A. Introduction

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

2. **Number:** BAL-004-WECC-4

3. **Purpose:** To maintain Western Interconnection (WI) frequency, and ensure that time error accumulation via Primary Inadvertent Interchange (PII) payback is conducted in a manner that does not result in a negative impact on reliability.

4. **Applicability:**

   4.1. Functional Entities:

   4.1.1. Balancing Authorities operating synchronously within the WI

5. **Effective Date:** The first day of the second quarter following regulatory approval.

6. **Background:**

   Pre-2000 (prior to mandatory Standards), the Western Electricity Coordinating Council (WECC) operated using the Minimum Operating Reliability Criteria (MORC). Per MORC Section D. Time Control, Control Areas were required to assist in maintaining frequency at or near 60.0 Hz, as prescribed in the Western System Coordinating Council (WSCC)[1] Procedure for Time Error Control (PTEC). Various versions of the PTEC predate 1980.

   In February 2003, the WECC Automatic Time Error Correction (ATEC) Procedure (Procedure) became effective for all Balancing Authorities in the WI. The original intent of the Procedure was to minimize the number of manual Time Error Corrections in the WI.[2]

   In June 2007, the Procedure was translated into BAL-STD-004-1, Time Error Correction, followed by BAL-004-WECC-1 through 3, Time Error Correction.[3] BAL-004-WECC-1 required Balancing Authorities within the WI to maintain Interconnection frequency within a predefined frequency profile, and to ensure that Time Error Corrections would not result in a negative impact on Interconnection reliability.

   In September 2009, in response to Federal Energy Regulatory Commission (FERC) Order 723, WECC received Standard Authorization Request (SAR) WECC-0068 requesting modification of BAL-004-WECC-1. Modifications were effective April 1, 2014, creating BAL-004-WECC-2. BAL-004-WECC-2 introduced two performance metrics: 1) in Requirement R1, a 150% metric, and 2) in Requirement R2, a 90-day metric. Neither of these metrics are supported by technical studies. They were included in BAL-004-WECC-

[1] WECC began in 1967 as the Western Systems Coordinating Council (WSCC), a group of 40 power systems with a common goal of providing reliable power to the public whom they served. WECC was founded March 22, 1994.

[2] The Procedure provided for cost assignment and equitable payback of Inadvertent Interchange, not otherwise addressed in BAL-004-4, Time Error Correction.

[3] See Version History Table.

2 as a compromise during drafting.

In May 2018, FERC approved minor revisions to BAL-004-WECC-2 as part of WECC SAR WECC-0124, effective October 1, 2018, creating BAL-004-WECC-3.[4]

In 2023, this Standard was reviewed as part of the WECC SAR WECC-0147. The drafting team noted: 1) Version 3, Requirement R5 migrated from the pre-2000 MORC without initial or subsequent technical support, and 2) R5 addresses capabilities of Automatic Generator Control (AGC) found in no other Standard, without mandating its use or stating how that capability interfaces with ATEC. R5 is retained herein until it can be properly addressed per a NERC Standard Authorization Request.

7. Standard-Only Definition:

7.1 Interchange Software:

This Standard uses the Standard-Only term "Interchange Software" to mean:

The single electronic confirmation tool identified by the Western Electricity Coordinating Council (WECC), or its successor, to be used by all Balancing Authorities throughout the Western Interconnection (WI), that serves as the primary means for confirmation and creation of the final record of Scheduled Net Interchange (NI_S[5]) and Actual Net Interchange (NI_A[6]), during all periods when the Interchange Software is available.

7.2. ATEC:

This Standard uses the term "ATEC" as defined in the WECC Regional Definitions section of the NERC Glossary of Terms Used in Reliability Standards.

[4] FERC Docket No. RD18-2-000. Effective Date October 1, 2018.
[5] Previously called Net Scheduled Interchange
[6] Previously called Net Actual Interchange

B. Requirements and Measures

R1. Each Balancing Authority shall use the Interchange Software as the sole source of data to calculate its ATEC. [Violation Risk Factor: Severe] [Time Horizon: Operations Assessment]

M1. Each Balancing Authority will have evidence that it used the Interchange Software as the sole source of data to calculate its ATEC, as required in Requirement R1.

Evidence may include, but is not limited to production of a corporate attestation or operating procedure indicating use of the Interchange Software as the sole source for calculating ATEC.

R2. Each Balancing Authority shall operate its system such that, the month-end absolute value of its On-Peak and Off-Peak, accumulated Primary Inadvertent Interchange (PIIaccum), as calculated by the Interchange Software, are each individually less than or equal to 150% of the previous calendar year's integrated hourly peak demand where peak demand is total load plus total exports. *[Violation Risk Factor Medium:] [Time Horizon: Operations Assessment]*

2.1. For new Balancing Authorities, the peak demand will be the maximum hourly integrated peak demand as it increases during the first year of operation.

