Exhibit A

Paragraph 81 Criteria

Exhibit A — Paragraph 81 Criteria

Paragraph 81 Criteria

The P 81 Team developed three criteria: (1) Criteria A: an overarching criteria designed to determine that there is no reliability gap created by the proposed retirement; (2) Criteria B: which consists of seven separate identifying criteria designed to recognize requirements appropriate for retirement; and (3) Criteria C: which consists of seven separate questions designed to assist the P 81 Team in making an informed decision regarding whether requirements are appropriate to propose for retirement.

In order for a Reliability Standard Requirement to be proposed for retirement, it must satisfy *both*: (i) Criteria A (the overarching criterion) and (ii) at least one of the Criteria B (identifying criteria). In addition, the data and reference points set forth below in Criteria C were considered to make a more informed decision on whether to proceed with retirement.

Criterion A (Overarching Criterion)
The Reliability Standard requirement requires responsible entities to conduct an activity or task that does little, if anything, to benefit or protect the reliable operation of the BES.

This criterion is based on the Commission's language in P 81 of the March 15th Order.

Section 215(a)(4) of the Federal Power Act defines "reliable operation" as: "… operating the elements of the bulk-power system within equipment and electric system thermal, voltage, and stability limits so that instability, uncontrolled separation, or cascading failures of such system will not occur as a result of a sudden disturbance, including a cybersecurity incident, or unanticipated failure of system elements."

Criteria B (Identifying Criteria)

B1. *Administrative*
The Reliability Standard requirement requires responsible entities to perform a function that is administrative in nature, does not support reliability and is needlessly burdensome.

This criterion is designed to identify Requirements that can be removed with little effect on reliability and whose removal will result in an increase in the efficiency of the ERO compliance program. Administrative functions may include a task that is or is not related to developing procedures or plans, such as establishing communication contacts. Thus, for certain requirements, Criterion B1 is closely related to Criteria B2, B3 and B4. Strictly administrative functions do not inherently impact reliability directly and, where possible, should be eliminated for purposes of efficiency and to allow the ERO and entities to allocate resources appropriately.

B2. *Data Collection/Data Retention*
These are requirements that obligate responsible entities to produce and retain data which document prior events or activities, and should be collected via some other method under NERC's rules and processes.

This criterion is designed to identify requirements that can be removed with little effect on reliability. The collection and/or retention of data do not necessarily have a reliability benefit and yet are often required to demonstrate compliance. Where data collection and/or data retention is unnecessary for reliability purposes, such requirements should be eliminated in order to increase the efficiency of the ERO compliance program.

B3. *Documentation*
The Reliability Standard requirement requires responsible entities to develop a document (e.g., plan, policy or procedure) which is not necessary to protect BES reliability.

This criterion is designed to identify requirements that require the development of a document that is unrelated to reliability or has no performance or results-based function. In other words, the document is required, but no execution of a reliability activity or task is associated with or required by the document.

B4. *Reporting*
The Reliability Standard requirement obligates responsible entities to report to a Regional Entity, NERC or another party or entity.

This criterion is designed to identify requirements that obligate Responsible Entities to report to a Regional Entity on activities which have no discernible impact on promoting the reliable operation of the BES and if the entity failed to meet this requirement, there would be little impact on reliability.

B5. ***Periodic Updates***
The Reliability Standard requirement requires responsible entities to periodically update (e.g., annually) documentation, such as a plan, procedure or policy without an operational benefit to reliability.

This criterion is designed to identify requirements that impose an updating requirement that is out of sync with the actual operations of the BES, unnecessary or duplicative.

B6. ***Commercial or Business Practice***
The Reliability Standard requirement is a commercial or business practice, or implicates commercial rather than reliability issues.

This criterion is designed to identify those requirements that require: (i) implementing a best or outdated business practice or (ii) implicating the exchange of or debate on commercially sensitive information while doing little, if anything, to promote the reliable operation of the BES.

B7. ***Redundant***
The Reliability Standard requirement is redundant with: (i) another FERC-approved Reliability Standard requirement(s); (ii) the ERO compliance and monitoring program or (iii) a governmental regulation (e.g., Open Access Transmission Tariff, North American Energy Standards Board ("NAESB"), etc.).

This criterion is designed to identify requirements that are redundant with other requirements and are, therefore, unnecessary. Unlike the other criteria listed in Criterion B, in the case of redundancy, the task or activity itself may contribute to a reliable BES, but it is not necessary to have two duplicative requirements on the same or similar task or activity. Such requirements can be removed with little or no effect on reliability and removal will result in an increase in efficiency of the ERO compliance program.

Criteria C (Additional Data and Reference Points)

To assist in the determination of whether to proceed with the retirement of a Reliability Standard requirement that satisfied both Criteria A and B, the following data and reference points were considered by the P 81 Team to make a more informed decision:

C1. Was the Reliability Standard requirement part of a FFT filing?

This criterion was applied in order to determine what efficiencies would be gained for the NERC compliance program.

C2. Is the Reliability Standard requirement being reviewed in an on-going Standards Development Project?

This criterion was applied in order to determine whether the requirement proposed for retirement was a part of an active on-going standard development project.

C3. What is the VRF of the Reliability Standard requirement?

Each requirement must have an associated violation risk factor ("VRF") (High, Medium, or Lower). The risk factor is one of several elements used to determine an appropriate sanction when the associated requirement is violated. The risk factor assesses the impact to reliability of violating a specific requirement. This criterion was applied in order to determine what efficiencies would be gained for the NERC compliance program.

C4. In which tier of the 2013 AML does the Reliability Standard requirement fall?

The NERC Actively Monitored List ("AML") is the minimum scope of compliance audits and consists of a three tiered approach.

- Tier 1 Requirements are those that are the most critical to the purpose and intent of the standard of which they are a part. Additionally, the ability of a registered entity to demonstrate compliance with Tier 1 Requirements will provide guidance to audit teams on the necessity to investigate further and broaden an audit's scope in additional Requirements or reliability standards or both.

- Tier 2 Requirements are also critical to the purpose of a standard, but less so than Tier 1 in that Tier 2 does not address the ERO high-risk priorities as directly as Tier 1. Tier 2 also does not pose as severe a risk as Tier 1. The determination of what tier each assignment is assigned is done using all the data and input mentioned earlier in this section of the report, applied with professional judgment and input from the Regional Entities. This is not to say that compliance with Tier 2 Requirements is not mandatory. Instead, Tier 2 Requirements represent an additional level of inquiry that must be undertaken when a registered entity does not display clear compliance with those most critical Requirements of Tier 1. In the process of this added level of investigation, it may become necessary to branch off into other reliability standards that were not identified as relating directly to an ERO priority.

- Tier 3 Requirements are those that, while still being significant to Bulk-Power System reliability, do not represent the purpose of a reliability standard directly or are not representative of ERO priorities. The exploration of an audit team into the compliance of a registered entity with Tier 3 Requirements will be initiated through links between identified deficiencies in Tier 1 and 2 Requirements and those of Tier 3.

Note, Registered Entities are responsible for compliance with all regulatory approved reliability standards and requirements in effect per their registered functions at all times, regardless of what is specified in the AML.

C5. Is there a possible negative impact on NERC's published and posted reliability principles?

The application of this criterion involves consideration of eight reliability principles published on the NERC webpage.[73]

C6. Is there any negative impact on the defense in depth protection of the Bulk Electric System?

This criterion is designed to assess whether other Requirements rely on the Requirement proposed for retirement to protect the BES, in recognition of the fact that NERC Reliability Standards are an integrated whole.

C7. Does the retirement promote results or performance based Reliability Standards?

Generally, NERC strives to achieve results-based Reliability Standards, which contain results-based requirements with sufficient clarity to hold entities accountable without being overly prescriptive as to how a specific reliability outcome is to be achieved. This criterion is designed to ensure that the P 81 Project is consistent with this direction.

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[73] 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.
Principle 2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
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.
Principle 4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained, and implemented.
Principle 5. Facilities for communication, monitoring, and control shall be provided, used, and maintained for the reliability of interconnected bulk power systems.
Principle 6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
Principle 7. The reliability of the interconnected bulk power systems shall be assessed, monitored, and maintained on a wide-area basis.
Principle 8. Bulk power systems shall be protected from malicious physical or cyber attacks. (footnote omitted).

Exhibit B

Implementation Plan for Retirement of BAL-004-0

Implementation Plan

Reliability Standard BAL-004-0

Project 2010-14.2.2 Balancing Authority Reliability-based Controls

Requested Approval

- **N/A**

Requested Retirement

- BAL-004-0 – Time Error Correction

Prerequisite Approval

- Retirement of NASEB standard WEQ-006

Revisions to Glossary Terms

- N/A

Applicable Entities

- Reliability Coordinator
- Balancing Authority

Applicable Facilities

- N/A

Effective Dates

Where approval by an applicable governmental authority is required, the standard shall be retired effective the later of (i) the first day of the first calendar quarter after the effective date of the applicable governmental authority's order approving the standard, (ii) the effective date of NAESB standard WEQ-006 retirement, (iii) or as otherwise provided for by the applicable governmental authority. Where approval by an applicable governmental authority is not required, the standard shall be retired effective the later of (i) the first day of the first calendar quarter after the date the standard is adopted by the NERC Board of Trustees, (ii) the effective date of NAESB standard WEQ-006 retirement, (iii) or as otherwise provided for in that jurisdiction.

Retirements

BAL-004-0 (Time Error Correction) shall be retired on the Effective Dates stated above.

Exhibit C

Supporting Technical Documents

Exhibit C-1

Time Error Correction and Reliability White Paper

Time Error Correction and Reliability White Paper

Recommendation of the Balancing Authority Reliability-based Controls 2.2 Standard Drafting Team to Retire BAL-004-0 – Time Error Correction

The Balancing Authority Reliability-based Controls 2 Periodic Review Team (BARC 2 PRT) was tasked with reviewing certain Reliability Standards and developing recommendations that each Reliability Standard be (1) reaffirmed as is (i.e., no changes needed); (2) revised (which may include revising or retiring one or more requirements); or (3) retired. After an extensive review, the BARC 2 PRT recommended that Reliability Standard BAL-004-0 be retired and that manual Time Error Correction (TEC) be eliminated as a continent-wide NERC standard. The Balancing Authority Reliability-based Controls 2.2 Standard Drafting Team (BARC 2.2 SDT) reviewed the findings of the BARC 2 PRT and issued a survey to the industry to gain a better perspective as to any concerns the industry may have if the practice of manual TEC was eliminated. The survey response indicated support for retirement of manual TEC as a standard. Upon review, as detailed below, the BARC 2.2 SDT determined that manual TEC would not support the reliability of the BPS. Conducting manual TEC in any form directly contradicts NERC Reliability Principle 2: “The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.” The practice of using manual TEC to place the Interconnection closer to the settings for automatic underfrequency load shedding does not support or enhance reliability. Therefore, BAL-004-0 should be retired.

The survey also indicated that the accompanying North American Energy Standard Board (NAESB) business practice standard, WEQ Manual Time Error Correction Business Practice Standard – WEQ-006, should be retired contemporaneously with BAL-004-0. The BARC 2.2 SDT’s recommendation for retirement of BAL-004-0 is contingent on simultaneous retirement of NAESB WEQ-006 to ensure clarity and to avoid inadvertent, uncoordinated, manual TEC. The BARC 2.2 SDT has been coordinating with NAESB on this issue. As discussed below, upon retirement of BAL-004-0 and NAESB WEQ-006, currently or soon to be effective Reliability Standards BAL-003-1 and BAL-001-2 will insent continued adherence to a frequency approximating 60 Hz over long-term averages.

This white paper reviews the history of manual TEC and BAL-004-0, outlines the key considerations of the BARC 2.2 SDT in developing its recommendation, and assesses whether the use of manual TEC supports the reliability of the Bulk Power System (BPS).

I. History of Time Error Correction and Reduced Reliance On Manual TEC Today

A. Invention of the Synchronous Motor Clock and Market Penetration

In 1916, Henry E. Warren invented the self-starting synchronous motor and three years later the motor was used for the production of the Telechron Clock. The Telechron Clock was a synchronous electric clock, which used alternating current electricity to measure time. Its accuracy depended on the frequency of the power grid. To incentivize electric system operators to regulate frequency in a way that kept the clocks running accurately, the Warren Clock Company, which was manufacturing the Telechron Clock at the time, gave electric clocks to electric system operators. The idea worked and system operators began regulating the frequency as desired by the Warren Clock Company.

During the 1920s, other companies developed synchronous motor clocks and used the same marketing strategy, giving electric clocks to system operators. As the penetration of the synchronous electric clock increased, the incremental electric revenue to utilities from the additional electric clock motors justified the relatively small cost to utilities to regulate system time by modifying system frequency. This additional revenue helped ensure that manual TEC would be an ongoing service provided by the electric utility industry.

B. Time Error Correction Practice and Improvements in Clock Accuracy

As the electric system became more interconnected, the service of providing manual TEC was incorporated into the industry's general operating practice. The current form of manual TEC is a legacy commercial practice that originated in the 1920s as a commercial service and was not related to the reliability of the electric grid. While documentation is available from as late as 1976 that synchronous electric clocks were still being used for important applications, by 1969, alternative methods of keeping accurate time penetrated the market and gradually displaced the electric clock. For example, the introduction of the first mass-produced quartz watch provided a more reliable and less expensive method to keep accurate time. Additionally, 15 years later, the United States made available for free the Global Positioning System, which is a space-based satellite navigation system that provides location and time information.

As discussed below in Section III.e., current Reliability Standards BAL-003-1 and BAL-001-2also ensure adherence to 60 Hz.

II. History of BAL-004-0

Reliability Standard BAL-004-0 – Time Error Correction became mandatory and enforceable on June 18, 2007. It contains four requirements:

- **R1** Only a Reliability Coordinator shall be eligible to act as an Interconnection Time Monitor. A single Reliability Coordinator in each Interconnection shall be designated by the NERC Operating Committee to serve as Interconnection Time Monitor.
- **R2** The Interconnection Time Monitor shall monitor Time Error and shall initiate or terminate corrective action orders in accordance with the NAESB Time Error Correction Procedure.
- **R3** Each Balancing Authority, when requested, shall participate in a Time Error Correction by one of the following methods:
  - **R3.1** The Balancing Authority shall offset its frequency schedule by 0.02 Hertz, leaving the Frequency Bias Setting normal; or
  - **R3.2** The Balancing Authority shall offset its Net Interchange Schedule (MW) by an amount equal to the computed bias contribution during a 0.02 Hertz Frequency Deviation (i.e. 20% of the Frequency Bias Setting).
- **R4** Any Reliability Coordinator in an Interconnection shall have the authority to request the Interconnection Time Monitor to terminate a Time Error Correction in progress, or a scheduled Time Error Correction that has not begun, for reliability considerations.
  - **R4.1** Balancing Authorities that have reliability concerns with the execution of a Time Error Correction shall notify their Reliability Coordinator and request the termination of a Time Error Correction in progress.

On July 11, 2007, a Standard Authorization Request (SAR) was submitted to NERC, proposing to revise BAL-004-0 to:

- Remove inappropriate compliance requirements on Reliability Coordinators who voluntarily agree to serve as Interconnection Time Monitors.
- Remove inappropriate compliance requirements on the NERC Operating Committee (OC), which is not a user, owner, or operator of the BPS.
- Remove inappropriate requirements to follow NAESB business practices.

The revised BAL-004-1 received 94.10% weighted segment approval on December 4, 2007, and was adopted by NERC's Board of Trustees on March 26, 2008. NERC filed a petition with the Federal Energy Regulatory Commission (FERC) on April 7, 2009, requesting approval for the revised BAL-004-1. In response, FERC issued a Notice of Proposed Rulemaking (NOPR) proposing to remand BAL-004-1 for further consideration. The NOPR requested that NERC:

- Change R2 to indicate that the Interconnection Time Monitor, designated according to a process described in a FERC approved document, is responsible for initiating or terminating a TEC in a reliable manner.
- Explain the circumstances under which the Time Monitor should start or end a TEC.

Between 2010 and 2012, NERC filed a series of petitions to defer action on the BAL-004-1 NOPR as it worked with the NERC Operating Committee (OC) to explore the possibility of eliminating manual TEC, using a field trial. In May and June of 2011, NERC held a webinar and issued a press release laying out a schedule to do a field trial in which manual TEC would have been stopped for a period of time. NERC's intention was to begin a phased elimination of TEC in ERCOT in August 2011.

After the webinar and issuance of the press release, and in part because NERC received feedback from private citizens, industry, and government entities expressing concern about the field trial, the trial was not conducted. Discussion of the data affecting these issues is included in Apendix I – Discussion of Correspondence attached.

On August 16, 2012, the NERC Board of Trustees withdrew its adoption of BAL-004-1, stating that:

- No Interconnection Time Monitor has ever incurred a violation.
- The NERC OC is not a registered entity, and therefore compliance actions are not a concern. Thus, it is acceptable to keep the OC reference in the Reliability Standard.
- There are no significant issues with the reference to NAESB in R2.

BAL-004-0 remains mandatory and enforceable. Since that time, BAL-004-0 has continued being examined, and the BARC 2.2 SDT has determined that under the current environment and rubric of Reliability Standards (discussed above), BAL-004-0 and NAESB WEQ-006 should be retired.

III. Key Considerations for BAL-004-0 Retirement

A. Manual TEC does not support the reliability of the BPS.

The frequency of an Interconnection is a contributor to the reliability of that Interconnection is. In North America, the system is designed to operate within a specified range, with 60 Hz as the center point of that range. Under and over frequency limits have been established to protect the equipment of both the providers and the users on the Interconnection from failure. As described above, Reliability Standards BAL-003-1 and BAL-001-2 support this by helping to ensure that frequency approximates 60 Hz in addition to modifications made to other standards, such as Interchange and Emergency Operations standards, increasing focus on data accuracy and frequency. As manual TEC is not required for reliability, a Reliability Standard focused on manual TEC is only necessary for ensuring that any manual TEC is implemented consistently across an Interconnection. The BARC 2.2 SDT maintains that elimination of manual TEC will allow each Interconnection to be operated closer to the design frequency of 60 Hz more often, by avoiding the over-corrections that arise in manual TEC accomplished under BAL-004-0 and NAESB WEQ-006.

Industry experts on the OC have stated that the practice of manual TEC does not support reliability, and is instead a strictly commercial service that does require a mandatory and enforceable Reliability Standard. [1] For instance, in an industry survey performed by the Balancing Authority Reliability-based Controls 1 Standard Drafting Team between September 12 and October 13, 2008, approximately 77% of respondents supported the discontinuation of manual TEC. Further, when revisions to BAL-004-0 were developed in the proposed BAL-004-1, "the underlying driver was that it was commonly understood that manual TECs were a commercial task."[2]

Because there is no additional benefit to reliability from the implementation of manual TEC, the BARC 2.2 SDT recommends the retirement of BAL-004-0.

B. *Manual TEC is occurring less frequently.*

Over the past ten years there has been a drastic decrease of the number of TEC called across all interconnections. There are a number of reasons for these decreases across the interconnections and these include but not limited to the following (see RS Meeting Presentations - January 28-29, 2015 (Coral Gables, FL), slides 50-53; http://www.nerc.com/comm/OC/Resources%20Subcommittee%20RS%202013/RS%20Meeting%20Presentations_January_28-29_2015.pdf):

- Economy (Recession)
- 2005 Energy Policy Act, creation of ERO as reliability enforcer
- The current suite of NERC Reliability Standards
- BAAL field trial participation
- Reduction in number of control areas in the Eastern and Western Interconnections
- Incremental steps in the expansion of PJM and MISO
- Development of Eastern largest Reserve Sharing Group
- Tools that better indicate current performance, such as the Intelligent Alarms from NERC-CERTS Resource Adequacy Application

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[1] Minutes from the March 6-7, 2012 meeting of the Operating Committee. Posted at: http://www.nerc.com/comm/OC/Agendas%20Highlights%20and%20Minutes%20DL/Agendas,%20Highlights,%20and%20Minutes%20-%202012/Operating_Committee_Meeting_Minutes_Mar_6-7_2011_R1.pdf

[2] Minutes from the March 6-7, 2012 meeting of the Operating Committee.

