data for on-peak and off-peak Accumulated Primary Inadvertent Interchange of large and small Balancing Authorities operating in the Western Interconnection. The drafting team determined that 150 percent of the previous year's peak demand or peak generation (for generation-only Balancing Authorities) was a reasonable value when a Balancing Authority instituted good controlling practices when balanced against meter-reading corrections and the size of each Balancing Authority.

The entity that did not agree that the standard met the criteria above, did not explain why the BAL-004-WECC-2 Standard did not meet the regional standard criteria. Its comments were similar to the other comments.

Organization	Yes or No	Question 5 Comment
Bonneville Power Administration	Yes	
Constellation Energy	Yes	The proposed regional reliability standard meets these criteria, yet still poses several concerns, as follow:R1: The notion of a monthly limit on Accumulated Primary Inadvertent Interchange creates a potentially troublesome burden on Balancing Authorities, in that under this approach, significant system events occurring at the end of a month can have an undue impact on the performance metric. A Balancing Authority may be implementing ATEC and all other applicable control mechanisms

Organization	Yes or No	Question 5 Comment
		appropriately throughout the month and still experience Primary Inadvertent balances that approach the defined limit for monthly performance. In such an instance, a significant system event occurring on the last day, or even the last hour, of the month could force a Balancing Authority out of compliance with this requirement. Given that the intent of this requirement is to ensure that Balancing Authorities' Primary Inadvertent balances are limited on an ongoing basis, there are other metrics that would similarly provide limitations, while better recognizing that the maintenance of appropriate Inadvertent Balances is a continual effort. It is preferable to utilize a metric that avoids overemphasizing the impact of a significant and unanticipated system event merely because it occurs late in a given month. Much as CPS1 is measured on a rolling 12 month basis, recognizing that impacts to system frequency play out over longer time frames and can counteract each other on that larger scale, a rolling 12 month obligation would make sense for the management of Inadvertent balances. As with CPS1, a monthly calculation can be performed as a check-measure, with each monthly inadvertent value averaged into a rolling 12 month limitation. This still holds entities to comply with an Inadvertent balance limit of 150% of previous year's peak, but acknowledges that inadvertent is an ongoing concern, rather than an isolated monthly concern. This alternate approach also helps in protecting Balancing Authorities from the undue impact of a last minute event. R8: The exclusion of methods of Inadvertent management other than ATEC places an unreasonable limitation on the ability of a Balancing Authority to maintain compliance with R1. As R1 creates new obligations for entities, WECC should be open to new methodologies for compliance, especially those which are already acceptably used in other interconnections. While the prevention of stranding Secondary Inadvertent Interchange is a valid concern, the standard should not specifically prohibit the development of methodologies by which alternate Inadvertent management processes can be employed without stranding Secondary Inadvertent Interchange. As shown by historical practices, there are occasions where Balancing Authorities have had a need to enable bilateral mechanisms to manage these balances, so a prohibition is not appropriate. The drafting team should revise

Organization	Yes or No	Question 5 Comment
		R8 to allow for alternative methodologies for compliance.
Response: • After consideration of the rolling 12-month comment, the drafting team felt that Balancing Authorities, when maintaining good control, should not be operating at the limits or near the limits specified in Requirement R1 of BAL-004-WECC-02. If a Balancing Authority institutes good controlling practices, a single month-end meter correction should not result in a violation the 150 percent limit for either the on-peak or off-peak period. A rolling 12-month average could result in giving Balancing Authorities the perception of acceptable performance measures by masking a bad meter. One of the intents of BAL-004-WECC-02 and the WECC Variance to BAL-001-0.1a is for Balancing Authorities to identify the bad meters as soon as possible and make corrections. • The drafting team does not believe the wording of Requirement R8 precludes the development of new or alternate methodologies to correct Inadvertent and/or Primary Inadvertent Interchange. The intent of Requirement R8 prohibits the use of methodologies that are known to strand Secondary Inadvertent Interchange across the Western Interconnection, which a bilateral exchange does.		
Salt River Project	Yes	
PacifiCorp	Yes	PacifiCorp is concerned with treatment of after-the-fact corrections of Primary Inadvertent Interchange and the potential for after-the-fact violations. For example, if a meter error is discovered and the meter has accumulated inadvertent for a long period of time, when the correction is made to fix all past values for that meter, it could put accumulated inadvertent into the violation range. Currently, entities are required to make this correction as soon as possible. Would entities now be required to make the after-the-fact corrections slowly, in order to not push accumulated inadvertent values beyond acceptable levels? Or will entities now be required to make the correction at the beginning of the month in order to have enough time to return the accumulated inadvertent to acceptable levels prior to the end of the month?
Response: • As long as corrections for errors to Primary Inadvertent Interchange are made within the 90-day limit per Requirement R2, the		