M2. Each Balancing Authority will have evidence that it operated its system such that the month-end absolute value of its On-Peak and Off-Peak, accumulated Primary Inadvertent Interchange (PIIaccum), as calculated by the Interchange Software, are each individually less than or equal to 150% of the previous calendar year's integrated hourly peak demand where peak demand is total load plus total exports, average load in those hours, as calculated by the Interchange Software, per Requirement R2, or per the exception allowed in R2.1.

R3. Each Balancing Authority shall, upon discovery of an error in its On-Peak or Off-Peak Inadvertent Interchange calculation, recalculate and correct the Inadvertent Interchange values within 90 days from the time the error is discovered. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M3. Each Balancing Authority discovering an error in its On-Peak or Off-Peak Inadvertent Interchange calculation will have evidence that it recalculated and corrected the Inadvertent Interchange values, within 90 days from the time the error is discovered, as required in Requirement R3.

Evidence may include, but is not limited to:

- Screen shots from the Interchange Software;
- Screen shots from the Balancing Authority's internal software functions such as internal databases, spreadsheets, and displays;
- Dated archive files; and
- Historic data.

R4. Each Balancing Authority shall keep 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. This period is separate from any period during which the Interchange Software was unavailable. *[Violation Risk Factor: Medium] [Time Horizon: Same-day Operations]*

M4. Each Balancing Authority will have evidence that it kept ATEC in service as required in Requirement R4, subject to the allowable exceptions provided.

Evidence may include, but is not limited to:

- Screen shots from the Interchange Software;
- Screen shots from the Balancing Authority's internal software functions such as internal databases, spreadsheets, and displays;
- Dated archive files; and
- Historical data.

R5. Each Balancing Authority shall be able to change its Automatic Generation Control (AGC) operating mode to correspond to current operating conditions. *[Violation Risk Factor: Medium] [Time Horizon: Real-Time Operations]*

M5. Each Balancing Authority will have evidence that its AGC is able to change operating modes to correspond to current operating conditions, as required in R5.

Evidence may include, but is not limited to:

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

R6. Each Balancing Authority shall upload hourly Actual Net Interchange (NI_A) to the Interchange Software no later than 50 minutes after each hour. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M6. Each Balancing Authority will have evidence that it uploaded hourly Actual Net Interchange (NI_A) to the Interchange Software no later than 50 minutes after each hour, as required in Requirement R6.

Evidence may include, but is not limited to:

- Screen shots from the Interchange Software;
- Screen shots from the Balancing Authority's internal software functions such as internal databases, spreadsheets, and displays;
- Dated archive files; and
- Historical data.

R7. Each Balancing Authority making a month-end adjustment shall input that value as part of its Actual Net Interchange (NI_A). *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M7. Each Balancing Authority making a month-end adjustment will have evidence that it input that value as part of its Actual Net Interchange (NI_A), as required in Requirement R7.

R8. Each Balancing Authority making a month-end adjustment shall ensure that value is added to its accumulated Primary Inadvertent Interchange. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*

M8. Each Balancing Authority making a month-end adjustment will have evidence that the value was added to its accumulated Primary Inadvertent Interchange, as required in Requirement R8.

C. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority:

As defined in the NERC Rules of Procedure, "Compliance Enforcement Authority" means NERC or the Regional Entity in their respective roles of monitoring and enforcing compliance with the NERC Reliability Standards.

1.2. Evidence Retention:

The following evidence retention period(s) 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.

The applicable entity shall keep data or evidence to show compliance as identified below unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation.

- Each Balancing Authority in the WI shall keep the following records for the preceding calendar year (January – December) plus the current calendar year:
  - Its values for PIIhourly, PIIaccum (On-Peak and Off-Peak), ΔTE, and any month-end adjustments.
  - Documentation illustrating any period(s) during which the Balancing Authority operated without ATEC, including the reason ATEC was not in operation.

1.3 Compliance Monitoring and Enforcement Program:

As defined in the NERC Rules of Procedure, "Compliance Monitoring and Enforcement Program" refers to the identification of the processes that will be used to evaluate data or information for the purpose of assessing performance or outcomes with the associated Reliability Standard.