• Inadvertent Interchange Tool, which gives BA's a heads up that their control may require some investigation

There exists no way of determining which of these factors may be the main factor in the decrease of manual TEC, but there has been a marked decrease since the factors listed above have taken place. This indicates that BAL-004-0 (and the NAESB corollary WEQ-006) are not materially assisting entities to maintain frequency at 60 Hz.

C. *The elimination of manual TEC is not expected to impact Inadvertent Interchange accumulations.*

In a FERC Order 693 directive related to BAL-004-0, FERC directed NERC "to perform whatever research it and the industry believe is necessary to provide a sound technical basis for either continuing with the present practice [of TEC] or identifying an alternative practice that is more effective and helps reduce inadvertent interchange." It should be noted that Time Error and Inadvertent Interchange are not necessarily linked, and therefore, eliminating manual TEC will not have negative imapcts on Inadvertent Interchange.

Time Error relates to the accumulated frequency drift of an Interconnection; whereas Inadvertent Interchange is an imbalance of scheduled and actual energy at a Balancing Authority's boundary in an Interconnection with other Balancing Authorities. Frequency drift is related to an imbalance between load and generation, which may be influenced by factors that include metering error, scheduling error, and the inability to instantaneously match load and generation.

Given the dynamics of load, generation, and Interconnection frequency, it is highly unlikely for any Balancing Authority to have an Area Control Error (ACE) of zero except by chance, so Inadvertent Interchange, positive and negative, is a fact of operation. In addition, the difference between the reliability requirement to ramp Interchange schedules and the business practice to account for Interchange schedules after the fact as "block schedules" (ramp not included) will also result in some amount of Inadvertent Interchange being accumulated each hour, even if the Balancing Authority could perfectly match load and generation throughout an hour. Like frequency drift, Inadvertent Interchange is influenced by the multiple factors that cause an imbalance between load and generation. Eliminating manual TEC will not impact Inadvertent Interchange accumulations.

D. Comments from non-electric power industry parties reflect misunderstanding regarding manual TEC.

When NERC and the NERC OC began exploring the possibility of conducting a field trial to eliminate manual TEC, they received feedback from private citizens, industry, and government representatives expressing concern about the impact of eliminating manual TEC. Some of these individuals expressed concern that eliminating manual TEC could affect billing meters or traffic lights that could rely on grid frequency.

However, for the reasons described in Section A of Part III above, such as Reliability Standards BAL-003-1 and BAL-001-2 , eliminating manual TEC will not adversely affect frequency. On average, frequency will approximate 60 Hz under these Reliability Standards, and eliminating BAL-004-0 and NAESB WEQ-006 will eliminate the over-corrections that are likely to cause deviation from 60 Hz in today's environment. [Further comments to address the types of concerns raised by non-electric power industry parties are included at Appendix I.]

Moreover, grid frequency is not the appropriate source for alignment to official time; there are other more appropriate sources available for that service. The National Institute of Standards and Technology and the U.S. Naval Observatory, for instance, maintain a website (www.time.gov) that could be used to correct time periodically, including after power outages. Manual TEC should not be required for the purpose of providing accurate time for synchronous electric clocks. Similarly, commercial or industrial processes dependent upon an exact duration of time could not rely on synchronous electric clocks, as any duration of time determined by such clocks can never be exact, and are negatively affected by each instance of manual TEC.

E. Other NERC Reliability Standards already require operation within a reliable frequency range.

NERC's suite of BAL Reliability Standards is designed to assure safe and reliable Interconnection operation within a defined frequency range, apart from any obligations associated with manual TEC in BAL-004-0. Reliability Standard BAL-003-1 – *Frequency Response and Frequency Bias Setting*, which became enforceable on April 1, 2015, requires sufficient Frequency Response from the Balancing Authority to maintain Interconnection Frequency within predefined bounds by arresting frequency deviations and supporting frequency until the frequency is restored to its scheduled value. This Reliability Standard ensures that each Interconnectionhas sufficient Frequency Response[3] to guard against underfrequency load shedding due to a credible event in that Interconnection. It ensures that Balancing Authorities provide the Frequency Response necessary to ensure that frequency does not reach the point where coordinated underfrequency load shedding relays curtail load. BAL-003-1 provides a reliability back stop for N-1-1 contigencies in that the standard requires the Balancing Authority to maintain frequency response to arrest frequency excursions following disturbance on the interconnection. The arresting of frequency allows the interconnection to stabilize and to make adjustments to be ready for the next disturbance.

In addition, the stated purpose of BAL-001-2 – Real Power Balancing Control Performance, which will become effective on July 1, 2016, is to control Interconnection frequency within defined limits. BAL-001

[3] Frequency Response is a measure of an Interconnection's ability to stabilize frequency immediately following the sudden loss of generation or load. Power system operators manage or control frequency primarily through adjustments to the output of generators with the goal of restoring balance between generation and load. Failure to maintain frequency can disrupt the operation of equipment and initiate disconnection of power plant equipment to prevent them from being damaged, which could lead to wide-spread blackouts.

Requirement R1 (CPS1) is the longer term measure of a Balancing Authorities control of frequency in the interconnection. Requirement R1 requires Balancing Authority to consistently over time adjust generation to improve frequency of the interconnection. BAL-001-2 Requirement R2, “Each Balancing Authority shall operate such that its clock-minute average of Reporting ACE does not exceed its clock-minute Balancing Authority ACE Limit (BAAL) for more than 30 consecutive clock-minutes”, is the short term real-time feedback to the system operator of frequency control of the interconnection. Requirement R2 combines frequency versus ACE information to give the operator the immediate feedback to make corrections to move frequency back to within Frequency Trigger Limits.

F. Revising BAL-004-0 would not enhance the reliability of the BPS.

In minutes from its March 6-7, 2012 meeting, the NERC OC states that “there is a general consensus that the conduct of manual TECs is a commercial service and does not rise to the level of a reliability standard, with the exception of setting bounds on the magnitude of frequency offset.”[4] But, recognizing that there are other ways to lessen the impact of manual TECs, the NERC OC did not pass a motion to move forward with a field trial to test the impact of eliminating Manual TECs. Further, some have suggested alternative methods of achieving TEC without a TEC Standard. These are discussed in Appendix II – Alternative TEC Methods Suggested.

When considering possible recommendations for BAL-004-0, the BARC 2.2 SDT discussed the option of revising BAL-004-0 to reduce the offset to allow for manual TEC to be implemented for a full load cycle over a consistent time period and lessen the burden on Interconnection Time Monitors. However, the BARC 2.2 SDT determined that would not support the reliability of the BPS. Conducting manual TEC in any form directly contradicts NERC Reliability Principle 2: “The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.” The practice of using manual TEC to place the Interconnection closer to the settings for automatic underfrequency load shedding does not support or enhance reliability. Therefore, in line with NERC’s efforts to eliminate standards that do not promote reliability, BAL-004-0 should be retired.

IV. Summary

Manual TEC is a commercial service that does not support reliability, and accurate time can be obtained from alternative sources. As noted above, other Reliability Standards insent frequency to remain within defined limits. Accordingly, BAL-004-0 – Time Error Correction and the associated NAESB WEQ Manual Time Error Correction Business Practice Standard – WEQ-006 should be retired.

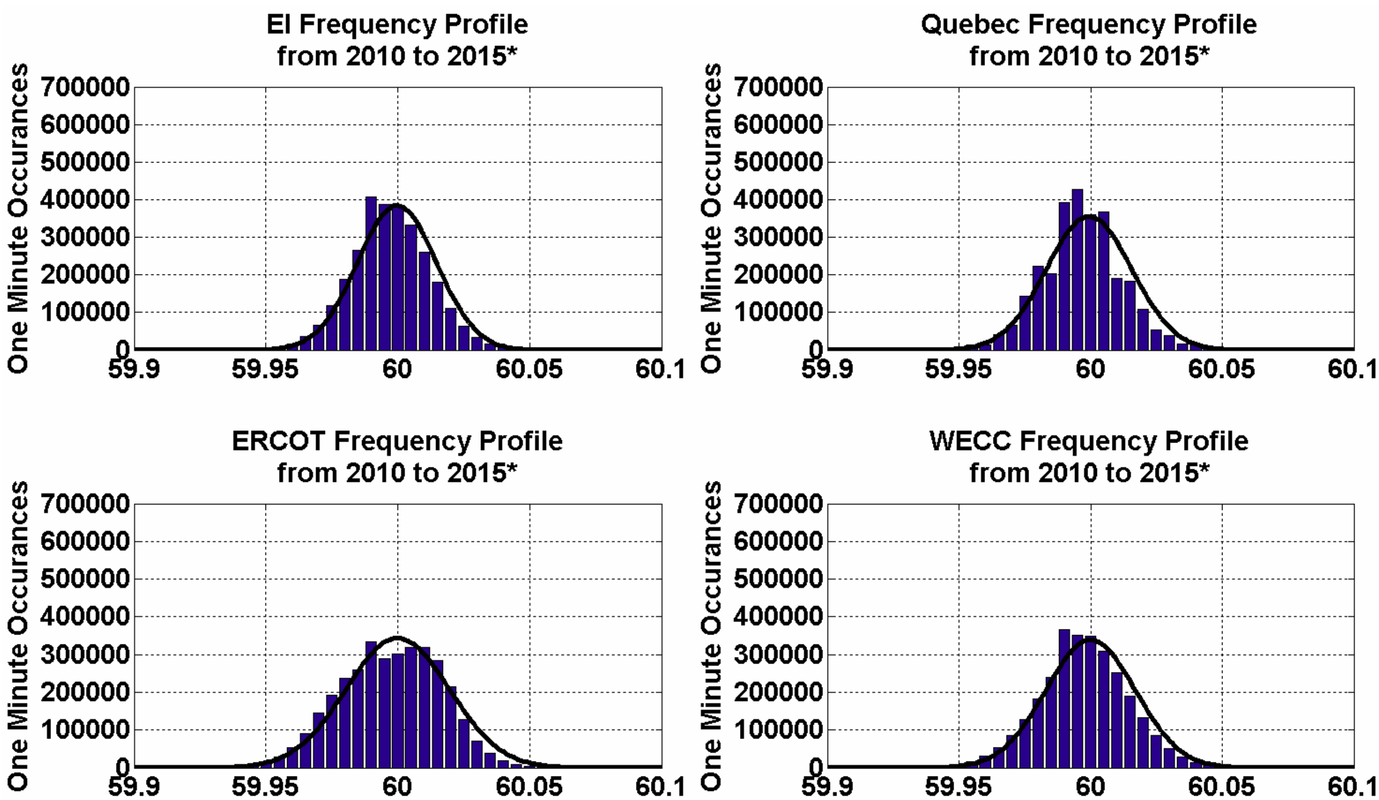
[4] Minutes from the March 6-7, 2012 meeting of the Operating Committee.

Appendix I – Discussion of Correspondence

Considerable correspondence was received by NERC in response to the announcement of the beginning of a trial to eliminate TEC. In most cases, those commenting on the trial admitted their lack of knowledge of interconnection frequency and its relation to Time Error and TEC. This appendix contains significant information to aid in the understanding of the issues related to time error correction.

Time Error Correction:

The North American Interconnections normally operate with a scheduled frequency of 60 Hz. As load and generation vary, actual frequency of the interconnection varies around this scheduled value. This variation is shown for one-minute average frequencies for the period from the beginning of 2010 through June 2015. This data shows that the one-minute frequency varies from a value of about 59.95 Hz to 60.05 Hz for the great majority of the time, over 99 % of the one-minute intervals. It also shows that the frequency error from 60 Hz is close to a Normal (Gaussian) Distribution.



These normal errors can be put into perspective by looking at the percentage the a 0.05 Hz error represents. This is obtained by dividing the 0.05 Hz error by the scheduled frequency of 60 Hz and

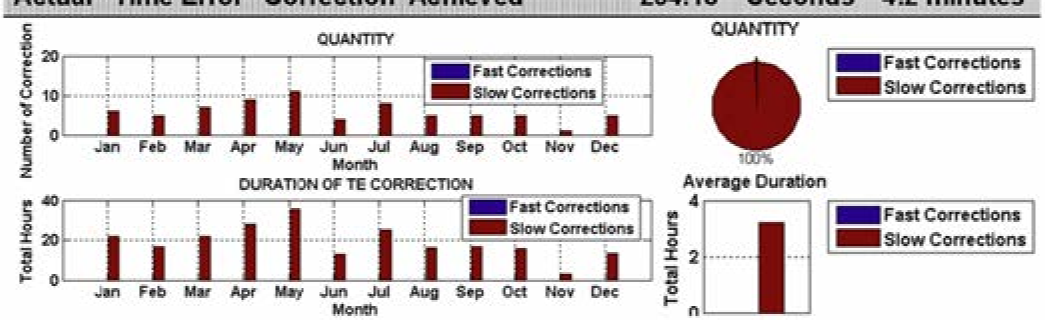
converting that number to a percentage. This gives an error of 0.083 %. The frequency error that the interconnections experience is less than one tenth of one percent. The elimination of TEC will have no significant effect on these error distributions, although it will move them slightly right or left so that the average error is slightly above or below 60 Hz.

Time error correction has historically been implemented by offsetting the scheduled frequency by 0.02 Hz above or below the normal frequency of 60 Hz. This scheduled offset moves the distribution closer to the relay limits for the interconnection, thus having a detrimental effect on reliability. The history of time error correction has been retained by the interconnections. This history for recent time error corrections is shown below for the Texas, Western, and Eastern Interconnections. This history shows that the total time error accumulated during the year 2014 was 4.2 minutes for the Texas Interconnection, 7.7 minutes for the Western Interconection, and 2.4 minutes for the Eastern Interconnection. An 8 minute annual error is an error of 0.0015%. When one considers that in most regions of the country, clocks are changed twice per year for Daylight Savings Time, these accumulated time errors are not significant. Although there are no guarantees that this experience will continue, it is expected to do so.

ERCOT TIME ERROR STATISTICS
2014 Summary

Annual Totals (YTD)

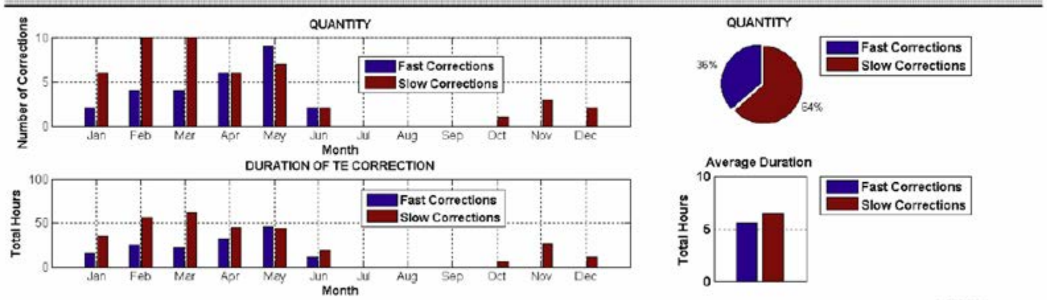
Total Number of Time Error Corrections	**71**		
"Fast" Time Error Corrections	0		
"Slow" Time Error Corrections	71		
Net Total Duration of TE Correction (Hrs)	**226.7**	**Hours**	
"Fast" Time Error Corrections	0	Hours	
"Slow" Time Error Corrections	226.7	Hours	
Average Duration of Time Error Corrections(Hrs)	**3.19**	**Hours**	
"Fast" Time Error Corrections			
"Slow" Time Error Corrections	3.19		
Actual "Time Error" Correction Achieved	**254.18**	**Seconds**	**4.2 minutes**



WECC TIME ERROR STATISTICS
2014 Summary

Annual Totals (YTD)

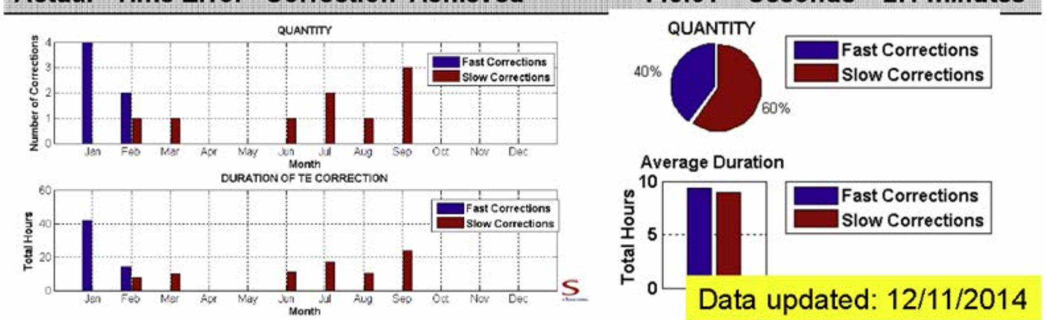
Total Number of Time Error Corrections	**74**		
"Fast" Time Error Corrections	27		
"Slow" Time Error Corrections	47		
Net Total Duration of TE Correction (Hrs)	**454.82**	**Hours**	
"Fast" Time Error Corrections	150.2	Hours	
"Slow" Time Error Corrections	304.6	Hours	
Average Duration of Time Error Corrections(Hrs)	**6.15**	**Hours**	
"Fast" Time Error Corrections	5.56		
"Slow" Time Error Corrections	6.48		
Actual "Time Error" Correction Achieved	**459.22**	**Seconds**	**7.7 minutes**