Organization	Yes or No	Question 5 Comment
standard does not prescribe when those corrections should be made.		
NorthWestern Energy	No	R1. Following the conclusion of each month each Balancing Authority shall verify that the absolute value of its Accumulated Primary Inadvertent Interchange (PIIaccum) for both the On-Peak period and the Off-Peak period are each individually less than or equal to: 1.1. For load-serving Balancing Authorities, 150% of the previous calendar year's integrated hourly Peak Demand. This requirement would tie entities' hands if they acquired a large accumulation of primary inadvertent. Our requirement would be 150% of the previous calendar year's integrated hourly peak demand, looking at a conservative year the peak demand could be estimated at 1650 MW. 150% of 1650 equals 2475 MW. Under this new standard we would be required to keep our primary inadvertent accumulation under 2475 MW at the conclusion of each month. This should not be an issue on a normal operating basis but if an error was found in the primary inadvertent calculation and we corrected the error from the time of its occurrence to the current hour we could end up with a large accumulation. We would have to pay back or reduce the accumulated primary inadvertent to below 2475 MW before the month's end. R2. Each Balancing Authority shall, upon discovery of an error in the calculation of PIIhourly, recalculate within 90 days, the value of PIIhourly and adjust the PIIaccum from the time of the error. [Violation Risk In this requirement we do not like the 90 day limit. We understand the intent to have BAs correct the error in a reasonable time frame but undue circumstances could prevent a re-calculation from happening as fast as we would like and the 90 day limit opens the door for a possible compliance violation.R3. Each Balancing Authority shall keep its Automatic Time Error Correction (ATEC) in service, with an allowable exception period of less than or equal to an accumulated 24 hours per calendar quarter for ATEC to be out of service. [Violation Risk Factor: Medium] [Time Horizon: Same-day Operations] In this requirement we do not like only being able to have ATEC out of service for up to 24 hours per calendar quarter. This requirement is in the current BAL-004-WECC-1 standard and we almost ran into issues when we had to take a generator offline. The 24 hours per calendar quarter seems like a very small time

Organization	Yes or No	Question 5 Comment
		frame given certain system conditions or events.

Response:

- Regarding the comment for R1: As long as corrections for errors are made within the 90-day limit per Requirement R2, the standard does not prescribe when those corrections should be made to Primary Inadvertent Interchange. If a Balancing Authority institutes good controlling practices, a single month-end meter correction should not result in a violation the 150 percent limit for either the on-peak or off-peak period.
- Regarding the comment for R2: The drafting team believes that 90 days are sufficient for correcting an error.
- Regarding the comment for R3: The drafting team believes the accumulative 24-hour exception period per quarter in Requirement R3 is the appropriate amount of time for ATEC to be out of service. By having an exception period in Requirement R3 the drafting team recognizes that there are times when Balancing Authorities are required to or have no choice other than to operate in other modes. The intent of the drafting team is to minimize these periods. Balancing Authorities should have policies and procedures in place to maintain control and to meet these time frames.

END OF REPORT

Ballot Pool Members
Final Ballot Results
BAL-004-WECC-2
BAL-001-0-1.a
Attachment Q

Below are the ballot results, summary, and individual pool results for BAL-004-WECC-2 Automatic Time Error Correction, and BAL-001-1-1.a. Real Power Balancing Control Performance.

Ballot Results – Adjusted for Affiliates

Ballot Name: .....BAL-004-WECC-002(WECC Standard), Automatic Time Error Correction (ATEC) WECC Variance to BAL-001-0.1a - Real Power Balancing Control Performance

Ballot Period:.....4/2/2012 - 5/18/2012

Total # Votes:.....154

Total Ballot Pool:.....168

Quorum: 91.7%

Weighted Sector Vote: 93.1%

Ballot Results: .....The Standard has Passed

Summary of Ballot Results – Adjusted for Affiliates

Sectors	Ballot Pool	Sector Weight	Affirmative # Votes	Fraction	Negative # Votes	Abstain # Votes	Did Not Cast a Vote
Distribution	29	1	24	0.96	1	2	2
End User Representative	1	0.1	1	0.1	0	0	0
Generation	32	1	23	0.96	1	3	5
Marketers and Brokers	33	1	26	0.93	2	4	1
Other Non-Registered Entities	5	0.4	3	0.3	1	0	1
State and Provincial Representatives	2	0.2	2	0.2	0	0	0
System Coordination	31	1	26	0.93	2	1	2
Transmission	35	1	28	0.93	2	2	3