Violation Severity Levels

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1.	NA	NA	NA	The Balancing Authority failed to use the Interchange Software as the sole source to calculate ATEC.
R2.	Following the conclusion of each month each Balancing Authority's absolute value of PIIaccum 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 PIIaccum 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 PIIaccum 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 PIIaccum 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.
R3.	The Balancing Authority did not recalculate PIIhourly and adjust the PIIaccum 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 PIIhourly and adjust the PIIaccum 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 PIIhourly and adjust the PIIaccum 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 PIIhourly and adjust PIIaccum within 180 days of the discovery of the error.
R4.	The Balancing Authority operated during a calendar	The Balancing Authority operated during a calendar	The Balancing Authority operated during a calendar	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.
R5.	N/A	N/A	N/A	The Balancing Authority is not able to change its AGC operating mode to correspond to current operating conditions.
R6.	The Balancing Authority failed to upload hourly Actual Net Interchange to the Interchange Software no later than 50 minutes after each hour, but uploaded the required data in less than or equal to two hours.	The Balancing Authority failed to upload hourly Actual Net Interchange to the Interchange Software no later than 50 minutes after each hour, but uploaded the required data in less than or equal to four hours.	The Balancing Authority failed to upload hourly Actual Net Interchange to the Interchange Software no later than 50 minutes after each hour, but uploaded the required data in less than or equal to six hours.	The Balancing Authority failed to upload hourly Actual Net Interchange to the Interchange Software no later than 50 minutes after each hour, but uploaded the required data in more than six hours.
R7.	NA	NA	NA	The Balancing Authority making a month-end adjustment failed to input that value as part of its Net Actual Interchange.
R8.	NA	NA	NA	The Balancing Authority making a month-end adjustment failed to add that value to its accumulated Primary Inadvertent Interchange.

D. Regional Variances

None.

E. Associated Documents

None.

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.	
2	October 16, 2013	A FERC Letter Order was issued on October 16, 2013, approving BAL-004-WECC-02. This standard will become enforceable on April 1, 2014.	

Version	Date	Action	Change Tracking
3	December 6, 2017	Approved by the WECC Board of Directors.	Five-year review. The project: 1) relocates the Background section to the preamble of the Guidance section, 2) adds On-Peak and Off-Peak parameters in Requirement R1/M1, 3) addresses WECC Interchange Tool software successors throughout, 4) conforms the document to current drafting conventions (R1/M1, R4/M4), and 5) addresses non-substantive syntax and template concerns.
3	February 8, 2018	Adopted by the NERC Board of Trustees.	
3	May 30, 2018	FERC Order issued approving BAL-004-WECC-3. Docket No. RD18-2-000. Effective Date October 1, 2018.	
4	March 13, 2024	WECC Board of Directors Approved	This project: 1) expands the existing Background section, 2) creates a Standard-specific definition (Interchange Software); 3) creates a requirement to use the Interchange Software; 4) addresses treatment of Balancing Authorities that do not have a full year of operating data; 5) consolidates and clarifies requirements; and 6) updates the document to NERC's newest templates.

Standard Attachments

Not used.

G. Rationale

Nomenclature Update

To conform to NERC's definitional approach, the legacy term Net Actual Interchange (NAI) was replaced with Actual Net Interchange (NI_A). Net Scheduled Interchange (NSI) was replaced with Scheduled Net Interchange (NI_S). The legacy terms and the updated terms are synonymous.

Requirement R1:

The goal of Requirement R1 is to ensure a consistent ATEC calculation within the WI.

Because ATEC is an automatic process, allowing inconsistent calculation of ATEC will cause imbalance in accumulations.

Requirement R2:

The goal of Requirement R2 is to limit the amount of PII_{accum} that a Balancing Authority can have at the end of each month.

To reach the goal, 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 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.

This approach is required because PII_{accum} may grow from month-end adjustments and metering errors, even with the inclusion of I_{ATEC} in the ACE equation.

Requirement R3:

The goal of Requirement R3 is to promote: 1) the timely correction of errors in the calculation of PII and PII_{accum}, and 2) the accurate, fair, and timely payback of accumulated PII balances.

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}.

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.

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. As PII hourly is corrected, then PIIaccum should be recalculated.

Requirement R4:

The goal of Requirement R4 is to promote fair and timely payback of PII_{accum} balances by ensuring that ATEC remains in service whenever possible.

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

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.

Requirement R5:

A review of NERC Standards conducted by the Version 4 drafting team concluded that this Requirement is best located in a Standard focused on Automatic Generator Control (AGC). However, until an AGC-specific Standard is drafted, the Requirement should not be retired.

The goal of Requirement R5 is to ensure that AGC has the ability to respond to varying operating conditions.

Requirement R6:

Not used**.**

Requirement R7:

Not used.

Requirement R8:

Not used.