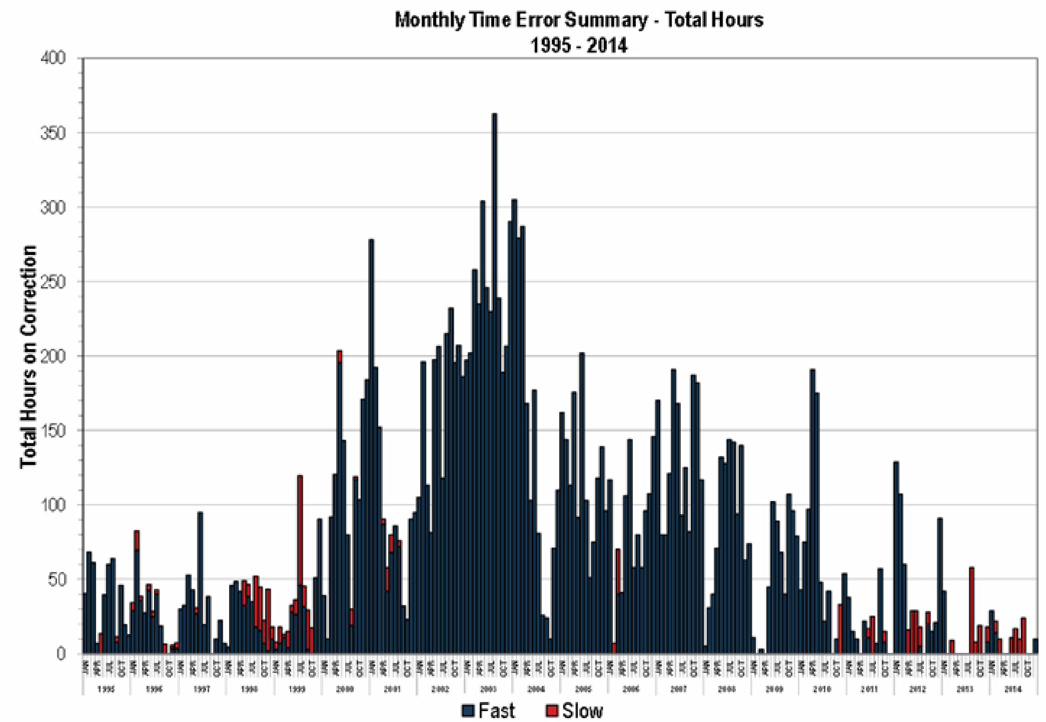


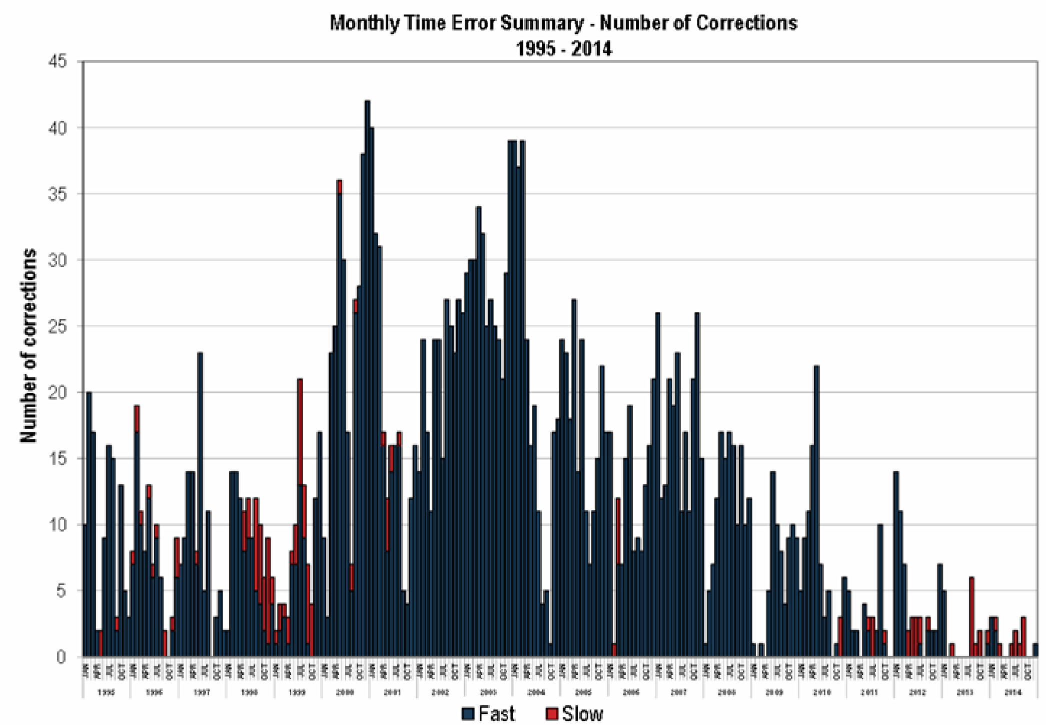
EI TIME ERROR STATISTICS
2014 Summary

Annual Totals (YTD)

Total Number of Time Error Corrections	**15**		
"Fast" Time Error Corrections	6		
"Slow" Time Error Corrections	9		
Net Total Duration of TE Correction (Hrs)	**135.98**	**Hours**	
"Fast" Time Error Corrections	56.0	Hours	
"Slow" Time Error Corrections	80.0	Hours	
Average Duration of Time Error Corrections(Hrs)	**9.07**	**Hours**	
"Fast" Time Error Corrections	9.33		
"Slow" Time Error Corrections	8.89		
Actual "Time Error" Correction Achieved	**145.61**	**Seconds**	**2.4 minutes**




Monthly Time Error Summary - Total Hours
1995 - 2014
Total Hours on Correction
Fast
Slow


Monthly Time Error Summary - Number of Corrections
1995 - 2014
Number of corrections
Fast
Slow

These last two graphs show the history of TEC over the last twenty years. They show that, since NERC was named the Electric Reliability Organization in 2007, TECs have significantly declined to todays levels. Many feel that this reduction in TEC is a result of improvements in the operation of the North American interconnections resulting from improvements in the NERC Reliability Standards and improvements in best practices as described in the NERC Reliability Guidelines.

Appendix II – Alternative TEC Methods Suggested

Each time the elimination of TEC has been recommended, some in the industry have suggested that alternative methods can be used to achieve TEC without having a reliability standard. Some of the methods suggested are discussed in this appendix.

Allow Uncoordinated Frequency Offset for TEC:

The NERC definition of Reporting ACE requires, "The use of a common Scheduled Frequency (F_S) for all areas at all times." The industry must investigate the effect of not following this part of the definition. When a BA uses a Scheduled Frequency different from the Scheduled Frequency in use by the remainder of the interconnection BAs, the use of this Scheduled Frequency affects the value of ACE. For example, if a BA offsets it Scheduled Frequency by +0.02 Hz when the remainder of the interconnection is using a Scheduled Frequency of 60 Hz, that BAs Reporting ACE will be reduced by an amount equal to its Frequency Bias times 0.02 Hz. This is relatively small effect, but there is an additional effect that most fail to consider.

When CPS1 and BAAL are calculated the value of Reporting ACE is multiplied by the value of the Frequency Error. The Frequency Error value also depends on the Scheduled Frequency. As a result, simply using a different Scheduled Frequency from the remainder of the interconnection will not only cause a small MW offset to Reporting ACE, but it may also cause a large change in CPS1 and BAAL measured performance. These large changes in performance measurement are the concern. causing its CPS1 and BAAL measure to change by more than just the change in the value of ACE. An example of this effect is provided as follows:

Example 1: Effect of Uncoordinated Frequency Offset
Assume that Time Error is fast indicating that a lower Scheduled Frequency will help to correct Time Error. Assume that Actual Frequency of the interconnection is 59.990 Hz and Scheduled Frequency is 60 Hz. Assume that a BA with a Frequency Bias Setting of 100 MW/0.1 Hz has a Tie Error of -290 MW. Using the Scheduled Frequency of 60 Hz, this BA will have the following performance measurements:

$ACE = \text{Tie Error } (10B)(F_A – F_S) = -290 -10 \times -100 \times (59.990 – 60.000) = -300 \text{ MW}$
$CPS1 = (2 – ((-300 /-10(-100)) \times -0.010) / \varepsilon_1^2) \times 100\% = 2-(0.003 / 0.000324) \times 100\% = -725\%$
$BAAL_{Low} = -10 (-100) \times (FTL_{Low} – F_S)^2 / (F_A – F_S) = 1000 \times (3 \times \varepsilon_1)^2 / (-0.01) = 1000 \times 9 \times \varepsilon_1^2 / (-0.01) = -291.6$

If an uncoordinated frequency offset is allowed, then this BA could offset its Scheduled Frequency -.02 Hz. Using this new scheduled frequency in the above measures will yield the following performance measurements:

$ACE = Tie\ Error – 10(B)(F_A – F_S) = -290 -10 \times -100 \times (59.990 – 59.980) = -280$ MW
$CPS1 = (2 – ((-280 /-10(-100)) \times 0.010) / \varepsilon_1^2) \times 100\% = 2-(-0.0028 / 0.000324) \times 100\% = 964\%$
$BAAL_{Low} = -10 (-100) \times (FTL_{Low} – F_S)^2 / (F_A – F_S) = 1000 \times (3 \times \varepsilon_1)^2 / (-0.01) = 1000 \times 9 \times \varepsilon_1^2 / (-0.01) = -291.6$

By making this simple change in Scheduled Frequency, the BA reduces its ACE by 20 MW, the BA improves its CPS1 performance by 1,689 %, and it improves its BAAL performance enough to avoid a BAAL non-compliance. Although on first look, it would appear that allowing uncoordinated frequency offsets to enable TEC is beneficial, allowing this practice would make all of the current performance measurements that rely on ACE unreliable.

Allow Unilateral Inadvertent Payback for TEC:

Another suggestion that has been made is that unilateral inadvertent payback be included in Reporting ACE allowing up to 5 MW or 10% of the Frequency Bias Setting in the direction to correct time error. This practice is also addressed in the Reporting ACE definition, "The algebraic sum of all area Net Interchange Schedules and all Net Interchange actual values is equal to zero at all times." It has further been suggested that enabling a unilateral inadvertent payback of this magnitude would have little effect on the current performance measures. As with the previous analysis for uncoordinated frequency offset, the effect of including a unilateral inadvertent payback term in Reporting ACE is evaluated in the following Example 2:

Example 2: Effect of Unilateral Inadvertent Payback
Assume that Time Error is fast indicating that a lower Scheduled Frequency will help to correct Time Error.
Assume that Actual Frequency of the interconnection is 59.990 Hz and Scheduled Frequency is 60 Hz.
Assume that a BA with a Frequency Bias Setting of 100 MW/0.1 Hz has a Tie Error of -290 MW.
Using the Scheduled Frequency of 60 Hz, this BA will have the following performance measurements:

$ACE = Tie\ Error – 10(B)(F_A – F_S) = -290 -10 \times -100 \times (59.990 – 60.000) = -300$ MW
$CPS1 = (2 – ((-300 /-10(-100)) \times -0.010) / \varepsilon_1^2) \times 100\% = 2-(0.003 / 0.000324) \times 100\% = -725\%$
$BAAL_{Low} = -10 (-100) \times (FTL_{Low} – F_S)^2 / (F_A – F_S) = 1000 \times (3 \times \varepsilon_1)^2 / (-0.01) = 1000 \times 9 \times \varepsilon_1^2 / (-0.01) = -291.6$

If a unilateral inadvertent payback term is allowed, then this BA could modify its Reporting ACE by 10 MW in the above calculation of performance measures. The performance calculations would change as follows:

$ACE = Tie\ Error – 10(B)(F_A – F_S) = -290 -10 \times -100 \times (59.990 – 60.000) + 10 = -290$ MW
$CPS1 = (2 – ((-290 /-10(-100)) \times 0.010) / \varepsilon_1^2) \times 100\% = 2-(0.0029 / 0.000324) \times 100\% = -695\%$
$BAAL_{Low} = -10 (-100) \times (FTL_{Low} – F_S)^2 / (F_A – F_S) = 1000 \times (3 \times \varepsilon_1)^2 / (-0.01) = 1000 \times 9 \times \varepsilon_1^2 / (-0.01) = -291.6$

By making this simple change by adding 10 MW of unilateral inadvertent payback, the BA reduces its ACE by 10 MW, the BA improves its CPS1 performance by 30 %, and it improves its BAAL performance enough to avoid a BAAL non-compliance. Although on first look, it would appear that allowing unilateral inadvertent payback to enable TEC causes only small changes in performance, and it therefore, should be enabled to address TEC. This position has been supported by a study that implemented unilateral inadvertent payback on a continuous basis at 10% of the Frequency Bias Setting would cause a change of less than 1% in CPS1 performance.

The problem with the above analysis is that unilateral inadvertent payback would only need to be implemented a small percentage of the time. Under these conditions, it is important to consider the factors that could influence when to implement a unilateral payback schedule. One factor is the Actual Frequency at the time the unilateral inadvertent payback schedule is implemented.

Example 3: Effect of Unilateral Inadvertent Payback
Assume that Time Error is fast indicating that a lower Scheduled Frequency will help to correct Time Error.
Assume that Actual Frequency of the interconnection is 59.940 Hz and Scheduled Frequency is 60 Hz.
Assume that a BA with a Frequency Bias Setting of 100 MW/0.1 Hz has a Tie Error of 10 MW.
Using the Scheduled Frequency of 60 Hz, this BA will have the following performance measurements:

ACE = Tie Error – $10(B)(F_A – F_S)$ = 10 -10 x -100 x (59.940 – 60.000) = -50 MW
CPS1 = $(2 – ((-50 /-10(-100)) \times -0.060) / \varepsilon_1{}^2) \times 100\% = 2-(0.003 / 0.000324) \times 100\% = -726\%$
$BAAL_{Low} = -10 (-100) \times (FTL_{Low} – F_S)^2 / (F_A – F_S) = 1000 \times (3 \times \varepsilon_1)^2 / (-0.01) = 1000 \times 9 \times \varepsilon_1{}^2 / (-0.06) = -48.6$

If a unilateral inadvertent payback term is allowed, then this BA could modify its Reporting ACE by 10 MW in the above calculation of performance measures. The performance calculations would change as follows:

ACE = Tie Error – $10(B)(F_A – F_S)$ = 10 -10 x -100 x (59.940 – 60.000) + 10 = -40 MW
CPS1 = $(2 – ((-40 /-10(-100)) \times 0.060) / \varepsilon_1{}^2) \times 100\% = 2-(0.0024 / 0.000324) \times 100\% = -541\%$
$BAAL_{Low} = -10 (-100) \times (FTL_{Low} – F_S)^2 / (F_A – F_S) = 1000 \times (3 \times \varepsilon_1)^2 / (-0.01) = 1000 \times 9 \times \varepsilon_1{}^2 / (-0.06) = -48.6$

By making this simple change of adding 10 MW of unilateral inadvertent payback, the BA reduces its ACE by 10 MW, the BA improves its CPS1 performance by 185 %, and easily meets its BAAL limit. Since the suggested change when implemented across all time has very little effect on CPS1 and BAAL, it would make sense to require unilateral inadvertent payback to be excluded from Reporting ACE to encourage that unilateral inadvertent payback to be implemented at times when it will have little to no effect on the CPS1 and BAAL performance measures. In other words, unilateral inadvertent payback should only be implemented when it will benefit the interconnection by moving Actual Frequency toward 60 Hz or when Actual Frequency is near 60 Hz and it will not contribute to reliability problems. Under these conditions, unilateral inadvertent payback will be able to be implemented almost 50% of the time.

Exhibit C-2

Project 2010-14.2 – Balancing Authority Reliability-based Controls 2
Periodic Review Template: BAL-004-0 – Time Error Correction

NERC
NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

DRAFT

Project 2010-14.2 – Balancing Authority Reliability-based Controls 2 Periodic Review Template: BAL-004-0—Time Error Correction

Updated April 28, 2014

Introduction

The North American Electric Reliability Corporation (NERC) is required to conduct a periodic review of each NERC Reliability Standard at least once every ten years, or once every five years for any Reliability Standard approved by the American National Standards Institute as an American National Standard.[1] The Reliability Standard identified below was included in the current cycle of periodic reviews. The current version, BAL-004-0, became enforceable on June 18, 2007.

Periodic Review Teams (PRTs) use the background information and the questions in the Periodic Review Template, along with available associated worksheets and reference documents, to guide a comprehensive review that results in a recommendation that the Reliability Standard should be: (1) reaffirmed as is (i.e., no changes needed); (2) revised (which may include revising or retiring one or more requirements); or (3) retired. If the team recommends a revision to or a retirement of the Reliability Standard, it must also submit a Standard Authorization Request (SAR) outlining the proposed scope and technical justification for the revision or retirement.

The BARC Phase 2 PRT recommends that BAL-004-0 be retired and has prepared a SAR to that effect.

Applicable Reliability Standard: BAL-004-0
Team Members (include name and organization): 1. Doug Hils (Chair) 2. Thomas W. (Tom) Siegrist (Vice Chair) 3. Ron Carlsen 4. Howard F. Illian 5. Mike Potishnak 6. Jerry Rust 7. Robert Stanton 8. Glenn Stephens 9. Stephen Swan

[1] NERC Standard Processes Manual 45 (2013), posted at http://www.nerc.com/pa/Stand/Documents/Appendix_3A_StandardsProcessesManual.pdf.

10. Mark Trumble 11. Mallory Huggins (Lead Standards Developer) 12. Laura Anderson (Standards Developer) 13. Sean Cavote (Standards Developer) 14. Steve Crutchfield (Standards Developer)
Date Review Completed: 05/02/14

Background Information ***(to be completed initially by NERC staff)***

1. **Are there any outstanding Federal Energy Regulatory Commission (FERC) directives associated with the Reliability Standard? (If so, NERC staff will attach a list of the directives with citations to associated FERC orders for inclusion in a SAR.)**

☒ Yes

☐ No

Please see the *Consideration of Issues and Directives* document associated with the BARC 2 Periodic Review.

2. **Have stakeholders requested clarity on the Reliability Standard in the form of an Interpretation (outstanding, in progress, or approved), Compliance Application Notice (CAN) (outstanding, in progress, or approved), or an outstanding submission to NERC's Issues Database? (If there are, NERC staff will include a list of the Interpretation(s), CAN(s), or stakeholder-identified issue(s) contained in the NERC Issues Database that apply to the Reliability Standard.)**

☐ Yes

☒ No

There are no Interpretations, CANs, or outstanding issues associated with BAL-004-0.

3. **Is the Reliability Standard one of the most violated Reliability Standards? If so, does the root cause of the frequent violation appear to be a lack of clarity in the language?**

☐ Yes

☒ No

Please explain: According to the Notice of Withdrawal of BAL-004-1 filed with FERC on March 19, 2013, "…no Interconnection Time Monitor has incurred a violation of BAL-004-0."

4. **Does the Reliability Standard need to be modified or converted to the results-based standard (RBS) format as outlined in *Attachment 1: Results-Based Standards*? Note that this analysis is twofold and requires collaboration among NERC staff and the Review Team. First, determine whether the *substance* of the Reliability Standard comports to the RBS principles described in Attachment 1. Second, ensure that, as Reliability Standards are reviewed, the *formatting* is**

changed as necessary to comply with the current format of a Reliability Standard. If the answer to either part of this question is "Yes," the Reliability Standard should be revised.

☐ Yes

☒ No

The Reliability Standard is not written in RBS format – Requirement R1 could be rewritten to better satisfy the guidelines for writing an RBS requirement, and the Reliability Standard needs to incorporate VSLs, VRFs, Time Horizons, Measures, and compliance information – but it does not need to be modified because the PRT is proposing to retire it.

Questions for the Subject Matter Expert (SME) Review Team

If NERC staff answered "Yes" to any of the questions above, the Reliability Standard probably requires revision. The questions below are intended to further guide your review. Some of the questions reference documents provided by NERC staff as indicated in the Background questions above.

1. **Paragraph 81: Does one or more of the requirements in the Reliability Standard meet criteria for retirement or modification based on Paragraph 81 concepts? Use *Attachment 2: Paragraph 81 Criteria* to make this determination.**

   ☒ Yes

   ☐ No

   Please summarize your application of Paragraph 81 Criteria, if any: All four requirements in BAL-004-0 should be retired.

   The Independent Expert Review Report recommended retiring BAL-004-0 R1, R2, R3, and R4, primarily under Paragraph 81 principles. Each requirement received content and quality scores of 0.

   During Phase 1 of the Paragraph 81 process, the Paragraph 81 review team received three sets of comments suggesting that BAL-004-0 R1, R2, R3, and R4 be retired. These commenters stated that BAL-004-0 is not important for reliability and is duplicative with NAESB standard WEQ-006.

   The PRT agrees with the Independent Experts and many stakeholders that BAL-004-0 should be retired under Paragraph 81 criteria. BAL-004-0 satisfies Criterion A of the Paragraph 81 criteria because it does not support the reliable operation of the BES.

   BAL-004-0 also satisfies Criteria B6. TEC is a commercial practice that relates to the quality of power delivered, not a practice that supports reliability.

   BAL-004-0 also satisfies Criteria C4, C5, and C7. With respect to C4, the 2014 Actively Monitored List does not include BAL-004-0 for either self-certification or audits. With respect to C5, there is a possible negative impact on NERC's published and posted reliability principles. For instance, slowing the clock for a manual TEC in the Eastern Interconnection brings the Interconnection slightly closer to the first step of Underfrequency Load Shedding, which contradicts Principle 2, which states that "The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand." Finally, with respect to C7, BAL-004-0 does not promote results- or performance-based Reliability Standards.

2. **Clarity:** If the Reliability Standard has an Interpretation, CAN, or issue associated with it, or is frequently violated because of ambiguity, it probably needs to be revised for clarity. Beyond these indicators, is there any reason to believe that the Reliability Standard should be modified to address a lack of clarity? Consider:

   a. Is this a Version 0 Reliability Standard?
   b. Does the Reliability Standard have obviously ambiguous language or language that requires performance that is not measurable?
   c. Are the requirements consistent with the purpose of the Reliability Standard?