Totals	**168**	**5.70**	**133**	**5.31**	**9**	**12**	**14**

Individual Ballot Pool Results

Sector	Organization	Member	Ballot	Comments
Distribution	Seattle City Light	Dana Wheelock	Affirmative	
Distribution	Southern California Edison	Steven Mavis	Affirmative	
Distribution	Tucson Electric Power	John Tolo	Affirmative	
Distribution	Grays Harbor County PUD	Wesley Gray	No Vote	
Distribution	Avista Corp	Scott Kinney	Negative	View
Distribution	Basin Electric Power Cooperative	David Rudolph	No Vote	
Distribution	Public Utility District No. 1 of Cowlitz County (Cowlitz PUD)	Russell Noble	Abstain	
Distribution	Tri-State Generation and Transmission Association, Inc.	Janelle Marriott-Gill	Affirmative	
Distribution	Bonneville Power Administration	Rebecca Berdahl	Affirmative	View
Distribution	BC Hydro and Power Authority	Pat Harrington	Affirmative	
Distribution	El Paso Electric	Claudia Deneen	Affirmative	
Distribution	PacifiCorp	Scott Smith	Affirmative	
Distribution	Public Service Company of Colorado (Xcel Energy)	Kelly Bloch	Affirmative	
Distribution	Public Service Company of New Mexico	Laurie Williams	Affirmative	
Distribution	Public Utility District No. 1 of Chelan County (CHPD)	Steve Wickel	Affirmative	
Distribution	Puget Sound Energy, Inc.	Don Yuen	Affirmative	View
Distribution	Sacramento Municipal Utility District	Joe Tarantino	Affirmative	
Distribution	Platte River Power Authority	Deborah Schaneman	Abstain	View
Distribution	Deseret Generation and Transmission Co-operative	Philip Tice	Affirmative	
Distribution	Colorado Springs Utilities	Warren Rust	Affirmative	
Distribution	City of Redding Electric Utility	Mary Downey	Affirmative	

Sector	Organization	Member	Ballot	Comments
Distribution	Tacoma Power	Renee Knarreborg	Affirmative	
Distribution	Modesto Irrigation District	Edward O'Brien	Affirmative	
Distribution	Western Area Power Administration - CRSP	Ken Otto	Affirmative	
Distribution	Western Area Power Administration - Desert Southwest Region	Mike Olson	Affirmative	
Distribution	Western Area Power Administration - LAP	Jeff Ackerman	Affirmative	
Distribution	Western Area Power Administration - Upper Great Plains Region	Jody Sundsted	Affirmative	
Distribution	Arizona Public Service Company	Jacob Tetlow	Affirmative	
End User Representative	Utah Association of Energy Users	Caitlin Liotiris	Affirmative	
Generation	BC Hydro and Power Authority	Clement Ma	Affirmative	
Generation	Iberdrola Renewables	Joe Polen	No Vote	
Generation	Los Angeles Department of Water and Power	Kenneth Silver	No Vote	
Generation	PacifiCorp	Susan Mosco	Affirmative	
Generation	PPL Montana	Leland McMillan	Affirmative	
Generation	Public Service Company of Colorado (Xcel Energy)	Dan Lusk	Affirmative	
Generation	Public Service Company of New Mexico	Laurie Williams	Affirmative	
Generation	Public Utility District No. 1 of Chelan County (CHPD)	John Yale	Affirmative	
Generation	Sacramento Municipal Utility District	Joe Tarantino	Affirmative	
Generation	Seattle City Light	Mike Haynes	Affirmative	
Generation	Southern California Edison	Denise Yaffe	Affirmative	
Generation	Tucson Electric Power	John Tolo	Affirmative	
Generation	NextEra Energy Resources	Mark Mango	Affirmative	
Generation	Burney Forest Power	Alan Bull	Abstain	