   ☐ Yes

   ☒ No

   Please summarize your assessment: BAL-004-0 is a Version 0 Reliability Standard, but the requirement language is clear, and is consistent with the purpose. The motivation for retiring BAL-004-0 is not a lack of clarity, but rather the fact that BAL-004-0 does not support reliability.

3. **Definitions**: Do any of the defined terms used within the Reliability Standard need to be refined?

   ☐ Yes

   ☒ No

   Please explain: The defined terms in the Reliability Standard do not need to be refined.

4. **Compliance Elements:** Are the compliance elements associated with the requirements (Measures, Data Retention, Violation Risk Factors (VRF), and Violation Severity Levels (VSL)) consistent with the direction of the Reliability Assurance Initiative and FERC and NERC guidelines?

   ☐ Yes

   ☒ No

   If you answered "No," please identify which elements require revision, and why: BAL-004-0 was assigned VRFs and VSLs as part of the VRF/VSL roll-up project, but it does not have Measures or Time Horizons. However, the absence of the compliance elements is irrelevant because the Reliability Standard is being recommended for retirement.

5. **Consistency with Other Reliability Standards:** Does the Reliability Standard need to be revised for formatting and language consistency among requirements within the Reliability Standard or consistency with other Reliability Standards? If you answered "Yes," please describe the changes needed to achieve formatting and language consistency:

   ☐ Yes
   ☒ No

6. **Changes in Technology, System Conditions, or other Factors:** Does the Reliability Standard need to be revised to account for changes in technology, system conditions, or other factors?

   ☐ Yes
   ☒ No

   If you answered "Yes," please describe the changes and specifically what the potential impact is to reliability if the Reliability Standard is not revised:

7. **Consideration of Generator Interconnection Facilities:** Is responsibility for generator interconnection Facilities appropriately accounted for in the Reliability Standard?

   ☒ Yes
   ☐ No

   Guiding Questions:

   If the Reliability Standard is applicable to GOs/GOPs, is there any ambiguity about the inclusion of generator interconnection Facilities? (If generation interconnection Facilities could be perceived to be excluded, specific language referencing the Facilities should be introduced in the Reliability Standard.) Not applicable.

   If the Reliability Standard is not applicable to GOs/GOPs, is there a reliability-related need for treating generator interconnection Facilities as transmission lines for the purposes of this Reliability Standard? (If so, GOs and GOPs that own or operate relevant generator interconnection Facilities should be explicit in the applicability section of the Reliability Standard.) No.

Recommendation

The answers to the questions above, along with a preliminary recommendation of the Review Team, will be posted for a 45-day comment period, and the comments publicly posted. The Review Team will review the comments to evaluate whether to modify its initial recommendation, and will document the final recommendation which will be presented to the Standards Committee.

Preliminary Recommendation (to be completed by the Review Team after its review and prior to posting the results of the review for industry comment):

☐ REAFFIRM

☐ REVISE

☒ RETIRE

Technical Justification *(If the Review Team recommends that the Reliability Standard be revised, a draft SAR may be included and the technical justification included in the SAR)*: As explained in more detail in the *Time Error Correction and Reliability White Paper*, TEC is a commercial service. The NERC Reliability Standards should be limited to maintaining and enhancing reliability. Manual TEC is a commercial service that does not support reliability, and accurate time can be procured from alternative sources. Accordingly, BAL-004-0 – Time Error Correction and the associated NAESB WEQ Manual Time Error Correction Business Practice Standard – WEQ-006 should be retired. Because inconsistent application of TEC within an Interconnection presents a risk to reliability, the accompanying NAESB standard, NAESB WEQ Manual Time Error Correction Business Practice Standard – WEQ-006, should also be retired.

A Standard Authorization Request outlining this proposal has been posted for stakeholder comment.

Preliminary Recommendation posted for industry comment (date): March 17, 2015

Final Recommendation (to be completed by the Review Team after it has reviewed industry comments on the preliminary recommendation):

☐ REAFFIRM *(This should only be checked if there are no outstanding directives, interpretations or issues identified by stakeholders.)*

☐ REVISE

☐ RETIRE

Technical Justification *(If the Review Team recommends that the Reliability Standard be revised, a draft SAR may be included and the technical justification included in the SAR)*:

Date submitted to NERC Staff:

Attachment 1: Results-Based Standards

The fourth question for NERC staff and the Review Team asks if the Reliability Standard needs to be converted to the results-based standards (RBS) format. The information below will be used by NERC staff and the Review Team in making this determination.

Transitioning the current body of standards into a clear, concise, and effective body will require a comprehensive application of the RBS concept. RBS concepts employ a defense-in-depth strategy for Reliability Standards development where each requirement has a role in preventing system failures, and the roles are complementary and reinforcing. Reliability Standards should be viewed as a portfolio of requirements designed to achieve an overall defense-in-depth strategy and comply with the quality objectives identified in the resource document titled, "Acceptance Criteria of a Reliability Standard."

Accordingly, the Review Team shall consider whether the Reliability Standard contains results-based requirements with sufficient clarity to hold entities accountable without being overly prescriptive as to how a specific reliability outcome is to be achieved. The RBS concept, properly applied, addresses the clarity and effectiveness aspects of a standard.

A Reliability Standard that adheres to the RBS format should strive to achieve a portfolio of performance-, risk-, and competency-based mandatory reliability requirements that support an effective defense-in-depth strategy. Each requirement should identify a clear and measurable expected outcome, such as: a) a stated level of reliability performance, b) a reduction in a specified reliability risk, or c) a necessary competency.

a. **Performance-Based**—defines a particular reliability objective or outcome to be achieved. In its simplest form, a results-based requirement has four components: who, under what conditions (if any), shall perform what action, to achieve what particular result or outcome?

b. **Risk-Based**—preventive requirements to reduce the risks of failure to acceptable tolerance levels. A risk-based reliability requirement should be framed as: who, under what conditions (if any), shall perform what action, to achieve what particular result or outcome that reduces a stated risk to the reliability of the bulk power system?

c. **Competency-Based**—defines a minimum set of capabilities an entity needs to have to demonstrate it is able to perform its designated reliability functions. A competency-based reliability requirement should be framed as: who, under what conditions (if any), shall have what capability, to achieve what particular result or outcome to perform an action to achieve a result or outcome or to reduce a risk to the reliability of the bulk power system?

Additionally, each RBS-adherent Reliability Standard should enable or support one or more of the eight reliability principles listed below. Each Reliability Standard should also be consistent with all of the reliability principles.

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.

2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.

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.

4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained, and implemented.

5. Facilities for communication, monitoring, and control shall be provided, used, and maintained for the reliability of interconnected bulk power systems.

6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.

7. The reliability of the interconnected bulk power systems shall be assessed, monitored, and maintained on a wide-area basis.

8. Bulk power systems shall be protected from malicious physical or cyber attacks.

If the Reliability Standard does not provide for a portfolio of performance-, risk-, and competency-based requirements or consistency with NERC's reliability principles, NERC staff and the Review Team should recommend that the Reliability Standard be revised or reformatted in accordance with the RBS format.

Attachment 2: Paragraph 81 Criteria

The first question for the Review Team asks if one or more of the requirements in the Reliability Standard meet(s) criteria for retirement or modification based on Paragraph 81 concepts.[2] Use the Paragraph 81 criteria explained below to make this determination. Document the justification for the decisions throughout and provide them in the final assessment in the Periodic Review Template.

For a Reliability Standard requirement to be proposed for retirement or modification based on Paragraph 81 concepts, it must satisfy **both**: (i) Criterion A (the overarching criterion); and (ii) at least one of the Criteria B listed below (identifying criteria). In addition, for each Reliability Standard requirement proposed for retirement or modification, the data and reference points set forth below in Criteria C should be considered for making a more informed decision.

Criterion A (Overarching Criterion)

The Reliability Standard requirement requires responsible entities ("entities") to conduct an activity or task that does little, if anything, to benefit or protect the reliable operation of the BES.

Section 215(a) (4) of the United States Federal Power Act defines "reliable operation" as: "… operating the elements of the bulk power system within equipment and electric system thermal, voltage, and stability limits so that instability, uncontrolled separation, or cascading failures of such system will not occur as a result of a sudden disturbance, including a cybersecurity incident, or unanticipated failure of system elements."

Criteria B (Identifying Criteria)

B1. Administrative

The Reliability Standard requirement requires responsible entities to perform a function that is administrative in nature, does not support reliability and is needlessly burdensome.

This criterion is designed to identify requirements that can be retired or modified with little effect on reliability and whose retirement or modification will result in an increase in the efficiency of the ERO compliance program. Administrative functions may include a task that is related to developing procedures or plans, such as establishing communication contacts. Thus, for certain requirements, Criterion B1 is closely related to Criteria B2, B3 and B4. Strictly administrative functions do not inherently negatively impact reliability directly and, where possible, should be eliminated or modified for purposes of efficiency and to allow the ERO and entities to appropriately allocate resources.

[2] In most cases, satisfaction of the Paragraph 81 criteria will result in the retirement of a requirement. In some cases, however, there may be a way to modify a requirement so that it no longer satisfies Paragraph 81 criteria. Recognizing that, this document refers to both options.

B2. Data Collection/Data Retention
These are requirements that obligate responsible entities to produce and retain data which document prior events or activities, and should be collected via some other method under NERC's rules and processes.

This criterion is designed to identify requirements that can be retired or modified with little effect on reliability. The collection and/or retention of data do not necessarily have a reliability benefit and yet are often required to demonstrate compliance. Where data collection and/or data retention is unnecessary for reliability purposes, such requirements should be retired or modified in order to increase the efficiency of the ERO compliance program.

B3. Documentation
The Reliability Standard requirement requires responsible entities to develop a document (*e.g.,* plan, policy or procedure) which is not necessary to protect reliability of the bulk power system.

This criterion is designed to identify requirements that require the development of a document that is unrelated to reliability or has no performance or results-based function. In other words, the document is required, but no execution of a reliability activity or task is associated with or required by the document.

B4. Reporting
The Reliability Standard requirement obligates responsible entities to report to a Regional Entity, NERC or another party or entity. These are requirements that obligate responsible entities to report to a Regional Entity on activities which have no discernible impact on promoting the reliable operation of the BES and if the entity failed to meet this requirement there would be little reliability impact.

B5. Periodic Updates
The Reliability Standard requirement requires responsible entities to periodically update (*e.g.,* annually) documentation, such as a plan, procedure or policy without an operational benefit to reliability.

This criterion is designed to identify requirements that impose an updating requirement that is out of sync with the actual operations of the BES, unnecessary, or duplicative.

B6. Commercial or Business Practice
The Reliability Standard requirement is a commercial or business practice, or implicates commercial rather than reliability issues.

This criterion is designed to identify those requirements that require: (i) implementing a best or outdated business practice or (ii) implicating the exchange of or debate on commercially sensitive information while doing little, if anything, to promote the reliable operation of the BES.

B7. Redundant
The Reliability Standard requirement is redundant with: (i) another FERC-approved Reliability Standard requirement(s); (ii) the ERO compliance and monitoring program; or (iii) a governmental regulation (*e.g.,* Open Access Transmission Tariff, North American Energy Standards Board ("NAESB"), etc.).

This criterion is designed to identify requirements that are redundant with other requirements and are, therefore, unnecessary. Unlike the other criteria listed in Criterion B, in the case of redundancy, the task or activity itself may contribute to a reliable BES, but it is not necessary to have two duplicative requirements on the same or similar task or activity. Such requirements can be retired or modified with little or no effect on reliability and removal will result in an increase in efficiency of the ERO compliance program.

Criteria C (Additional data and reference points)
Use the following data and reference points to assist in the determination of (and justification for) whether to proceed with retirement or modification of a Reliability Standard requirement that satisfies both Criteria A and B:

C1. Was the Reliability Standard requirement part of a FFT filing?
The application of this criterion involves determining whether the requirement was included in a FFT filing.

C2. Is the Reliability Standard requirement being reviewed in an ongoing Standards Development Project?
The application of this criterion involves determining whether the requirement proposed for retirement or modification is part of an active Standards Development Project, with consideration for the status of the project. If the requirement has been approved by Registered Ballot Body and is scheduled to be presented to the NERC Board of Trustees, in most cases it will not need to be addressed in the periodic review. The exception would be a requirement, such as the Critical Information Protection (CIP) requirements for Version 3 and 4, that is not due to be retired for an extended period of time. Also, for informational purposes, whether the requirement is included in a future or pending Standards Development Project should be identified and discussed.

C3. What is the VRF of the Reliability Standard requirement?
The application of this criterion involves identifying the VRF of the requirement proposed for retirement or modification, with particular consideration of any requirement that has been assigned as having a Medium or High VRF. Also, the fact that a requirement has a Lower VRF is not dispositive that

it qualifies for retirement or modification. In this regard, Criterion C3 is considered in light of Criterion C5 (Reliability Principles) and C6 (Defense in Depth) to ensure that no reliability gap would be created by the retirement or modification of the Lower VRF requirement. For example, no requirement, including a Lower VRF requirement, should be retired or modified if doing so would harm the effectiveness of a larger scheme of requirements that are purposely designed to protect the reliable operation of the BES.

C4. In which tier of the most recent Actively Monitored List (AML) does the Reliability Standard requirement fall?
The application of this criterion involves identifying whether the requirement proposed for retirement or modification is on the most recent AML, with particular consideration for any requirement in the first tier of the AML.

C5. Is there a possible negative impact on NERC's published and posted reliability principles?
The application of this criterion involves consideration of the eight following reliability principles published on the NERC webpage.

Reliability Principles
NERC Reliability Standards are based on certain reliability principles that define the foundation of reliability for North American bulk power systems. Each reliability standard shall enable or support one or more of the reliability principles, thereby ensuring that each standard serves a purpose in support of reliability of the North American bulk power systems. Each reliability standard shall also be consistent with all of the reliability principles, thereby ensuring that no standard undermines reliability through an unintended consequence.

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.

Principle 2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.

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.

Principle 4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained, and implemented.

Principle 5. Facilities for communication, monitoring, and control shall be provided, used, and maintained for the reliability of interconnected bulk power systems.

Principle 6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.

Principle 7. The reliability of the interconnected bulk power systems shall be assessed, monitored, and maintained on a wide-area basis.

Principle 8. Bulk power systems shall be protected from malicious physical or cyber attacks. (footnote omitted).

C6. Is there any negative impact on the defense in depth protection of the BES?
The application of this criterion considers whether the requirement proposed for retirement or modification is part of a defense in depth protection strategy. In order words, the assessment is to verify whether other requirements rely on the requirement proposed for retirement or modification to protect the BES.

C7. Does the retirement or modification promote results or performance based Reliability Standards?
The application of this criterion considers whether the requirement, if retired or modified, will promote the initiative to implement results- and/or performance-based Reliability Standards.

Exhibit C-3

Manual Time Error Correction Reference Document

Time Monitoring Reference Document

Introduction

This reference document outlines responsibilities of Reliability Coordinators serving as time monitors in the North American Interconnections. This document specifies how manual Time Error Corrections (MTEC) are to be implemented if needed to resolve issues and outlines procedural responsibilities assigned to the time monitor.[1] Changes to this reference document will be at the direction of the NERC Operating Committee (OC).

Designation of Time Monitor

There will be one designated time monitor within each Interconnection. NERC's Operating Reliability Subcommittee (ORS) will select a time monitor for each Interconnection. At the annual December meeting of the OC, the ORS will notify the OC of the designated time monitors for the next two time monitor terms.

The minimum term of each time monitor shall be no less than one (1) year. With the exception of the Eastern Interconnection, the time monitor term shall be automatically renewed unless requested otherwise by providing a minimum of six (6) months' notice to the ORS. The Eastern Interconnection time monitor will rotate on an annual basis as outlined below. Should an existing or future time monitor no longer be willing or able to fulfill its responsibilities, the OC will, within the six (6) month period after notice, direct the ORS to select a replacement and communicate the transition plan to the OC.

NERC's Resources Subcommittee (RS) will report to the OC and ORS any issues to be solved by implementing MTEC and give the technical basis for the determination.

If a time monitor fails to fulfill its responsibilities, the ORS will work with the time monitor to resolve the problem. The ORS will submit a report to the OC either identifying corrective measures taken or providing a recommendation for a new time monitor.

Responsibilities of the Time Monitor

When an issue has been identified and will be resolved through MTEC, the time monitor will start and stop MTEC as outlined in Attachment A of this reference document.

The time monitor will terminate any MTEC believed to be adversely impacting reliability. Requests for termination may be made by any Reliability Coordinator or by a Balancing Authority through its respective Reliability Coordinator. The time monitor will provide reports (as determined by the OC), including but not limited to accumulated Time Error following each MTEC.

[1] This reference document is provided for guidance and does not reflect binding norms or mandatory requirements.

Time Monitor Transition

The current time monitor will contact the next scheduled time monitor no later than October 1st to begin coordinating the transition that will occur on February 1st of the following year. This coordination should include such things as local procedures currently in use, data requirements, and communications. In the event unusual operating issues prevent the designated Eastern Interconnection time monitor from fulfilling its responsibilities, the previous time monitor should maintain the capability to perform the time monitor duties.

References

A copy of each time monitor's local procedure is available on an as needed basis. For additional information or to request a copy of the time monitor's local procedures, an entity should contact the current time monitor.

Interconnection Time Monitors

Each Interconnection has identified the following Reliability Coordinator as its time monitor:

1. ERCOT Interconnection – ERCOT Reliability Coordinator
2. Québec Interconnection – Hydro-Québec TransÉnergie Reliability Coordinator
3. WECC Interconnection – Peak Reliability
4. Eastern Interconnection – The Reliability Coordinators in the Eastern Interconnection will rotate the time monitor responsibilities on an annual basis as follows:
    a. PJM – February 1, 2016 through January 31, 2017
    b. FRCC – February 1, 2017 through January 31, 2018
    c. ISO-NE – February 1, 2018 through January 31, 2019
    d. SaskPower – February 1, 2019 through January 31, 2020
    e. Southeastern – February 1, 2020 through January 31, 2021
    f. TVA – February 1, 2021 through January 31, 2022
    g. MISO – February 1, 2022 through January 31, 2023
    h. IESO (Ontario) – February 1, 2023 through January 31, 2024
    i. NBP (New Brunswick Power) – February 1, 2024 through January 31, 2025
    j. VACAR-South – February 1, 2025 through January 31, 2026
    k. SPP – February 1, 2026 through January 31, 2027
    l. NYISO – February 1, 2027 through January 31, 2028

Attachment A

Introduction

Interconnection frequency is normally scheduled at 60.00 Hz. Since control is imperfect, frequency will average slightly above or below 60.00 Hz. When an issue is identified and implementation of a MTEC will correct the issue, corrective action is taken by adjusting the Interconnection's scheduled frequency.

Each Balancing Authority is expected to participate in Interconnection MTEC procedures unless it is operating asynchronously to its Interconnection. If a Balancing Authority is experiencing a reliability problem that would be aggravated by the correction, it must inform its Reliability Coordinator, so that the Reliability Coordinator can take appropriate action. The requirement to participate will be enforced through an Operating Instruction from the Reliability Coordinator acting as the time monitor.

Single Balancing Authority Interconnections or Balancing Authorities operating asynchronously may establish their own time error control bands and time correction methodology, but should notify the OC of the bands utilized, as well as subsequent changes.

Interconnections may choose to follow alternative procedures. If so, those procedures should be shared with the OC and approved by the OC.

General Practices

1. **Manual Time Error Correction Notice and Commencement.** MTECs are conducted following the process below.
2. **Time Error Correction Initiation and Termination**. MTEC starts and ends on the hour or half-hour with notice by the time monitor generally given at least one hour before the MTEC is scheduled to start or terminate.
3. **Time Error Correction labeling.** MTEC notifications are labeled on a monthly basis using an Interconnection approach (e.g. A-Z, AA-AZ, BA-BZ,…).
4. **Time Correction Offset.** The Balancing Authority may participate in MTEC by either of the following two methods:
    a. **Frequency Offset (Preferred Approach).** The Balancing Authority may offset its frequency schedule by 0.02 Hz (or other smaller offset designated by the time monitor[2]), leaving the Frequency Bias Setting normal, or
    b. **Schedule Offset**. If the frequency schedule cannot be offset, the Balancing Authority may offset its net Interchange Schedule (MW) by an amount equal to the computed bias contribution times the desired frequency offset.
5. **Request for Termination or Halt of Scheduled MTEC.** Any Reliability Coordinator in an Interconnection may request the termination of an MTEC or of the initiation of a scheduled MTEC.

[2] Alternative procedures should be approved the NERC OC prior to implementation.

A Balancing Authority that has a reliability concern with the execution of an MTEC should notify their Reliability Coordinator to request a termination of the MTEC. A Reliability Coordinator requesting a termination or halt of an MTEC is asked to forward the reasons for requesting the termination to the chairs of the RS and ORS.

General Manual Time Error Correction Practice

Unless local Interconnection procedures prevail, MTECs will last four hours[3] unless terminated by a Reliability Coordinator for reliability concerns. Corrections for fast Time Error in the Eastern Interconnection should not be initiated such that they would run during the morning load ramp[4]. Generally, the normal MTEC process is to offset the scheduled frequency by 0.02 Hz, *e.g.*, slow time error is corrected by setting frequency to 60.02 Hz and fast time error is corrected by setting frequency to 59.98 Hz.

[3] The four hour duration is intended to reduce the likelihood of errors. A four hour correction would reduce a 30 second Time Error to approximately 25 seconds.

[4] Avoiding MTEC initiation for fast Time Error during the morning load ramp reduces the likelihood of low frequency excursions during schedule changes and can preclude an MTEC where load increase would naturally reduce fast Time Error.

Exhibit D

Summary of Development History and Complete Record of Development

Summary of Development History

Summary of Development History

The development record for proposed Reliability Standard BAL-004-0 is summarized below.

I. Overview of the Standard Drafting Team

When evaluating a proposed Reliability Standard, the Commission is expected to give "due weight" to the technical expertise of the ERO.[1] The technical expertise of the ERO is derived from the standard drafting team selected to lead each project in accordance with Section 4.3 if the NERC Standards Process Manual.[2] For this project, the standard drafting team consisted of industry experts, all with a diverse set of experiences. A roster of the standard drafting team members is included in Exhibit E.

II. Standard Development History

A. Standard Authorization Request Development

Project 2010-14.2.2 – Phase 2 of Balancing Authority Reliability-based Controls was initiated on March 17, 2015 as a Standard Authorization Request ("SAR") to address the Commission's directives in Order No. 693,[3] and retire requirements that met the criteria developed in the Paragraph 81 project. In Order No. 693, the Commission directed NERC to develop measures and compliance elements for the standard and to review the effect that the standard had on inadvertent interchange. The SAR was approved by the Standards Committee on March 11, 2015 and was posted for a 30-day comment period from March 17, 2015 through April 16, 2015.

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1 Section 215(d)(2) of the Federal Power Act; 16 U.S.C. §824(d) (2) (2012).

2 The NERC *Standard Processes Manual* is available at http://www.nerc.com/comm/SC/Documents/Appendix_3A_StandardsProcessesManual.pdf.

3 Order No. 693, *Mandatory Reliability Standards for the Bulk-Power System*, 72 Fed. Reg. 16,415 (2007) (to be codified at 18 C.F.R. pt. 40).

B. First Posting – Formal Comment Period, Initial Ballot

Proposed Reliability BAL-004-0 was first posted for a 45-day formal comment period from September 24, 2015 through November 12, 2015, with an initial ballot held from November 3, 2015 through November 12, 2015. Several documents were posted for guidance with the first posting: (i) Implementation Plan; (ii) the Unofficial Comment Form, and (iii) a White Paper document. The initial ballot received 84.40% quorum, and 98.17% approval.[4] There were 17 sets of responses to the posting, including comments from approximately 77 different individuals from approximately 53 companies representing 8 of the10 of the industry segments.[5]

C. Final Ballot

Proposed Reliability Standard BAL-004-0 was posted for a 10-day final ballot period from December 8, 2015 through December 17, 2015. The ballot for the proposed Reliability Standard and associated documents reached quorum at 88.65% of the ballot pool, and the standard received sufficient affirmative votes for approval, receiving support from 98.26% of the voters.[6]

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4 NERC, *Summary of Initial Ballot Results*, Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls, *available at* http://www.nerc.com/pa/Stand/Project%2020101422%20Phase%202%20of%20BARC%20%20BAL004%20DL/2010-14.2.2_BAL-004-0_IB_Results_Word_Announce_11162015.pdf.

5 NERC, *Consideration of Comments*, Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls, (December 8, 2015), *available at* http://www.nerc.com/pa/Stand/Project%2020101422%20Phase%202%20of%20BARC%20%20BAL004%20DL/2010-14_2_2_Phase_2_of_BARC_BAL-004_Consideration_of_Comments_12082015.pdf.

6 NERC, *Standards Announcement*, Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls, *available at* http://www.nerc.com/pa/Stand/Project%2020101422%20Phase%202%20of%20BARC%20%20BAL004%20DL/2010-14.2.2_BAL-004-0_FB_Results_Word_Announce_12182015.pdf.

D. Board of Trustees Adoption

Proposed Reliability Standard BAL-004-0 was adopted by the NERC Board of Trustees on November 2, 2016.

Complete Record of Development

Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls - BAL-004-2

Related Files | Project 2007-05 - Balancing Authority Controls | Project 2007-18 - Reliability-based Control | Project 2010-14.2 – Periodic Review of BAL Standards

Status

A final ballot for the recommended retirement of **BAL-004-0 – Time Error Correction** concluded **8 p.m. Eastern, Thursday, December 17, 2015.** The voting results can be accessed via the links below. The standard will be submitted to the Board of Trustees for adoption and then filed with the appropriate regulatory authorities.

Background

The BARC 2 PRT was appointed by the Standards Committee on September 19, 2013 as part of NERC's obligation to conduct periodic reviews of its standards. The BARC 2 PRT used background information on the standards and the questions set forth in the Periodic Review Template developed by NERC and approved by the Standards Committee, along with associated worksheets and reference documents, to determine whether BAL-004-0 should be: (1) affirmed as is (i.e., no changes needed); (2) revised (which may include revising or retiring one or more requirements); or (3) retired. During the development of the recommendation, the PRT also considered stakeholder recommendations for candidate Paragraph 81 requirements from Phase 1 of Paragraph 81, and applied the Paragraph 81 criteria to all of the requirements. The team also considered the Independent Expert Review Panel recommendations on the two standards.

After an extensive review, the BARC 2 PRT is recommending that Reliability Standard BAL-004-0 be retired and that manual Time Error Correction (TEC) be eliminated as a continent-wide NERC requirement. Once the current 30-day industry comment period concludes, the BARC 2 SDT will consider comments and finalize its recommendation, which will be presented to the Standards Committee.

The Balancing Authority Reliability-based Controls 2.2 Standard Drafting Team (BARC 2.2 SDT) reviewed the findings of the BARC 2 Primary Review Team. A survey was posted for comment August 12-25, 2015 to gain a better perspective as to any concerns the industry may have if the practice of manual Time Error Correction (TEC) was eliminated. The survey responses indicated support for retirement of manual TEC as a standard. Upon further review the BARC 2.2 SDT determined that manual TEC would not support the reliability of the BPS. Conducting manual TEC in any form directly contradicts NERC Reliability Principle 2: “The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.” The practice of using manual TEC to place the Interconnection closer to the settings for automatic underfrequency load shedding does not support or enhance reliability. Therefore, BAL-004-0 should be retired.

The survey responses also indicated that the accompanying North American Energy Standard Board (NAESB) WEQ Manual Time Error Correction Business Practice Standard – WEQ-006, should be retired contemporaneously with BAL-004-0. The BARC 2.2 SDT's recommendation for retirement of BAL-004-0 is contingent on simultaneous retirement of NAESB WEQ-006 to ensure clarity and to avoid inadvertent, uncoordinated, manual TEC. The BARC 2.2 SDT has been coordinating with NAESB on this issue. Upon retirement of BAL-004-0 and NAESB WEQ-006, currently or soon to be effective Reliability Standards BAL-003-1 and BAL-001-2 will incent continued adherence to a frequency approximating 60 Hz over long-term averages.

Standard(s) affected - BAL-004-0

Purpose / Industry Need:
N/A

Draft	Actions	Dates	Results	Consideration of Comments
BAL-004-0 White Paper **(27)**	Final Ballot Info **(28)** Vote	12/08/15 - 12/17/15	Summary **(29)** Ballot Results **(30)**	
BAL-004-0 Due to the recommended retirement/extensive changes, a redline of BAL-004 is not included Implementation Plan **(17)** **Supporting Materials** Unofficial Comment Form **(18)** White Paper **(19)**	Initial Ballot Updated Info **(20)** Info **(21)** Vote	11/03/15 - 11/12/15	Summary **(23)** Ballot Results **(24)**	
	Comment Period Info **(22)** Submit Comments	09/24/15 - 11/12/15	Comments Received **(25)**	Consideration of Comments **(26)**

	Join Ballot Pool	09/24/15 - 10/23/15		
Time Error Correction Requirements **(12)** **Supporting Materials** Unofficial Survey Form (Word) **(13)**	Survey Period Info **(14)** Submit Responses	08/12/15 - 08/25/15	Comments Received **(15)**	Consideration of Comments **(16)**
Unofficial Nomination Form (Word) **(10)**	Supplemental Nomination Period Info **(11)** Submit Nomination	05/21/15 - 06/01/15		
Standard Authorization Request **(1)** **Supporting Materials** Unofficial Comment Form (Word) **(2)**	Comment Period Info **(6)** Submit Comments	03/17/15 - 04/15/15	Comments Received **(8)**	Consideration of Comments **(9)**

Periodic Review Team Recommendations **(3)** White Paper **(4)** Unofficial Nomination Form (Word) **(5)**	Nomination Period Info **(7)** Submit Nomination	03/17/15 - 03/26/15		

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Standards Authorization Request Form

When completed, please email this form to:
sarcomm@nerc.com.

NERC welcomes suggestions to improve the reliability of the Bulk-Power System through improved Reliability Standards. Please use this Standard Authorization Request (SAR) form to submit your request to propose a new Reliability Standard, a revision to a Reliability Standard, or the retirement of a Reliability Standard.

Request to propose a new Reliability Standard, a revision to a Reliability Standard, or the retirement of a Reliability Standard			
Title of Reliability Standard Proposed for Retirement:	BAL-004-0 – Time Error Correction		
Date Submitted:	Draft Posted for Stakeholder Review March 17, 2015		
SAR Requester Information:			
Name:	The Balancing Authority Reliability-based Controls Phase 2 (BARC 2) Periodic Review Team (Roster)		
Organization:	N/A		
Telephone:	N/A	E-mail:	N/A
SAR Type (check as many as applicable):			
☐ New Reliability Standard		☒ Retirement of existing Reliability Standard	
☐ Revision to existing Reliability Standards		☐ Urgent Action	

SAR Information
Industry Need (What is the industry problem this request is trying to solve?):
NERC is dedicated to developing and maintaining Reliability Standards that focus the industry's attention on those issues that support the reliability of the Bulk-Power System. As explained in the Independent Expert Review Project report, the industry and FERC have expressed concern that a significant number of NERC requirements do not contribute materially to the reliability of the Bulk-

SAR Information
Power System. When NERC maintains requirements that do not contribute materially to reliability, registered entities may lose focus on the most critical matters that can adversely impact reliability and resources are diverted from higher priority activities. Standards that do not contribute to reliability should be retired.
Purpose or Goal (How does this request propose to address the problem described above?):
This request proposes to retire a standard that does not contribute materially to reliability.
Identify the objectives of the proposed Reliability Standard's requirements (What specific reliability deliverables are required to achieve the goal?):
N/A – This SAR is proposing a retirement to a Reliability Standard.
Brief Description (Provide a paragraph that describes the scope of this Reliability Standard action.):
The practice of manual Time Error Correction, which is required under BAL-004-0, is a commercial service that does not support reliability. It should be retired.
Detailed Description (Provide a description of the proposed project with sufficient details for the standard drafting team to execute the SAR. Also provide a justification for the development or revision of the Reliability Standard, including an assessment of the reliability and market interface impacts of implementing or not implementing the Reliability Standard action.):
As explained in further detail in the paper "Time Error Correction and Reliability White Paper," the practice of manual Time Error Correction does not support reliability. The current form of manual Time Error Correction is a legacy commercial practice that originated in the 1920s as a commercial service. It was never related to the reliability of the electric grid. In continuing to require the practice of manual Time Error Correction, NERC is diverting industry resources from higher priority activities that impact reliability. The standard drafting team should proceed with the retirement of BAL-004-0 and the elimination of the practice of manual Time Error Correction, developing a careful implementation plan that ensures a safe and coordinated elimination of the practice across each Interconnection.

Reliability Functions		
The Reliability Standard applies to the following functions (check each one that applies):		
☐	Regional Reliability Organization	Conducts the regional activities related to planning and operations, and coordinates activities of Responsible Entities to secure the reliability of the Bulk Electric System within the region and adjacent regions.
☒	Reliability Coordinator	Responsible for the real-time operating reliability of its Reliability Coordinator Area in coordination with its neighboring Reliability Coordinator's wide area view.
☒	Balancing Authority	Integrates resource plans ahead of time, and maintains load-interchange-resource balance within a Balancing Authority Area and supports Interconnection frequency in real time.
☐	Interchange Authority	Ensures communication of interchange transactions for reliability evaluation purposes and coordinates implementation of valid and balanced interchange schedules between Balancing Authority Areas.
☐	Planning Coordinator	Assesses the longer-term reliability of its Planning Coordinator Area.
☐	Resource Planner	Develops a >one year plan for the resource adequacy of its specific loads within a Planning Coordinator area.
☐	Transmission Planner	Develops a >one year plan for the reliability of the interconnected Bulk Electric System within its portion of the Planning Coordinator area.
☐	Transmission Service Provider	Administers the transmission tariff and provides transmission services under applicable transmission service agreements (e.g., the pro forma tariff).
☐	Transmission Owner	Owns and maintains transmission facilities.
☐	Transmission Operator	Ensures the real-time operating reliability of the transmission assets within a Transmission Operator Area.
☐	Distribution Provider	Delivers electrical energy to the End-use customer.
☐	Generator Owner	Owns and maintains generation facilities.
☐	Generator Operator	Operates generation unit(s) to provide real and reactive power.

Reliability Functions		
☐	Purchasing-Selling Entity	Purchases or sells energy, capacity, and necessary reliability-related services as required.
☐	Market Operator	Interface point for reliability functions with commercial functions.
☐	Load-Serving Entity	Secures energy and transmission service (and reliability-related services) to serve the End-use Customer.

Reliability and Market Interface Principles – N/A, as BAL-004-0 does not support any of the Reliability Principles.	
Applicable Reliability Principles (check all that apply):	
☐	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 Reliability Standards.
☐	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
☐	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.
☐	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
☐	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
☐	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
☐	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.
☐	8. Bulk power systems shall be protected from malicious physical or cyber attacks.

Does the proposed Reliability Standard comply with all of the following Market Interface Principles? N/A	Enter (yes/no)
1. A Reliability Standard shall not give any market participant an unfair competitive advantage.	
2. A Reliability Standard shall neither mandate nor prohibit any specific market structure.	

Reliability and Market Interface Principles – N/A, as BAL-004-0 does not support any of the Reliability Principles.	
3. A Reliability Standard shall not preclude market solutions to achieving compliance with that Reliability Standard.	
4. A Reliability Standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with Reliability Standards.	

Related Reliability Standards – N/A	
Reliability Standard No.	Explanation

Related SARs – N/A	
SAR ID	Explanation

Regional Variances	
Region	Explanation
ERCOT	
FRCC	
MRO	
NPCC	
RFC	
SERC	
SPP	

Regional Variances	
WECC	BAL-004-WECC-02 – Automatic Time Error Correction maintains Interconnection frequency and ensures that (automatic) Time Error Corrections and Primary Inadvertent Interchange paybacks are conducted in a manner that does not adversely affect the reliability of the Interconnection.

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Unofficial Comment Form

Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls: Time Error Correction BAL-004-0 Standard Authorization Request

DO NOT use this form for submitting comments. Use the electronic form to submit comments on the Standard Authorization Request (SAR) recommendation to retire BAL-004-0. Comments must be submitted by **8 p.m. Eastern, Wednesday, April 15, 2015**.

Documents and information about this project are available on the project page. If you have questions, contact Senior Standards Developer, Darrel Richardson (via email), or at (609) 613-1848.

Background Information

This posting solicits comments on the recommendation of the Balancing Authority Reliability-based Controls 2 Periodic Review Team (BARC 2 PRT) to retire BAL-004-0 – Time Error Correction. To support its recommendation, the BARC 2 PRT has posted a paper, "Time Error Correction and Reliability White Paper," and a draft Standard Authorization Request alongside its formal recommendation.

The BARC 2 PRT was appointed by the Standards Committee on September 19, 2013 as part of NERC's obligation to conduct periodic reviews of its standards. The BARC 2 PRT used background information on the standards and the questions set forth in the Periodic Review Template developed by NERC and approved by the Standards Committee, along with associated worksheets and reference documents, to determine whether BAL-004-0 should be: (1) affirmed as is (i.e., no changes needed); (2) revised (which may include revising or retiring one or more requirements); or (3) retired. During the development of the recommendation, the PRT also considered stakeholder recommendations for candidate Paragraph 81 requirements from Phase 1 of Paragraph 81, and applied the Paragraph 81 criteria to all of the requirements. The team also considered the Independent Expert Review Panel recommendations on the two standards.

After an extensive review, the BARC 2 PRT agrees with the Independent Expert Review Panel and is recommending that Reliability Standard BAL-004-0 be retired and that manual Time Error Correction (TEC) be eliminated as a continent-wide NERC requirement. The accompanying North American Energy Standard Board (NAESB) business practice standard, WEQ Manual Time Error Correction Business Practice Standard – WEQ-006, should also be retired. Once the current 30-day industry comment period concludes, the BARC 2 SDT will consider comments and finalize its recommendation, which will be presented to the Standards Committee.

Questions

1. Do you agree that BAL-004-0 – Time Error Correction should be retired and that the practice of manual Time Error Correction should be eliminated? If not, please explain.

   Yes:

   No:

   Comments:

2. Do you know of any constituents that may have concerns with the retirement of standard BAL-004-0 – Time Error Correction? If yes, please explain.

   Yes:

   No:

   Comments:

Project 2010-14.2 – Balancing Authority Reliability-based Controls 2 Periodic Review Template: BAL-004-0—Time Error Correction

Updated April 28, 2014

Introduction

The North American Electric Reliability Corporation (NERC) is required to conduct a periodic review of each NERC Reliability Standard at least once every ten years, or once every five years for any Reliability Standard approved by the American National Standards Institute as an American National Standard.[1] The Reliability Standard identified below was included in the current cycle of periodic reviews. The current version, BAL-004-0, became enforceable on June 18, 2007.

Periodic Review Teams (PRTs) use the background information and the questions in the Periodic Review Template, along with available associated worksheets and reference documents, to guide a comprehensive review that results in a recommendation that the Reliability Standard should be: (1) reaffirmed as is (i.e., no changes needed); (2) revised (which may include revising or retiring one or more requirements); or (3) retired. If the team recommends a revision to or a retirement of the Reliability Standard, it must also submit a Standard Authorization Request (SAR) outlining the proposed scope and technical justification for the revision or retirement.