Sector	Organization	Member	Ballot	Comments
Generation	Avista Corp	Steve Wenke	Affirmative	
Generation	Basin Electric Power Cooperative	Mike Fluharty	Affirmative	
Generation	Coso Energy Developers	Ellen Allman	No Vote	
Generation	Coso Finance Partners	Ellen Allman	No Vote	
Generation	Coso Power Developers	Ellen Allman	No Vote	
Generation	Public Utility District No. 1 of Cowlitz County (Cowlitz PUD)	Russell Noble	Abstain	
Generation	DGC Operations, LLC NCR00125	Wayne Forsyth	Abstain	
Generation	NAES Corporation - Dave Gates Generating Station at Mill Creek	Angela Small	Affirmative	
Generation	Terra-Gen Dixie Valley, LLC	Ellen Allman	No Vote	
Generation	CalPeak Power LLC	Alan Bull	Abstain	
Generation	Cabrillo Power II, LLC	Brian Theaker	No Vote	
Generation	Colorado Springs Utilities	Paul Morland	Affirmative	
Generation	Puget Sound Energy, Inc.	Tom Flynn	Affirmative	
Generation	Deseret Generation and Transmission Co-operative	Philip Tice	Affirmative	
Generation	Platte River Power Authority	Roland Thiel	Abstain	
Generation	City of Redding Electric Utility	Mary Downey	Affirmative	
Generation	Arizona Public Service Company	Chris Cambridge	Affirmative	
Generation	GenOn Energy Inc.	John Chillemi	Affirmative	
Generation	Modesto Irrigation District	Edward O'Brien	Affirmative	
Generation	CER Generation II, LLC	Mary Lynch	Negative	View
Generation	Tacoma Power	Claire Lloyd	Affirmative	
Generation	Cabrillo Power I, LLC	Brian Theaker	No Vote	
Generation	El Segundo Power, LLC	Brian Theaker	No Vote	
Marketers and Brokers	Bonneville Power Administration	Brenda Anderson	Affirmative	View

Sector	Organization	Member	Ballot	Comments
Marketers and Brokers	Morgan Stanley Capital Group Inc.	Deborah Hart	Abstain	View
Marketers and Brokers	PacifiCorp	Dan Zollner	Affirmative	
Marketers and Brokers	PPL EnergyPlus, LLC	Jon Williamson	Affirmative	
Marketers and Brokers	Public Service Company of Colorado (Xcel Energy)	David Lemmons	Affirmative	
Marketers and Brokers	Public Service Company of New Mexico	Laurie Williams	Affirmative	
Marketers and Brokers	Public Utility District No. 1 of Chelan County (CHPD)	Hugh Owen	Affirmative	
Marketers and Brokers	Sacramento Municipal Utility District	Joe Tarantino	Affirmative	
Marketers and Brokers	Seattle City Light	Dennis Sismaet	Affirmative	
Marketers and Brokers	Southern California Edison	Lujuanna Medina	Affirmative	
Marketers and Brokers	Black Hills Corporation	Andy Butcher	Affirmative	
Marketers and Brokers	Avista Corp	Brent Guyer	Negative	View
Marketers and Brokers	Clatskanie PUD	Tami Keith	Abstain	
Marketers and Brokers	Public Utility District No. 1 of Cowlitz County (Cowlitz PUD)	Russell Noble	Abstain	
Marketers and Brokers	NRG Energy, Inc.	Brian Theaker	Affirmative	
Marketers and Brokers	Tri-State Generation and Transmission Association, Inc.	Janelle Marriott-Gill	Affirmative	
Marketers and Brokers	Platte River Power Authority	Carol Ballantine	Abstain	
Marketers and Brokers	Colorado Springs Utilities	Paul Morland	Affirmative	
Marketers and Brokers	Deseret Generation and Transmission Co-operative	Philip Tice	Affirmative	
Marketers and Brokers	Portland General Electric Company	JJ Jamieson	Affirmative	

Sector	Organization	Member	Ballot	Comments
Marketers and Brokers	Arizona Public Service Company	Gordon Scheinost	Affirmative	
Marketers and Brokers	City of Redding Electric Utility	Mary Downey	Affirmative	
Marketers and Brokers	Puget Sound Energy, Inc.	Erin Apperson	Affirmative	View
Marketers and Brokers	Tenaska Power Services	Anthony Brill	No Vote	
Marketers and Brokers	Sempra Generation	Emily Shults	Affirmative	
Marketers and Brokers	GenOn Energy Inc.	John Chillemi	Affirmative	
Marketers and Brokers	Modesto Irrigation District	Edward O'Brien	Affirmative	
Marketers and Brokers	Western Area Power Administration - CRSP	Ken Otto	Affirmative	
Marketers and Brokers	Western Area Power Administration - Desert Southwest Region	Allan Austin	Affirmative	
Marketers and Brokers	Western Area Power Administration - LAP	Jeff Ackerman	Affirmative	
Marketers and Brokers	Western Area Power Administration - Sierra Nevada Region Merchant	Charles Faust	Affirmative	
Marketers and Brokers	Constellation Energy Commodities Group, Inc.	Mary Lynch	Negative	View
Other Non-Registered Entities	enXco	Walt Bukowski	No Vote	
Other Non-Registered Entities	Constellation Energy Control and Dispatch, LLC	CJ Ingersoll	Negative	View
Other Non-Registered Entities	Mariner Consulting Services, Inc.	John Stout	Affirmative	
Other Non-Registered Entities	Utility System Efficiencies, Inc.	Robert Dintelman	Affirmative	
Other Non-Registered Entities	SAIC Energy Environment and Infrastructure LLC	Duncan Brown	Affirmative	
State and Provincial Representatives	California Energy Commission	Bill Chamberlain	Affirmative	