The BARC Phase 2 PRT recommends that BAL-004-0 be retired and has prepared a SAR to that effect.

Applicable Reliability Standard: BAL-004-0
Team Members (include name and organization): 1. Doug Hils (Chair) 2. Thomas W. (Tom) Siegrist (Vice Chair) 3. Ron Carlsen 4. Howard F. Illian 5. Mike Potishnak 6. Jerry Rust 7. Robert Stanton 8. Glenn Stephens 9. Stephen Swan

[1] NERC Standard Processes Manual 45 (2013), posted at http://www.nerc.com/pa/Stand/Documents/Appendix_3A_StandardsProcessesManual.pdf.

10. Mark Trumble 11. Mallory Huggins (Lead Standards Developer) 12. Laura Anderson (Standards Developer) 13. Sean Cavote (Standards Developer) 14. Steve Crutchfield (Standards Developer)
Date Review Completed: 05/02/14

Background Information ***(to be completed initially by NERC staff)***

1. **Are there any outstanding Federal Energy Regulatory Commission (FERC) directives associated with the Reliability Standard? (If so, NERC staff will attach a list of the directives with citations to associated FERC orders for inclusion in a SAR.)**

   ☒ Yes

   ☐ No

   Please see the *Consideration of Issues and Directives* document associated with the BARC 2 Periodic Review.

2. **Have stakeholders requested clarity on the Reliability Standard in the form of an Interpretation (outstanding, in progress, or approved), Compliance Application Notice (CAN) (outstanding, in progress, or approved), or an outstanding submission to NERC's Issues Database? (If there are, NERC staff will include a list of the Interpretation(s), CAN(s), or stakeholder-identified issue(s) contained in the NERC Issues Database that apply to the Reliability Standard.)**

   ☐ Yes

   ☒ No

   There are no Interpretations, CANs, or outstanding issues associated with BAL-004-0.

3. **Is the Reliability Standard one of the most violated Reliability Standards? If so, does the root cause of the frequent violation appear to be a lack of clarity in the language?**

   ☐ Yes

   ☒ No

   Please explain: According to the Notice of Withdrawal of BAL-004-1 filed with FERC on March 19, 2013, "…no Interconnection Time Monitor has incurred a violation of BAL-004-0."

4. **Does the Reliability Standard need to be modified or converted to the results-based standard (RBS) format as outlined in *Attachment 1: Results-Based Standards*? Note that this analysis is twofold and requires collaboration among NERC staff and the Review Team. First, determine whether the *substance* of the Reliability Standard comports to the RBS principles described in Attachment 1. Second, ensure that, as Reliability Standards are reviewed, the *formatting* is**

changed as necessary to comply with the current format of a Reliability Standard. If the answer to either part of this question is "Yes," the Reliability Standard should be revised.

☐ Yes

☒ No

The Reliability Standard is not written in RBS format – Requirement R1 could be rewritten to better satisfy the guidelines for writing an RBS requirement, and the Reliability Standard needs to incorporate VSLs, VRFs, Time Horizons, Measures, and compliance information – but it does not need to be modified because the PRT is proposing to retire it.

Questions for the Subject Matter Expert (SME) Review Team

If NERC staff answered "Yes" to any of the questions above, the Reliability Standard probably requires revision. The questions below are intended to further guide your review. Some of the questions reference documents provided by NERC staff as indicated in the Background questions above.

1. **Paragraph 81: Does one or more of the requirements in the Reliability Standard meet criteria for retirement or modification based on Paragraph 81 concepts? Use *Attachment 2: Paragraph 81 Criteria* to make this determination.**

   ☒ Yes

   ☐ No

   Please summarize your application of Paragraph 81 Criteria, if any: All four requirements in BAL-004-0 should be retired.

   The Independent Expert Review Report recommended retiring BAL-004-0 R1, R2, R3, and R4, primarily under Paragraph 81 principles. Each requirement received content and quality scores of 0.

   During Phase 1 of the Paragraph 81 process, the Paragraph 81 review team received three sets of comments suggesting that BAL-004-0 R1, R2, R3, and R4 be retired. These commenters stated that BAL-004-0 is not important for reliability and is duplicative with NAESB standard WEQ-006.

   The PRT agrees with the Independent Experts and many stakeholders that BAL-004-0 should be retired under Paragraph 81 criteria. BAL-004-0 satisfies Criterion A of the Paragraph 81 criteria because it does not support the reliable operation of the BES.

   BAL-004-0 also satisfies Criteria B6. TEC is a commercial practice that relates to the quality of power delivered, not a practice that supports reliability.

   BAL-004-0 also satisfies Criteria C4, C5, and C7. With respect to C4, the 2014 Actively Monitored List does not include BAL-004-0 for either self-certification or audits. With respect to C5, there is a possible negative impact on NERC's published and posted reliability principles. For instance, slowing the clock for a manual TEC in the Eastern Interconnection brings the Interconnection slightly closer to the first step of Underfrequency Load Shedding, which contradicts Principle 2, which states that "The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand." Finally, with respect to C7, BAL-004-0 does not promote results- or performance-based Reliability Standards.

2. **Clarity:** If the Reliability Standard has an Interpretation, CAN, or issue associated with it, or is frequently violated because of ambiguity, it probably needs to be revised for clarity. Beyond these indicators, is there any reason to believe that the Reliability Standard should be modified to address a lack of clarity? Consider:

    a. Is this a Version 0 Reliability Standard?
    b. Does the Reliability Standard have obviously ambiguous language or language that requires performance that is not measurable?
    c. Are the requirements consistent with the purpose of the Reliability Standard?

    ☐ Yes

    ☒ No

    Please summarize your assessment: BAL-004-0 is a Version 0 Reliability Standard, but the requirement language is clear, and is consistent with the purpose. The motivation for retiring BAL-004-0 is not a lack of clarity, but rather the fact that BAL-004-0 does not support reliability.

3. **Definitions**: Do any of the defined terms used within the Reliability Standard need to be refined?

    ☐ Yes

    ☒ No

    Please explain: The defined terms in the Reliability Standard do not need to be refined.

4. **Compliance Elements:** Are the compliance elements associated with the requirements (Measures, Data Retention, Violation Risk Factors (VRF), and Violation Severity Levels (VSL)) consistent with the direction of the Reliability Assurance Initiative and FERC and NERC guidelines?

    ☐ Yes

    ☒ No

    If you answered "No," please identify which elements require revision, and why: BAL-004-0 was assigned VRFs and VSLs as part of the VRF/VSL roll-up project, but it does not have Measures or Time Horizons. However, the absence of the compliance elements is irrelevant because the Reliability Standard is being recommended for retirement.

5. **Consistency with Other Reliability Standards:** Does the Reliability Standard need to be revised for formatting and language consistency among requirements within the Reliability Standard or consistency with other Reliability Standards? If you answered "Yes," please describe the changes needed to achieve formatting and language consistency:

   ☐ Yes

   ☒ No

6. **Changes in Technology, System Conditions, or other Factors:** Does the Reliability Standard need to be revised to account for changes in technology, system conditions, or other factors?

   ☐ Yes

   ☒ No

   If you answered "Yes," please describe the changes and specifically what the potential impact is to reliability if the Reliability Standard is not revised:

7. **Consideration of Generator Interconnection Facilities:** Is responsibility for generator interconnection Facilities appropriately accounted for in the Reliability Standard?

   ☒ Yes
   ☐ No

   Guiding Questions:

   If the Reliability Standard is applicable to GOs/GOPs, is there any ambiguity about the inclusion of generator interconnection Facilities? (If generation interconnection Facilities could be perceived to be excluded, specific language referencing the Facilities should be introduced in the Reliability Standard.) Not applicable.

   If the Reliability Standard is not applicable to GOs/GOPs, is there a reliability-related need for treating generator interconnection Facilities as transmission lines for the purposes of this Reliability Standard? (If so, GOs and GOPs that own or operate relevant generator interconnection Facilities should be explicit in the applicability section of the Reliability Standard.) No.

Recommendation

The answers to the questions above, along with a preliminary recommendation of the Review Team, will be posted for a 45-day comment period, and the comments publicly posted. The Review Team will review the comments to evaluate whether to modify its initial recommendation, and will document the final recommendation which will be presented to the Standards Committee.

Preliminary Recommendation (to be completed by the Review Team after its review and prior to posting the results of the review for industry comment):

☐ REAFFIRM

☐ REVISE

☒ RETIRE

Technical Justification *(If the Review Team recommends that the Reliability Standard be revised, a draft SAR may be included and the technical justification included in the SAR)*: As explained in more detail in the *Time Error Correction and Reliability White Paper*, TEC is a commercial service. The NERC Reliability Standards should be limited to maintaining and enhancing reliability. Manual TEC is a commercial service that does not support reliability, and accurate time can be procured from alternative sources. Accordingly, BAL-004-0 – Time Error Correction and the associated NAESB WEQ Manual Time Error Correction Business Practice Standard – WEQ-006 should be retired. Because inconsistent application of TEC within an Interconnection presents a risk to reliability, the accompanying NAESB standard, NAESB WEQ Manual Time Error Correction Business Practice Standard – WEQ-006, should also be retired.

A Standard Authorization Request outlining this proposal has been posted for stakeholder comment.

Preliminary Recommendation posted for industry comment (date): March 17, 2015

Final Recommendation (to be completed by the Review Team after it has reviewed industry comments on the preliminary recommendation):

☐ REAFFIRM *(This should only be checked if there are no outstanding directives, interpretations or issues identified by stakeholders.)*

☐ REVISE

☐ RETIRE

Technical Justification *(If the Review Team recommends that the Reliability Standard be revised, a draft SAR may be included and the technical justification included in the SAR)*:

Date submitted to NERC Staff:

Attachment 1: Results-Based Standards

The fourth question for NERC staff and the Review Team asks if the Reliability Standard needs to be converted to the results-based standards (RBS) format. The information below will be used by NERC staff and the Review Team in making this determination.

Transitioning the current body of standards into a clear, concise, and effective body will require a comprehensive application of the RBS concept. RBS concepts employ a defense-in-depth strategy for Reliability Standards development where each requirement has a role in preventing system failures, and the roles are complementary and reinforcing. Reliability Standards should be viewed as a portfolio of requirements designed to achieve an overall defense-in-depth strategy and comply with the quality objectives identified in the resource document titled, "Acceptance Criteria of a Reliability Standard."

Accordingly, the Review Team shall consider whether the Reliability Standard contains results-based requirements with sufficient clarity to hold entities accountable without being overly prescriptive as to how a specific reliability outcome is to be achieved. The RBS concept, properly applied, addresses the clarity and effectiveness aspects of a standard.

A Reliability Standard that adheres to the RBS format should strive to achieve a portfolio of performance-, risk-, and competency-based mandatory reliability requirements that support an effective defense-in-depth strategy. Each requirement should identify a clear and measurable expected outcome, such as: a) a stated level of reliability performance, b) a reduction in a specified reliability risk, or c) a necessary competency.

a. **Performance-Based**—defines a particular reliability objective or outcome to be achieved. In its simplest form, a results-based requirement has four components: who, under what conditions (if any), shall perform what action, to achieve what particular result or outcome?

b. **Risk-Based**—preventive requirements to reduce the risks of failure to acceptable tolerance levels. A risk-based reliability requirement should be framed as: who, under what conditions (if any), shall perform what action, to achieve what particular result or outcome that reduces a stated risk to the reliability of the bulk power system?

c. **Competency-Based**—defines a minimum set of capabilities an entity needs to have to demonstrate it is able to perform its designated reliability functions. A competency-based reliability requirement should be framed as: who, under what conditions (if any), shall have what capability, to achieve what particular result or outcome to perform an action to achieve a result or outcome or to reduce a risk to the reliability of the bulk power system?

Additionally, each RBS-adherent Reliability Standard should enable or support one or more of the eight reliability principles listed below. Each Reliability Standard should also be consistent with all of the reliability principles.

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.

2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.

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.

4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained, and implemented.

5. Facilities for communication, monitoring, and control shall be provided, used, and maintained for the reliability of interconnected bulk power systems.

6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.

7. The reliability of the interconnected bulk power systems shall be assessed, monitored, and maintained on a wide-area basis.

8. Bulk power systems shall be protected from malicious physical or cyber attacks.

If the Reliability Standard does not provide for a portfolio of performance-, risk-, and competency-based requirements or consistency with NERC's reliability principles, NERC staff and the Review Team should recommend that the Reliability Standard be revised or reformatted in accordance with the RBS format.

Attachment 2: Paragraph 81 Criteria

The first question for the Review Team asks if one or more of the requirements in the Reliability Standard meet(s) criteria for retirement or modification based on Paragraph 81 concepts.[2] Use the Paragraph 81 criteria explained below to make this determination. Document the justification for the decisions throughout and provide them in the final assessment in the Periodic Review Template.

For a Reliability Standard requirement to be proposed for retirement or modification based on Paragraph 81 concepts, it must satisfy **both**: (i) Criterion A (the overarching criterion); and (ii) at least one of the Criteria B listed below (identifying criteria). In addition, for each Reliability Standard requirement proposed for retirement or modification, the data and reference points set forth below in Criteria C should be considered for making a more informed decision.

Criterion A (Overarching Criterion)

The Reliability Standard requirement requires responsible entities ("entities") to conduct an activity or task that does little, if anything, to benefit or protect the reliable operation of the BES.

Section 215(a) (4) of the United States Federal Power Act defines "reliable operation" as: "… operating the elements of the bulk power system within equipment and electric system thermal, voltage, and stability limits so that instability, uncontrolled separation, or cascading failures of such system will not occur as a result of a sudden disturbance, including a cybersecurity incident, or unanticipated failure of system elements."

Criteria B (Identifying Criteria)

B1. Administrative

The Reliability Standard requirement requires responsible entities to perform a function that is administrative in nature, does not support reliability and is needlessly burdensome.

This criterion is designed to identify requirements that can be retired or modified with little effect on reliability and whose retirement or modification will result in an increase in the efficiency of the ERO compliance program. Administrative functions may include a task that is related to developing procedures or plans, such as establishing communication contacts. Thus, for certain requirements, Criterion B1 is closely related to Criteria B2, B3 and B4. Strictly administrative functions do not inherently negatively impact reliability directly and, where possible, should be eliminated or modified for purposes of efficiency and to allow the ERO and entities to appropriately allocate resources.

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[2] In most cases, satisfaction of the Paragraph 81 criteria will result in the retirement of a requirement. In some cases, however, there may be a way to modify a requirement so that it no longer satisfies Paragraph 81 criteria. Recognizing that, this document refers to both options.

B2. Data Collection/Data Retention
These are requirements that obligate responsible entities to produce and retain data which document prior events or activities, and should be collected via some other method under NERC's rules and processes.

This criterion is designed to identify requirements that can be retired or modified with little effect on reliability. The collection and/or retention of data do not necessarily have a reliability benefit and yet are often required to demonstrate compliance. Where data collection and/or data retention is unnecessary for reliability purposes, such requirements should be retired or modified in order to increase the efficiency of the ERO compliance program.

B3. Documentation
The Reliability Standard requirement requires responsible entities to develop a document (*e.g.,* plan, policy or procedure) which is not necessary to protect reliability of the bulk power system.

This criterion is designed to identify requirements that require the development of a document that is unrelated to reliability or has no performance or results-based function. In other words, the document is required, but no execution of a reliability activity or task is associated with or required by the document.

B4. Reporting
The Reliability Standard requirement obligates responsible entities to report to a Regional Entity, NERC or another party or entity. These are requirements that obligate responsible entities to report to a Regional Entity on activities which have no discernible impact on promoting the reliable operation of the BES and if the entity failed to meet this requirement there would be little reliability impact.

B5. Periodic Updates
The Reliability Standard requirement requires responsible entities to periodically update (*e.g.,* annually) documentation, such as a plan, procedure or policy without an operational benefit to reliability.

This criterion is designed to identify requirements that impose an updating requirement that is out of sync with the actual operations of the BES, unnecessary, or duplicative.

B6. Commercial or Business Practice
The Reliability Standard requirement is a commercial or business practice, or implicates commercial rather than reliability issues.

This criterion is designed to identify those requirements that require: (i) implementing a best or outdated business practice or (ii) implicating the exchange of or debate on commercially sensitive information while doing little, if anything, to promote the reliable operation of the BES.

B7. Redundant

The Reliability Standard requirement is redundant with: (i) another FERC-approved Reliability Standard requirement(s); (ii) the ERO compliance and monitoring program; or (iii) a governmental regulation (*e.g.,* Open Access Transmission Tariff, North American Energy Standards Board ("NAESB"), etc.).

This criterion is designed to identify requirements that are redundant with other requirements and are, therefore, unnecessary. Unlike the other criteria listed in Criterion B, in the case of redundancy, the task or activity itself may contribute to a reliable BES, but it is not necessary to have two duplicative requirements on the same or similar task or activity. Such requirements can be retired or modified with little or no effect on reliability and removal will result in an increase in efficiency of the ERO compliance program.

Criteria C (Additional data and reference points)

Use the following data and reference points to assist in the determination of (and justification for) whether to proceed with retirement or modification of a Reliability Standard requirement that satisfies both Criteria A and B:

C1. Was the Reliability Standard requirement part of a FFT filing?

The application of this criterion involves determining whether the requirement was included in a FFT filing.

C2. Is the Reliability Standard requirement being reviewed in an ongoing Standards Development Project?

The application of this criterion involves determining whether the requirement proposed for retirement or modification is part of an active Standards Development Project, with consideration for the status of the project. If the requirement has been approved by Registered Ballot Body and is scheduled to be presented to the NERC Board of Trustees, in most cases it will not need to be addressed in the periodic review. The exception would be a requirement, such as the Critical Information Protection (CIP) requirements for Version 3 and 4, that is not due to be retired for an extended period of time. Also, for informational purposes, whether the requirement is included in a future or pending Standards Development Project should be identified and discussed.

C3. What is the VRF of the Reliability Standard requirement?

The application of this criterion involves identifying the VRF of the requirement proposed for retirement or modification, with particular consideration of any requirement that has been assigned as having a Medium or High VRF. Also, the fact that a requirement has a Lower VRF is not dispositive that it qualifies for retirement or modification. In this regard, Criterion C3 is considered in light of Criterion C5 (Reliability Principles) and C6 (Defense in Depth) to ensure that no reliability gap would be created by the retirement or modification of the Lower VRF requirement. For example, no requirement, including a Lower VRF requirement, should be retired or modified if doing so would harm the effectiveness of a larger scheme of requirements that are purposely designed to protect the reliable operation of the BES.

C4. In which tier of the most recent Actively Monitored List (AML) does the Reliability Standard requirement fall?
The application of this criterion involves identifying whether the requirement proposed for retirement or modification is on the most recent AML, with particular consideration for any requirement in the first tier of the AML.

C5. Is there a possible negative impact on NERC's published and posted reliability principles?
The application of this criterion involves consideration of the eight following reliability principles published on the NERC webpage.

Reliability Principles
NERC Reliability Standards are based on certain reliability principles that define the foundation of reliability for North American bulk power systems. Each reliability standard shall enable or support one or more of the reliability principles, thereby ensuring that each standard serves a purpose in support of reliability of the North American bulk power systems. Each reliability standard shall also be consistent with all of the reliability principles, thereby ensuring that no standard undermines reliability through an unintended consequence.

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.

Principle 2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.

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.

Principle 4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained, and implemented.

Principle 5. Facilities for communication, monitoring, and control shall be provided, used, and maintained for the reliability of interconnected bulk power systems.

Principle 6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.

Principle 7. The reliability of the interconnected bulk power systems shall be assessed, monitored, and maintained on a wide-area basis.

Principle 8. Bulk power systems shall be protected from malicious physical or cyber attacks. (footnote omitted).