Sector	Organization	Member	Ballot	Comments
State and Provincial Representatives	Public Service Commission of Utah	Ric Campbell	Affirmative	
System Coordination	Arizona Public Service Company	Robert Smith	Affirmative	
System Coordination	Bonneville Power Administration	Fran Halpin	Affirmative	View
System Coordination	BC Hydro and Power Authority	Patricia Robertson	Affirmative	
System Coordination	California Independent System Operator	Richard Vine	Negative	View
System Coordination	Los Angeles Department of Water and Power	Kenneth Silver	No Vote	
System Coordination	NV Energy	Richard Salgo	Affirmative	
System Coordination	PacifiCorp	Ryan Millard	Affirmative	
System Coordination	Public Service Company of Colorado (Xcel Energy)	Robert Staton	Affirmative	
System Coordination	Public Utility District No. 1 of Chelan County (CHPD)	John Appel	Affirmative	
System Coordination	Puget Sound Energy, Inc.	Mike Tongue	Affirmative	View
System Coordination	Sacramento Municipal Utility District	Joe Tarantino	Affirmative	
System Coordination	Seattle City Light	Pawel Krupa	Affirmative	
System Coordination	Southern California Edison	Lujuanna Medina	Affirmative	
System Coordination	Tucson Electric Power	John Tolo	Affirmative	
System Coordination	Balancing Authority of Northern California	Joseph Tarantino	Affirmative	
System Coordination	Black Hills Corporation	Alvin Pinkston	Affirmative	
System Coordination	Avista Corp	Scott Kinney	Negative	View
System Coordination	Tri-State Generation and Transmission Association, Inc.	Mary Ann Zehr	Affirmative	

Sector	Organization	Member	Ballot	Comments
System Coordination	Colorado Springs Utilities	Jennifer Eckels	Affirmative	
System Coordination	Platte River Power Authority	John Collins	Abstain	
System Coordination	Deseret Generation and Transmission Co-operative	Philip Tice	Affirmative	
System Coordination	City of Redding Electric Utility	Mary Downey	Affirmative	
System Coordination	Tacoma Power	Twila Hofer	Affirmative	
System Coordination	Modesto Irrigation District	Edward O'Brien	Affirmative	
System Coordination	Western Area Power Administration - Rocky Mountain Region	Orlando Reyes	Affirmative	
System Coordination	Western Area Power Administration - Sierra Nevada Region Merchant	Charles Faust	Affirmative	
System Coordination	Western Area Power Administration - Upper Great Plains Region	Lloyd Linke	Affirmative	
System Coordination	Rocky Mountain Reserve Group	Robert Johnson	Affirmative	
System Coordination	Western Electricity Coordinating Council	Linda Perez	No Vote	
Transmission	Public Service Company of Colorado (Xcel Energy)	Robert Staton	Affirmative	
Transmission	Public Service Company of New Mexico	Laurie Williams	Affirmative	
Transmission	Public Utility District No. 1 of Chelan County (CHPD)	Chad Bowman	Affirmative	
Transmission	Sacramento Municipal Utility District	Joe Tarantino	Affirmative	
Transmission	Seattle City Light	Hao Li	Affirmative	
Transmission	Southern California Edison	Steven Mavis	Affirmative	
Transmission	Southwest Transmission Cooperative, Inc. (SWTC)	John Shaver	Affirmative	
Transmission	NextEra Energy Resources	Mark Mango	Affirmative	

Sector	Organization	Member	Ballot	Comments
Transmission	Grays Harbor County PUD	Wesley Gray	No Vote	
Transmission	Avista Corp	Scott Kinney	Negative	View
Transmission	Basin Electric Power Cooperative	Daniel Klempel	Affirmative	
Transmission	Public Utility District No. 1 of Cowlitz County (Cowlitz PUD)	Russell Noble	Abstain	
Transmission	Bonneville Power Administration	Don Watkins	Affirmative	View
Transmission	BC Hydro and Power Authority	Devinder Ghangass	Affirmative	
Transmission	California Independent System Operator	Richard Vine	Negative	View
Transmission	Deseret Generation and Transmission Co-operative	James Tucker	No Vote	
Transmission	Farmington Electric Utility System	Linda Jacobson-Quinn	Affirmative	
Transmission	NV Energy	Richard Salgo	Affirmative	
Transmission	PacifiCorp	Kelly Cumiskey	Affirmative	
Transmission	Tucson Electric Power	John Tolo	Affirmative	
Transmission	Clark Public Utilities	Jack Stamper	Affirmative	
Transmission	Tacoma Power	Joseph Wilson	Affirmative	
Transmission	Platte River Power Authority	Terry Baker	Abstain	
Transmission	Puget Sound Energy, Inc.	Denise Lietz	Affirmative	View
Transmission	Colorado Springs Utilities	Warren Rust	Affirmative	
Transmission	Arizona Public Service Company	Steven Norris	Affirmative	
Transmission	Tri-State Generation and Transmission Association, Inc.	Tracy Sliman	Affirmative	
Transmission	Modesto Irrigation District	Edward O'Brien	Affirmative	
Transmission	Western Area Power Administration - Desert Southwest Region	Mike Olson	Affirmative	
Transmission	Western Area Power Administration - Rocky Mountain Region	Bob Easton	Affirmative	

Sector	Organization	Member	Ballot	Comments
Transmission	Western Area Power Administration - Sierra Nevada Region	Pete Garris	Affirmative	
Transmission	Western Area Power Administration - Upper Great Plains Region	Steve Sanders	Affirmative	
Transmission	CHPD	Chad Bowman	No Vote	

Final Ballot Results Minority Issues
WECC-0068 Modification of BAL-004-WECC-1
Automatic Time Error Correction
Attachment X

Below please find the Final Ballot results and the actual comments submitted with each negative vote.

Ballot Results - Adjusted for Affiliates

Ballot Name:	BAL-004-WECC-002(WECC Standard), Automatic Time Error Correction (ATEC) WECC Variance to BAL-001-0.1a - Real Power Balancing Control Performance
Ballot Period:	4/2/2012 - 5/18/2012
Total # Votes:	154
Total Ballot Pool:	168
Quorum:	91.7%
Weighted Sector Vote:	93.1%
Ballot Results:	The Standard has Passed

Summary of Ballot Results - Adjusted for Affiliates

Sectors	Ballot Pool	Sector Weight	Affirmative		Negative	Abstain	Did Not Cast a Vote
			# Votes	Fraction	# Votes	# Votes	
Distribution	29	1	24	0.96	1	2	2
End User Representative	1	0.1	1	0.1	0	0	0
Generation	32	1	23	0.96	1	3	5
Marketers and Brokers	33	1	26	0.93	2	4	1
Other Non-Registered Entities	5	0.4	3	0.3	1	0	1
State and Provincial Representatives	2	0.2	2	0.2	0	0	0
System Coordination	31	1	26	0.93	2	1	2
Transmission	35	1	28	0.93	2	2	3
Totals	**168**	**5.70**	**133**	**5.31**	**9**	**12**	**14**

Ballot:	BAL-004-WECC-002
Sector:	Distribution Marketers and Brokers System Coordination Transmission
Name:	Scott Kinney Brent Guyer
Company:	Avista Corp
Vote:	Negative
Comments:	Avista supports the standard in general but does not agree with R1.1, which allows a BA to carry a primary inadvertent balance of 150% of peak load without requiring action. This is a significant balance for some BAs. Action should be taken way before balances reach this level based on previous experience in the interconnection. A more appropriate level would be 75-100% of peak load. Avista provided this same comment during standard development.