C6. Is there any negative impact on the defense in depth protection of the BES?
The application of this criterion considers whether the requirement proposed for retirement or modification is part of a defense in depth protection strategy. In order words, the assessment is to verify whether other requirements rely on the requirement proposed for retirement or modification to protect the BES.

C7. Does the retirement or modification promote results or performance based Reliability Standards?
The application of this criterion considers whether the requirement, if retired or modified, will promote the initiative to implement results- and/or performance-based Reliability Standards.

Time Error Correction and Reliability White Paper

Recommendation of the Balancing Authority Reliability-based Controls 2 Periodic Review Team to Retire BAL-004-0 – Time Error Correction

The Balancing Authority Reliability-based Controls 2 Periodic Review Team (BARC 2 PRT) was tasked with reviewing certain Reliability Standards and developing recommendations that each Reliability Standard be (1) reaffirmed as is (i.e., no changes needed); (2) revised (which may include revising or retiring one or more requirements); or (3) retired. After an extensive review, the BARC 2 PRT is recommending that Reliability Standard BAL-004-0 be retired and that manual Time Error Correction (TEC) be eliminated as a continent-wide NERC requirement. The accompanying North American Energy Standard Board (NAESB) business practice standard, WEQ Manual Time Error Correction Business Practice Standard – WEQ-006, should also be retired.

This white paper reviews the history of manual TEC and BAL-004-0, outlines the key considerations of the BARC 2 PRT in developing its recommendation, and assesses whether TEC supports the reliability of the Bulk Power System (BPS).

History of Time Error Correction

Invention of the Synchronous Motor Clock and Market Penetration

In 1916, Henry E. Warren invented the self-starting synchronous motor and three years later the motor was used for the production of the Telechron Clock. The Telechron Clock was a synchronous electric clock, which used alternating current electricity to measure time. Its accuracy depended on the frequency of the power grid. To incentivize electric system operators to regulate frequency in a way that kept the clocks running accurately, the Warren Clock Company, which was manufacturing the Telechron Clock at the time, gave electric clocks to electric system operators. The idea worked and system operators began regulating the frequency as desired by the Warren Clock Company.

During the 1920s, other companies developed synchronous motor clocks and used the same marketing strategy, giving electric clocks to system operators. As the penetration of the synchronous electric clock increased, the electric revenue from the electric clock motors increased enough to justify the relatively small cost required of electric system operators to regulate system time by modifying system frequency. This additional revenue ensured that manual TEC would be an ongoing service provided by the electric utility industry.

Time Error Correction Practice and Improvements in Clock Accuracy

As the electric industry expanded and interconnected, the service of providing manual TEC was incorporated into the industry's general operating practice. The current form of manual TEC is a legacy commercial practice that originated in the 1920s as a commercial service and was never related to the reliability of the electric grid. While documentation is available from as late as 1976 that synchronous electric clocks were still being used for important applications, by 1969, alternative methods of keeping accurate time penetrated the market and gradually displaced the electric clock. For example, the introduction of the first mass-produced quartz watch provided a more reliable and less expensive method to keep accurate time. Additionally, 15 years later, the United States made available for free the Global Positioning System, which is a space-based satellite navigation system that provides location and time information.

History of BAL-004-0

Reliability Standard BAL-004-0 – Time Error Correction became mandatory and enforceable on June 18, 2007. It contains four requirements:

- **R1** Only a Reliability Coordinator shall be eligible to act as an Interconnection Time Monitor. A single Reliability Coordinator in each Interconnection shall be designated by the NERC Operating Committee to serve as Interconnection Time Monitor.
- **R2** The Interconnection Time Monitor shall monitor Time Error and shall initiate or terminate corrective action orders in accordance with the NAESB Time Error Correction Procedure.
- **R3** Each Balancing Authority, when requested, shall participate in a Time Error Correction by one of the following methods:
    - **R3.1** The Balancing Authority shall offset its frequency schedule by 0.02 Hertz, leaving the Frequency Bias Setting normal; or
    - **R3.2** The Balancing Authority shall offset its Net Interchange Schedule (MW) by an amount equal to the computed bias contribution during a 0.02 Hertz Frequency Deviation (i.e. 20% of the Frequency Bias Setting).
- **R4** Any Reliability Coordinator in an Interconnection shall have the authority to request the Interconnection Time Monitor to terminate a Time Error Correction in progress, or a scheduled Time Error Correction that has not begun, for reliability considerations.
    - **R4.1** Balancing Authorities that have reliability concerns with the execution of a Time Error Correction shall notify their Reliability Coordinator and request the termination of a Time Error Correction in progress.

On July 11, 2007, a Standard Authorization Request (SAR) was submitted to NERC, proposing to revise BAL-004-0 to:

- Remove inappropriate compliance requirements on Reliability Coordinators who voluntarily agree to serve as Interconnection Time Monitors.

- Remove inappropriate compliance requirements on the NERC Operating Committee (OC), which is not a user, owner, or operator of the BPS.
- Remove inappropriate requirements to follow NAESB business practices.

The revised BAL-004-1 received 94.10% weighted segment approval on December 4, 2007, and was adopted by NERC's Board of Trustees on March 26, 2008. NERC filed a petition with the Federal Energy Regulatory Commission (FERC) on April 7, 2009, requesting approval for the revised BAL-004-1. In response, FERC issued a Notice of Proposed Rulemaking (NOPR) proposing to remand BAL-004-1 for further consideration. The NOPR requested that NERC:

- Change R2 to indicate that the Interconnection Time Monitor, designated according to a process described in a FERC approved document, is responsible for initiating or terminating a TEC in a reliable manner.
- Explain the circumstances under which the Time Monitor should start or end a TEC.

Between 2010 and 2012, NERC filed a series of petitions to defer action on the BAL-004-1 NOPR as it worked with the NERC OC to explore the possibility of eliminating manual TEC, starting with a field trial. In May and June of 2011, NERC held a webinar and issued a press release laying out a schedule to do a field trial in which manual TEC would have been stopped for a period of time. NERC's intention was to begin a phased elimination of TEC in ERCOT in August 2011.

After the webinar and issuance of the press release, and in part because NERC received feedback from private citizens, industry, and government entities expressing concern about the field trial, the trial was not conducted.

On August 16, 2012, the NERC Board of Trustees withdrew its adoption of BAL-004-1, stating that:

- No Interconnection Time Monitor has ever incurred a violation.
- The NERC OC is not a registered entity, and therefore compliance actions are not a concern. Thus, it is acceptable to keep the OC reference in the Reliability Standard.
- There are no significant issues with the reference to NAESB in R2.
- Work on BARC 2 will begin in 2014.

BAL-004-0 remains mandatory and enforceable.

Key Considerations for BAL-004-0 Retirement

Manual TEC does not support the reliability of the BPS.

Industry agrees that the practice of manual TEC does not support reliability, and is instead a low-value commercial service that does not rise to the level of a mandatory and enforceable Reliability Standard. [1] For instance, in an industry survey performed by the Balancing Authority Reliability-based Controls 1 Standard Drafting Team between September 12 and October 13, 2008, approximately 77% of respondents supported the discontinuation of manual TEC. Further, when revisions to BAL-004-0 were developed in the proposed BAL-004-1, "the underlying driver was that it was commonly understood that manual TECs were a commercial task."[2]

The reliability of an Interconnection is in part the result of the frequency at which the Interconnection operates. In North America, the system is designed to operate within a safe range, with 60 Hz as the center point of that range. Under and over frequency limits have been set to protect the equipment of both the providers and the users on the Interconnection from failure. The BARC 2 PRT maintains that elimination of manual TEC actually will allow the Interconnection to be operated closer to the design frequency of 60 Hz more often.

A Reliability Standard focused on manual TEC is only necessary for ensuring that manual TEC is implemented consistently across an Interconnection. Because there is no additional benefit to reliability from the implementation of manual TEC, the BARC 2 PRT recommends the retirement of BAL-004-0.

The elimination of manual TEC is not expected to impact Inadvertent Interchange accumulations.
In a FERC Order 693 directive related to BAL-004-0, FERC directed NERC "to perform whatever research it and the industry believe is necessary to provide a sound technical basis for either continuing with the present practice [of TEC] or identifying an alternative practice that is more effective and helps reduce inadvertent interchange." However, Time Error and Inadvertent Interchange are not necessarily linked. In fact, positive Time Error could be decreasing and at the same time, the magnitude of the Inadvertent Interchange account for one Balancing Authority could be increasing in support of Interconnection frequency (negative balance getting larger), and the magnitude of the Inadvertent Interchange account for another Balancing Authority could be decreasing, also in support of Interconnection frequency (positive balance getting smaller). Both actions in this example contribute to reducing the Time Error.

Time Error relates to frequency drift of an Interconnection; whereas Inadvertent Interchange is an energy (MW) exchange at the Balancing Authority level in an Interconnection with multiple controlling entities. Frequency drift is related to an imbalance between load and generation, which may be influenced by factors including metering error, scheduling error, and the inability to continuously match load and generation. Given the dynamics of load, generation, and Interconnection frequency, it is not possible for

[1] Minutes from the March 6-7, 2012 meeting of the Operating Committee. Posted at: http://www.nerc.com/comm/OC/Agendas%20Highlights%20and%20Minutes%20DL/Agendas,%20Highlights,%20and%20Minutes%20-%202012/Operating_Committee_Meeting_Minutes_Mar_6-7_2011_R1.pdf

[2] Minutes from the March 6-7, 2012 meeting of the Operating Committee.

any Balancing Authority to have an Area Control Error (ACE) of zero except by chance, so Inadvertent Interchange, positive and negative, is a fact of operation. In addition, the difference between the reliability requirement to ramp Interchange schedules and the business practice to account for Interchange schedules after the fact as "block schedules" (ramp not included) will also result in some amount of Inadvertent Interchange being accumulated, even if the Balancing Authority could perfectly operate to a zero ACE throughout the hour. Like frequency drift, Inadvertent Interchange is influenced by all the factors that cause an imbalance between load and generation. Eliminating manual TEC will not impact Inadvertent Interchange accumulations.

Comments from non-technical parties outside the industry have impacted reliability decisions related to TEC in the past.

When NERC and the NERC OC began exploring the possibility of conducting a field trial to eliminate manual TEC, they received feedback from private citizens, industry, and government representatives expressing concern about the impact of eliminating manual TEC. For example, these individuals expressed concern that eliminating manual TEC could affect billing meters or traffic lights that might rely on grid frequency.

However, grid frequency is not the appropriate source for alignment to official time; there are other more appropriate sources available for that service. The National Institute of Standards and Technology and the U.S. Naval Observatory, for instance, maintain a website (www.time.gov) that could be used to correct time periodically, including after power outages. Manual TEC should not be required for the purpose of providing accurate time for synchronous electric clocks. Similarly, commercial or industrial processes dependent upon an exact duration of time could not rely on synchronous electric clocks, as any duration of time determined by such clocks can never be exact.

Other NERC Reliability Standards already require operation within a reliable frequency range.

NERC's suite of BAL Reliability Standards is designed to assure a safe and reliable Interconnection operating within a safe frequency range. For instance, BAL-003-1 – Frequency Response and Frequency Bias Setting, which will become enforceable on April 1, 2015, requires that frequency is maintained within defined bounds. This Reliability Standard ensures that each of the Interconnections have sufficient Frequency Response[3] to guard against underfrequency load shedding due to a credible event in that Interconnection. It ensures that Balancing Authorities provide the Frequency Response necessary to ensure that frequency does not reach the point where coordinated underfrequency load shedding relays are set to curtail load through a measurement methodology that ensures consistency across the industry for both Frequency Response and Frequency Bias Setting calculations. Similarly, the stated purpose of

[3] Frequency Response is a measure of an Interconnection's ability to stabilize frequency immediately following the sudden loss of generation or load. Power system operators manage or control frequency primarily through adjustments to the output of generators with the goal of restoring balance between generation and load. Failure to maintain frequency can disrupt the operation of equipment and initiate disconnection of power plant equipment to prevent them from being damaged, which could lead to wide-spread blackouts.

BAL-001-2 – Real Power Balancing Control Performance, which was filed with FERC for approval on April 2, 2014, is to control Interconnection frequency within defined limits.

Revising BAL-004-0 would not enhance the reliability of the BPS.

In minutes from its March 6-7, 2012 meeting, the NERC OC states that "there is a general consensus that the conduct of manual TECs is a commercial service and does not rise to the level of a reliability standard, with the exception of setting bounds on the magnitude of frequency offset."[4] But, recognizing that there are other ways to lessen the impact of manual TECs, the NERC OC did not pass a motion to move forward with a field trial to test the impact of eliminating Manual TECs.

When considering possible recommendations for BAL-004-0, the BARC 2 PRT discussed the option of revising BAL-004-0 to reduce the offset to allow for manual TEC to be implemented for a full load cycle over a consistent time period and lessen the burden on Interconnection Time Monitors. However, the BARC 2 PRT determined that would not support the reliability of the BPS. Conducting manual TEC in any form directly contradicts NERC Reliability Principle 2: "The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand." The practice of using manual TEC to place the Interconnection closer to the settings for automatic underfrequency load shedding does not support or enhance reliability. Therefore, in line with NERC's efforts to eliminate standards that do not promote reliability, BAL-004-0 should be retired.

Summary

Manual TEC is a commercial service that does not support reliability, and accurate time can be procured from alternative sources. Accordingly, BAL-004-0 – Time Error Correction and the associated NAESB WEQ Manual Time Error Correction Business Practice Standard – WEQ-006 should be retired.

[4] Minutes from the March 6-7, 2012 meeting of the Operating Committee.

Unofficial Nomination Form

Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls: Time Error Correction BAL-004-0

Solicitation for Standard Drafting Team Nominations

DO NOT use this form for submitting nominations. Use the electronic form to submit nominations by **8 p.m. Eastern, Friday, March 6, 2015.** This unofficial version is provided to assist nominees in compiling the information necessary to submit the electronic form.

If you have any questions, contact Senior Standards Developer, Darrel Richardson (via email) or at (609) 613-1848.

By submitting a nomination form, you are indicating your willingness and agreement to actively participate in the review or drafting team meetings if appointed by the Standards Committee. If appointed, you are expected to attend most of the face-to-face drafting team meetings as well as participate in all the team meetings held via conference calls.

The time commitment for these projects is expected to be up to two face-to-face meetings per quarter (on average two full working days each meeting) with conference calls scheduled as needed to meet the agreed upon timeline the review or drafting team sets forth. Review and drafting teams also will have side projects, either individually or by subgroup, to present to the larger team for discussion and review. Lastly, an important component of the review and drafting team efforts is outreach. Members of the team should be conducting outreach during development prior to posting to ensure all issues can be discussed and resolved.

Background

The Project 2010-14.2.2 was initiated by the Standards Committee in September 2013 as part of NERC's obligation to conduct periodic reviews of its standards. The Balancing Authority Reliability-based Control Phase 2 periodic review team (BARC 2 PRT) used background information on the standards and the questions set forth in the Periodic Review Template developed by NERC and approved by the Standards Committee, along with associated worksheets and reference documents, to determine whether BAL-004-0 should be: (1) affirmed as is (i.e., no changes needed); (2) revised (which may include revising or retiring one or more requirements); or (3) retired. During the development of the recommendation, the PRT also considered stakeholder recommendations for candidate Paragraph 81 requirements from Phase 1 of Paragraph 81, and applied the Paragraph 81 criteria to all of the requirements. The team also considered the Independent Expert Review Panel recommendations on the two standards.

After an extensive review, the BARC 2 PRT agreed with the Independent Expert Review Panel and is recommending that Reliability Standard BAL-004-0 be retired and that manual Time Error Correction (TEC) be eliminated as a continent-wide NERC requirement. The accompanying North American Energy Standard Board (NAESB) business practice standard, WEQ Manual Time Error Correction Business Practice Standard – WEQ-006, should also be retired. Once the current 30-day industry comment period concludes, the BARC 2 standard drafting team (BARC 2 SDT) will consider comments and finalize its recommendation, which will be presented to the Standards Committee. The SDT will also consider any FERC directives and guidance, stakeholder input, and relevant industry reports prior to finalizing its recommendation.

Please provide the following information for the nominee:	
Name:	
Title:	
Organization:	
Address:	
Telephone:	
Email:	
Please briefly describe the nominee's experience and qualifications to serve on the selected project(s):	
If you are currently a member of any NERC SAR or standard drafting team, please list each team here: ☐ Not currently on any active SAR or standard drafting team. ☐ Currently a member of the following SAR or standard drafting team(s):	
If you previously worked on any NERC SAR or standard drafting team, please identify the team(s): ☐ No prior NERC SAR or standard drafting team. ☐ Prior experience on the following SAR or standard drafting team(s):	

Select each NERC Region in which you have experience relevant to Project 2009-02:		
☐ ERCOT	☐ NPCC	☐ SPP
☐ FRCC	☐ RF	☐ WECC
☐ MRO	☐ SERC	☐ NA – Not Applicable

Select each Industry Segment that you represent:	
☐	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, and Provincial Regulatory or other Government Entities
☐	10 — Regional Reliability Organizations and Regional Entities
☐	NA – Not Applicable

Select each Function[1] in which you have current or prior expertise:

☐ Balancing Authority	☐ Transmission Operator
☐ Compliance Enforcement Authority	☐ Transmission Owner
☐ Distribution Provider	☐ Transmission Planner
☐ Generator Operator	☐ Transmission Service Provider
☐ Generator Owner	☐ Purchasing-selling Entity
☐ Interchange Authority	☐ Reliability Coordinator
☐ Load-serving Entity	☐ Reliability Assurer
☐ Market Operator	☐ Resource Planner
☐ Planning Coordinator	

Provide the names and contact information for two references who could attest to your technical qualifications and your ability to work well in a group:

Name:		Telephone:	
Organization:		Email:	
Name:		Telephone:	
Organization:		Email:	

[1] These functions are defined in the NERC Functional Model, which is available on the NERC web site.

Provide the names and contact information of your immediate supervisor or a member of your management who can confirm your organization’s willingness to support your active participation.			
Name:		Telephone:	
Title:		Email:	

Standards Announcement

Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls
BAL-004-0 Standard Authorization Request

Formal Comment Period Open through April 15, 2015
Standard Drafting Team Nomination Period Open through March 26, 2015

Commenting for this project is in the Standards Balloting & Commenting System (SBS)

Now Available

A 30-day formal comment period for the **Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls** Standard Authorization Request (SAR) is open through **8 p.m. Eastern, Wednesday, April 15, 2015**.

SBS Login, Registration, Validation and Permissions

To **comment** in the SBS, you must have a contributor, voter, or proxy role.

Commenting
Use the electronic form to submit comments on the SAR. If you experience any difficulties in using the electronic form, contact Wendy Muller. An unofficial Word version of the comment form is posted on the project page.

Standard Drafting Team Nominations
Nominations are being sought for standard drafting team members through **8 p.m. Eastern, Thursday, March 26, 2015**. Use the electronic form to submit a nomination. An unofficial Word version of the nomination form is posted on the Standard Drafting Team Vacancies page and the project page.

For more information on the **Standards Development Process**, refer to the Standard Processes Manual.

For more information or assistance, contact Senior Standards Developer, Darrel Richardson (via email), or at (609) 613-1848.