Comments

Ballot:	BAL-004-WECC-002
Sector:	Generation Marketers and Brokers
Name:	Mary Lynch
Company:	CER Generation II, LLC Constellation Energy Commodities Group, Inc.
Vote:	Negative
Comments:	Concern: The variance language: “the transition to controlling and reporting using the ATEC ACE should be minimal” under-represents the imposition of the variance on certain entities. CECD operates in both the EAST and WEST. As proposed, this standard will require a customized implementation fix in the system to allow for RAW ACE CPS in the East and ATEC ACE and CPS in the WEST. It is not clear that the expense and burden is justified by reliability gains. In addition, given that ACE is a factor used to determine DCS recovery it is not clear whether ATEC ACE will be used in BAL-002. Please clarify. Concern: In response to the FERC directive to provide clarity around what is a large accumulation and ensuring action by the responsible entity to act to reduce its inadvertent, WECC proposes establishing a limit on Accumulated Primary Inadvertent Interchange for on-peak and off-peak. This is problematic and contradictory to the function and history of inadvertent accounts. Inadvertent accounts came to be and were not historically subject to limits because of the unpredictable nature of balancing a system. Events that are beyond the control of a Balancing Authority such as loss of generation, transmission outages, load variation, etc., are not an acceptable basis for a

	standards violation. If an event or string of events occurs near the end of a month, there may not be an opportunity to make a correction and become compliant. This condition may be aggravated by the standards requirement that Inadvertent be paid back only through ATEC rather than through bilateral or unilateral payback arrangements. Instead, we suggest using the limit as a definition of large inadvertent accumulation that requires implementation of corrective measures. Further, we also suggest eliminating the requirement that prohibits other forms of Inadvertent Payback to allow more flexibility for controlling the accumulated balance. There may also need to be a definition of unilateral payback reflecting intent as part of the definition and clarifying that a unilateral payback must be confirmed as a unilateral payback and not determined merely because the raw data looks to include unilateral payback. Instances may occur in which an inadvertent condition relates to an operating condition. The data may appear to be a unilateral payback when in fact it is not the case. No violations should be issued based on appearances.

Comments

Ballot:	BAL-004-WECC-002
Sector:	System Coordination Transmission
Name:	Richard Vine
Company:	California Independent System Operator
Vote:	Negative
Comments:	The CAISO's only material objection relates to R4: We believe that WIT should be the source of WECC PII calculations to ensure consistency across the entire Reliability Region. We are unsure how else this can occur. It seems like the language is a compromise, which forces BA's to manage "true ups" with their counterparts where individual PII numbers potentially won't match. This also seems like a function WECC would want to control, as well as be able to replicate. This approach should also make for better WECC tracking and monitoring going forward (just like it is done today).

Regional Reliability Standard Submittal Request
Attachment M

Region:	**Western Electricity Coordinating Council**
Regional Standard Number:	**WECC Standard BAL-004-WECC-02**
Regional Standard Title:	**Automatic Time Error Correction**
Date Submitted:	**October 24, 2012**
Regional Contact Name:	**Steven L. Rueckert**
Regional Contact Title:	**Director of Standards**
Regional Contact Telephone Number:	**(801) 883-6878**

Request (check all that apply):

- ☐ Approval of a new standard
- ☒ Revision of an existing standard
- ☐ Withdrawal of an existing standard
- ☐ Urgent Action

Has this action been approved by your Board of Directors:

- ☒ Yes
- ☐ No

(If no please indicate date standard action is expected along with the current status (e.g., third comment period with anticipated board approval on mm/dd/year)):

BAL-004-WECC-02 Automatic Time Error Correction and the BAL-001-0.1a WECC Variance were approved by the WECC Board of Directors On June 25, 2012, along with a resolution that BAL-004-WECC-01 be withdrawn upon the Effective Date if BAL-004-WECC-02. The vote was unanimous.

[Note: The purpose of the remaining questions is to provide NERC with the

information needed to file the regional standard(s) with FERC. The information provided may to a large degree be used verbatim. It is extremely important for the entity submitting this form to provide sufficient detail that clearly delineates the scope and justification of the request.]	
Concise statement of the basis and purpose (scope) of request:	The purpose of this request is to make FERC directed modifications to the BAL-004-WECC-01, Automatic Time Error Correction Regional Standard. Additionally, WECC staff and the drafting team have proposed modificiations that clarify the intent, but do not change the overall requirements. As required by FERC the proposed changes: 1) clarify and define restrictions on Primary Inadvertent Interchange (PII), 2) clarify the method used to calculate accumulated Automatic Time Error Correction (ATEC) out-of-service time, 3) modify the Violation Risk Factors, and 4) provide Violation Severity Levels for each requirement. This request is being made in conjunction with proposed changes to BAL-001-0.1a that provide ATEC defining equations for use in Area Control Error (ACE) operation in the WECC Region.
Concise statement of the justification of the request:	The justification for the refinements to WECC Regional Reliability Standard BAL-004-WECC-2 – Automatic Time Error Correction is to implement the directives in FERC Order 723 and to make other clarifications that the industry deems necessary, while maintaining the Western Interconnection's reliability. In addition to complying with the FERC order, the proposed changes clarify and make the standard more useable thereby improving system operation. The resultant documents propose an alternative methodology for calculating Area Control Error.

Regional Reliability Standard Submittal Request
Attachment N

Region:	**Western Electricity Coordinating Council**
Regional Standard Number:	**WECC Regional Variance to BAL-001-0.1a**
Regional Standard Title:	**Real Power Balancing Control Performance**
Date Submitted:	**October 24, 2012**
Regional Contact Name:	**Steven L. Rueckert**
Regional Contact Title:	**Director of Standards**
Regional Contact Telephone Number:	**(801) 883-6878**

Request (check all that apply):

- ☐ Approval of a new standard
- ☒ Revision of an existing standard
- ☐ Withdrawal of an existing standard
- ☐ Urgent Action

Has this action been approved by your Board of Directors:

- ☒ Yes
- ☐ No

(If no please indicate date standard action is expected along with the current status (e.g., third comment period with anticipated board approval on mm/dd/year)):

BAL-004-WECC-02 Automatic Time Error Correction and the BAL-001-0.1a WECC Variance were approved by the WECC Board of Directors On June 25, 2012, along with a resolution that BAL-004-WECC-01 be withdrawn upon the Effective Date if BAL-002-WECC-02. The vote was unanimous.

[Note: The purpose of the remaining questions is to provide NERC with the information needed to file the regional standard(s) with FERC. The information provided may to a large degree be used verbatim. It is extremely important for the entity submitting this form to

provide sufficient detail that clearly delineates the scope and justification of the request.]	
Concise statement of the basis and purpose (scope) of request:	The purpose of the proposed WECC Regional Variance in BAL-001-0.1a Real Power Balancing Control Performance is to provide a method for Balancing Authorities (BA) to control to a point that will automatically schedule Primary Inadvertent Interchange back to other Balancing Authorities. Specifically, it is requested that the standards are modified as follows: 1. Add Requirement and Measures, Section E.B.1 through E.B.3, as a WECC Regional Variance which requires use of an Area Control Equation (ACE) that uses an Automatic Time Error Correction (ATEC) term. The equation is currently contained in BAL-004-WECC-01 but is reformatted to conform with BAL-001-0.1a. In the WECC Region, this will be used in lieu of Requirement R1 and Section D.2. The formula and calculation of the ATEC term and revised ACE equation are provided in the Requirement and Measures, Section E.B.1. through E.B.3. 2. Withdrawal of BAL-001-0.1a Appendix 2 Interpretation of Requirement R1 and the BAL-003-0.1b Appendix 1 Interpretation of Requirement R3. These are no longer needed since the addition of the WECC Regional Variance eliminates the need for these interpretations.
Concise statement of the justification of the request:	Replacing the NERC ACE equation with an ATEC ACE equation is an alternative methodology with the same reliability objective as the existing BAL-001-0.1a standard. It uses the approved method of automatically scheduling back Primary Inadvertent Interchange (PII) to other BA's by changing the BA's control performance target to provide payback of PII. To limit risk and excessive correction rates, the time-error correction portion of output is limited to within a predefined range called L_{max}. which is also defined in the variance. The proposed changes to BAL-001-0.1a are being requested in conjunction with proposed changes for BAL-004-WECC-02. Together the changes will eliminate confusion and will unify CPS reporting results with actual operating practices. Overall this will improve system operations.

EXHIBIT J

Standard Drafting Team Roster

WECC Standards Committee Roster
WECC-0068 Modification of BAL-004-WECC-1
Automatic Time Error Correction

New Actions Settings View: **Standard View**

First Name	Last Name	Company	Sector	Role
Angela	Small	NAES	Generation	Member
Gregory	Maxfield	Pacificorp	Marketers and Brokers	Member
Crystal	Musselman	Proven Compliance Solutions	Other Non-Registered Entities	Member
Jerry	Murray	Oregon Public Utility Commission	State and Provincial	Member
Joseph	Tarantino	Sacramento Municipal Utility District	System Coordinator	Member
Dana	Cabbell	Southern California Edison	Transmission	Member
Glen	Hoisington	FEUS	Distribution	Member
Rick	Noger	Praxair	End User	Member
John	Meyer	Non-Affiliate Director / WSC Chair	Non-Affiliate Director / WSC C	Chair