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

Standards Announcement

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BAL-004-0 Standard Authorization Request

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Comments Received Report

Survey Details

Name	2010-14.2.2 Phase 2 of BARC | BAL-004-0 SAR
Description	
Start Date	3/17/2015
End Date	4/16/2015

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

Full Name	Entity Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Region	Group Member Segment(s)
Ben Engelby	ACES Power Marketing	6		ACES Standards Collaborators - BARC Project	John Shaver	Arizona Electric Power Cooperative, Inc. Southwest Transmission Cooperative, Inc.	WECC	1,4,5
					Shari Heino	Brazos Electric Power Cooperative, Inc.	TRE	1,5
					Mike Brytowski	Great River Energy	MRO	1,3,5,6
					Chip Koloini	Golden Spread Electric Cooperative, Inc.	SPP	3,5
					Bill Hutchison	Southern Illinois Power Cooperative	SERC	1,5
					Ellen Watkins	Sunflower Electric Power Corporation	SPP	1

Full Name	Entity Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Region	Group Member Segment(s)
					Bob Solomon	Hoosier Energy Rural Electric Cooperative, Inc.	RFC	1
Randi Heise	Dominion - Dominion Resources, Inc.	5		Dominion - RCS	Larry Nash	Dominion Virginia Power	SERC	1
					Louis Slade	Dominion Resources, Inc.	SERC	6
					Connie Lowe	Dominion Resources, Inc.	RFC	3
					Randi Heise	Dominion Resources, Inc,	NPCC	5
Albert DiCaprio	PJM Interconnection, L.L.C.	2	RFC	ISO Standards Review Committee	Charles Yeung	SPP	SPP	2
					Ben Li	IESO	NPCC	2
					Mark Holman	PJM	RFC	2
					Mark Holman	PJM	RFC	2
					Kathleen Goodman	ISONE	NPCC	2
					Greg Campoli	NYISO	NPCC	2
					Christina V. Bigelow	ERCOT	TRE	2
					Ali Miremadi	CAISO	WECC	2
Michael Lowman	Duke Energy	1,3,5,6	FRCC,SERC, RFC	Mike Lowman on Behalf of Duke Energy	Doug Hils	Duke Energy	RFC	1
					Lee Schuster	Duke Energy	FRCC	3
					Dale Goodwine	Duke Energy	SERC	5

Full Name	Entity Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Region	Group Member Segment(s)
					Greg Cecil	Duke Energy	RFC	6
Emily Rousseau	MRO	1,2,3,4,5,6	MRO	MRO-NERC Standards Review Forum (NSRF)	Joe Depoorter	Madison Gas & Electric	MRO	3,4,5,6
					Amy Casucelli	Xcel Energy	MRO	1,3,5,6
					Chuck Lawrence	American Transmission Company	MRO	1
					Chuck Wicklund	Otter Tail Power Company	MRO	1,3,5
					Dan Inman	Minnkota Power Cooperative, Inc	MRO	1,3,5,6
					Dave Rudolph	Basin Electric Power Cooperative	MRO	1,3,5,6
					Kayleigh Wilkerson	Lincoln Electric System	MRO	1,3,5,6
					Jodi Jenson	Western Area Power Administration	MRO	1,6
					Larry Heckert	Alliant Energy	MRO	4
					Mahmood Safi	Omaha Public Utility District	MRO	1,3,5,6

Full Name	Entity Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Region	Group Member Segment(s)
					Marie Knox	Midwest ISO Inc.	MRO	2
					Mike Brytowski	Great River Energy	MRO	1,3,5,6
					Randi Nyholm	Minnesota Power	MRO	1,5
					Scott Nickels	Rochester Public Utilities	MRO	4
					Terry Harbour	MidAmerican Energy Company	MRO	1,3,5,6
					Tom Breene	Wisconsin Public Service Corporation	MRO	3,4,5,6
					Tony Eddleman	Nebraska Public Power District	MRO	1,3,5
Lee Pedowicz	Northeast Power Coordinating Council	10	NPCC	NPCC RSC 2010-14.2.2	Alan Adamson	New York State Reliability Council, LLC	NPCC	10
					David Burke	Orange and Rockland Utilities Inc.	NPCC	3
					Greg Campoli	New York Independent	NPCC	2

Full Name	Entity Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Region	Group Member Segment(s)
						System Operator		
					Sylvain Clermont	Hydro-Quebec TransEnergie	NPCC	1
					Kelly Dash	Consolidated Edison Co. of New York, Inc.	NPCC	1
					Gerry Dunbar	Northeast Power Coordinating Council	NPCC	10
					Kathleen Goodman	ISO - New England	NPCC	2
					Mark Kenny	Northeast Utilities	NPCC	1
					Helen Lainis	Independent Electricity System Operator	NPCC	2
					Alan MacNaughton	New Brunswick Power Corporation	NPCC	9
					Paul Malozewski	Hydro One Networks Inc.	NPCC	1

Full Name	Entity Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Region	Group Member Segment(s)
					Bruce Metruck	New York Power Authority	NPCC	6
					Lee Pedowicz	Northeast Power Coordinating Council	NPCC	10
					Robert Pellegrini	The United Illuminating Company	NPCC	1
					Si Truc Phan	Hydro-Quebec TransEnergie	NPCC	1
					David Ramkalawan	Ontario Power Generation, Inc.	NPCC	5
					Brian Robinson	Utility Services	NPCC	8
					Wayne Sipperly	New York Power Authority	NPCC	5
					Ben Wu	Orange and Rockland Utilities Inc.	NPCC	1
					Peter Yost	Consolidated Edison Co. of New York, Inc.	NPCC	3
					Michael Jones	National Grid	NPCC	1

Full Name	Entity Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Region	Group Member Segment(s)
					Brian Shanahan	National Grid	NPCC	1
					Connie Lowe	Dominion Resources Services, Inc.	NPCC	5
					Silvia Parada Mitchell	NextEra Energy, LLC	NPCC	5
Brent Ingebrigtson	LG&E and KU Energy, LLC	1,3,5,6	MRO,WECC, NPCC,SERC, SPP,RFC	PPL NERC Registered Affiliates	Brent Ingebrigtson	LG&E and KU Energy, LLC	SERC	1,3,5,6
					Brenda Truhe	PPL Electric Utilities Corporation	RFC	1
					Charlie Freibert	LG&E and KU energy, LLC	SERC	3
					Elizabeth Davis	PPL Energy Plus, LLC	RFC	6
					Elizabeht Davis	PPL Energy Plus, LLC	MRO	6
					Elizabeth Davis	PPL Energy Plus, LLC	WECC	6
					Elizabeth Davis	PPL EnergyPlus, LLC	NPCC	6
					Elizabeth Davis	PPL EnergyPlus, LLC	SERC	6

Full Name	Entity Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Region	Group Member Segment(s)
					Elizabeth Davis	PPL EnergyPlus, LLC	SPP	6
					Aine Hasham-Lawrence	PPL Generation, LLC	RFC	5
					Aine Hasham-Lawrence	PPL Susquehanna, LLV	RFC	5
					Aine Hasham Lawrence	PPL Montana, LLC	WECC	6
Marsha Morgan	Southern Company - Southern Company Services, Inc.	1,3,5,6	SERC	Southern Company	Robert Schaffeld	Southern Company Services, Inc	SERC	1
					John Ciza	Southern Company Generation and Energy Marketing	SERC	6
					R Scott Moore	Alabama Power Company	SERC	3
					William Shultz	Southern Company Generation	SERC	5
Jason Smith		2	SPP	SPP Standards Review Group	Darryl Boggess	Western Farmers	SPP	1,5

Full Name	Entity Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Region	Group Member Segment(s)
	Southwest Power Pool, Inc. (RTO)					Electric Cooperative		
					Shannon Mickens	Southwest Power Pool	SPP	2
					James Nail	City of Independence, Missouri	SPP	3,5
					Carl Stelly	Southwest Power Pool	SPP	2

Survey Questions

See the Unofficial Comment Form on the Project Page for additional background information.

If you would like to bypass taking the survey, scroll down to submit.

This will allow you to view Social Survey and agree/disagree with an already posted

1. Do you agree that BAL-004-0 – Time Error Correction should be retired and that the practice of manual

Time Error Correction should be eliminated? If not, please explain.

Yes
No

2. Do you know of any constituents that may have concerns with the retirement of standard BAL-004-0 – Time Error Correction? If yes, please explain.

Yes
No

Responses By Question

See the Unofficial Comment Form on the [Project Page](#) for additional background information.

Dan Roethemeyer - Dynegy Inc. - 5 -

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - SPP

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

John Fontenot - Bryan Texas Utilities - 1 -

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Dennis Minton - Florida Keys Electric Cooperative Assoc. - 1 -

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Kaleb Brimhall - Colorado Springs Utilities - 5 -

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Nick Vtyurin - Manitoba Hydro - 1,3,5,6 - MRO

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Albert DiCaprio - PJM Interconnection, L.L.C. - 2 - RFC

Error: Subreport could not be shown.

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Molly Devine - IDACORP - Idaho Power Company - 1 -

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Marsha Morgan - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC

Error: Subreport could not be shown.

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Terry BIlke - Midcontinent ISO, Inc. - 2 -

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Rachel Coyne - Texas Reliability Entity, Inc. - 10 -

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Randi Heise - Dominion - Dominion Resources, Inc. - 5 -

Error: Subreport could not be shown.

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Kathleen Black - DTE Energy - 3,4,5 - RFC

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

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christina bigelow - Electric Reliability Council of Texas, Inc. - 2 -

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Michael Lowman - Duke Energy - 1,3,5,6 - FRCC,SERC,RFC

Error: Subreport could not be shown.

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Lee Pedowicz - Northeast Power Coordinating Council - 10 - NPCC

Error: Subreport could not be shown.

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Leonard Kula - Independent Electricity System Operator - 2 -

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Jason Smith - Southwest Power Pool, Inc. (RTO) - 2 - SPP

Error: Subreport could not be shown.

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Emily Rousseau - MRO - 1,2,3,4,5,6 - MRO

Error: Subreport could not be shown.

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Brent Ingebrigtson - LG&E and KU Energy, LLC - 1,3,5,6 - MRO,WECC,NPCC,SERC,SPP,RFC

Error: Subreport could not be shown.

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Ben Engelby - ACES Power Marketing - 6 -

Error: Subreport could not be shown.

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Craig Figart - Avista - Avista Utilities - NA - Not Applicable - WECC

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Fuchsia Davis - Bonneville Power Administration - 1,3,5,6 - WECC

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

John Merrell - Tacoma Public Utilities (Tacoma, WA) - 1 -

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

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Dan Roethemeyer - Dynegy Inc. - 5 -

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - SPP

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

John Fontenot - Bryan Texas Utilities - 1 -

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Dennis Minton - Florida Keys Electric Cooperative Assoc. - 1 -

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Kaleb Brimhall - Colorado Springs Utilities - 5 -

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Nick Vtyurin - Manitoba Hydro - 1,3,5,6 - MRO

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Albert DiCaprio - PJM Interconnection, L.L.C. - 2 - RFC

Error: Subreport could not be shown.

Selected Answer:

Answer Comment:

Document Name:

Likes:	0
Dislikes:	0

Molly Devine - IDACORP - Idaho Power Company - 1 -

Selected Answer:

Answer Comment:

Document Name:

Likes:	0
Dislikes:	0

Marsha Morgan - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC

Error: Subreport could not be shown.

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Terry BIlke - Midcontinent ISO, Inc. - 2 -

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Rachel Coyne - Texas Reliability Entity, Inc. - 10 -

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Randi Heise - Dominion - Dominion Resources, Inc. - 5 -

Error: Subreport could not be shown.

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Kathleen Black - DTE Energy - 3,4,5 - RFC

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

christina bigelow - Electric Reliability Council of Texas, Inc. - 2 -

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Michael Lowman - Duke Energy - 1,3,5,6 - FRCC,SERC,RFC

Error: Subreport could not be shown.

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Lee Pedowicz - Northeast Power Coordinating Council - 10 - NPCC

Error: Subreport could not be shown.

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Leonard Kula - Independent Electricity System Operator - 2 -

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Jason Smith - Southwest Power Pool, Inc. (RTO) - 2 - SPP

Error: Subreport could not be shown.

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Emily Rousseau - MRO - 1,2,3,4,5,6 - MRO

Error: Subreport could not be shown.

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Brent Ingebrigtson - LG&E and KU Energy, LLC - 1,3,5,6 - MRO,WECC,NPCC,SERC,SPP,RFC

Error: Subreport could not be shown.

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Ben Engelby - ACES Power Marketing - 6 -

Error: Subreport could not be shown.

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Craig Figart - Avista - Avista Utilities - NA - Not Applicable - WECC

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Fuchsia Davis - Bonneville Power Administration - 1,3,5,6 - WECC

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

John Merrell - Tacoma Public Utilities (Tacoma, WA) - 1 -

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

1. Do you agree that BAL-004-0 – Time Error Correction should be retired and that the practice of manual Time Error Correction should be eliminated? If not, please explain.

Dan Roethemeyer - Dynegy Inc. - 5 -

Selected Answer: Yes

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - SPP

Selected Answer: Yes

Answer Comment:

Action should be taken to meet with NERC and FERC representatives to determine need for a commercial or other alrernative standard.

Document Name:

Likes: 0

Dislikes: 0

John Fontenot - Bryan Texas Utilities - 1 -

Selected Answer: Yes

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Dennis Minton - Florida Keys Electric Cooperative Assoc. - 1 -

Selected Answer: Yes

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Kaleb Brimhall - Colorado Springs Utilities - 5 -

Selected Answer: Yes

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Nick Vtyurin - Manitoba Hydro - 1,3,5,6 - MRO

Selected Answer: Yes

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Albert DiCaprio - PJM Interconnection, L.L.C. - 2 - RFC

Error: Subreport could not be shown.

Selected Answer: Yes

Answer Comment:

The SRC supports a Project to retire BAL-004-0.

Document Name:

Likes: 0

Dislikes: 0

Molly Devine - IDACORP - Idaho Power Company - 1 -

Selected Answer: Yes

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Marsha Morgan - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC

Error: Subreport could not be shown.

Selected Answer: Yes

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Terry BIlke - Midcontinent ISO, Inc. - 2 -

Selected Answer: No

Answer Comment:

While we agree that Manual Time Error Corrections (TEC) should be removed from the NERC standards, the practice of conducting TEC should continue as either a procedure in the NERC Operating Manual or affirmatively turned over to NAESB as a Business Practice Standard. The only thing that may need to be retained in a standard (and could be put in BAL—005 or BAL-006) is a requirement to set the maximum offset for TECs or unilateral Inadvertent Interchange Payback to either:

•		A frequency offset of 20% of Frequency Bias Setting.

•		An interchange schedule representing 20% of Frequency Bias Setting.

Document Name:

Likes: 0

Dislikes: 0

Rachel Coyne - Texas Reliability Entity, Inc. - 10 -

Selected Answer: Yes

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Randi Heise - Dominion - Dominion Resources, Inc. - 5 -

Error: Subreport could not be shown.

Selected Answer: Yes

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Kathleen Black - DTE Energy - 3,4,5 - RFC

Selected Answer: Yes

Answer Comment:

We agree that time error correction does not have an impact on BES reliability. No objection to eliminating time error correction and retiring BAL-004-0.

Document Name:

Likes: 0

Dislikes: 0

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christina bigelow - Electric Reliability Council of Texas, Inc. - 2 -

Selected Answer: Yes

Answer Comment:

ERCOT understands and agrees with the conclusion in the SAR and associated White Paper that Time Error Correction (TEC) is primarily a commercial function and, therefore, that the associated reliability standard (BAL-004) could be retired without materially impacting the reliability of the Bulk Electric System (BES). ERCOT does not, however, agree that the practice of manual TEC should be eliminated altogether and further disagrees that associated commercial business practices should be retired concurrently. Accordingly, ERCOT can support retirement of BAL-004 so long as there is an appropriate, applicable commercial standard to ensure that billing, settlements, and other aspects of wholesale markets are not adversely impacted by either the retirement of reliability standard BAL-004 or the time period needed to convert impacted BES devices to alternate time sources. Hence, ERCOT respectfully suggests that the SAR be modified to set forth an obligation for the SDT to ensure that there will not be a lapse in the provision of this commercial service.

Document Name:

Likes: 0

Dislikes: 0

Michael Lowman - Duke Energy - 1,3,5,6 - FRCC,SERC,RFC

Error: Subreport could not be shown.

Selected Answer: Yes

Answer Comment:

Duke Energy agrees with the retirement of BAL-004-0 and Time Error Correction.

Document Name:

Likes: 0

Dislikes: 0

Lee Pedowicz - Northeast Power Coordinating Council - 10 - NPCC

Error: Subreport could not be shown.

Selected Answer: Yes

Answer Comment:

The Drafting Team will have to evaluate whether the terms Time Error and Time Error
Correction can be removed from the NERC Glossary, and whether any other NERC documents are
impacted.

Document Name:

Likes: 0

Dislikes: 0

Leonard Kula - Independent Electricity System Operator - 2 -

Selected Answer: Yes

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Jason Smith - Southwest Power Pool, Inc. (RTO) - 2 - SPP

Error: Subreport could not be shown.

Selected Answer: Yes

Answer Comment:

We agree that the NERC Reliability Standard BAL-004-0 should be retired as it serves no purpose towards maintaining a reliable Bulk Electric System. In fact it could be characterized as contributing somewhat towards unreliable impacts such as inadvertent interchange and reducing system frequency closer to an unstable point and Under Frequency Load Shedding trip points as stated in the white paper.

While we agree that some parties may feel there is a need to continue the use of Time Error Corrections in some form for certain needs, we feel that need does not rise to the level that requires a Reliability Standard. As such, BAL-004-0 should be retired. A separate means of establishing the need and process for conducting manual Time Error Corrections outside of Reliability Standards could be investigated. Perhaps there is a business practice or some other means to continue to accomplish the practice of TEC. Are there any potential impacts of discontinuing the practice of manual Time Error Corrections altogether? Can it impact timing references on equipment used to analyze performance of the BES? Prior to discontinuing the practice, a survey should be used to assess any reliability impacts.

Document Name:

Likes: 0

Dislikes: 0

Emily Rousseau - MRO - 1,2,3,4,5,6 - MRO

Error: Subreport could not be shown.

Selected Answer: No

Answer Comment:

While we agree that Manual Time Error Corrections (TEC) should be removed from the NERC standards, the practice of conducting TEC should continue as either a procedure in the NERC Operating Manual or affirmatively turned over to NAESB as a Business Practice Standard. The only thing that may need to be retained in a standard (and could be put in BAL—005 or BAL-006) is a requirement to set the maximum offset for TECs or unilateral Inadvertent Interchange Payback to either:

1) A frequency offset of 20% of Frequency Bias Setting.

2) An interchange schedule representing 20% of Frequency Bias Setting.

Document Name:

Likes: 0

Dislikes: 0

Brent Ingebrigtson - LG&E and KU Energy, LLC - 1,3,5,6 - MRO,WECC,NPCC,SERC,SPP,RFC

Error: Subreport could not be shown.

Selected Answer: Yes

Answer Comment:

These comments are submitted on behalf of the following PPL NERC Registered Affiliates: LG&E and KU Energy, LLC; PPL Electric Utilities Corporation, PPL EnergyPlus, LLC; PPL Generation, LLC; PPL Susquehanna, LLC and PPL Montana, LLC. The PPL NERC Registered Affiliates are registered in six regions (MRO, NPCC, RFC, SERC, SPP, and WECC) for one or more of the following NERC functions: BA, DP, GO, GOP, IA, LSE, PA, PSE, RP, TO, TOP, TP, and TSP.

Document Name:

Likes: 0

Dislikes: 0

Ben Engelby - ACES Power Marketing - 6 -

Error: Subreport could not be shown.

Selected Answer: Yes

Answer Comment:

We support the SAR and retirement of the BAL-004-0. However, we are concerned that a NERC whitepaper recommends retirement of the associated NAESB standard. We do not believe the NERC whitepaper should make such a recommendation. Rather, NERC should, at most, notify NAESB of its intent to retire that standard. NAESB can then take appropriate action.

Document Name:

Likes: 0

Dislikes: 0

Craig Figart - Avista - Avista Utilities - NA - Not Applicable - WECC

Selected Answer: No

Answer Comment:

YES, Manual TEC (MTEC) could be eliminated for all other interconnections, but **NO**, not yet for WECC. In the WECC, Automatic Time Error Correction (ATEC) per BAL-004-WECC-2 is used to manage Time Error automatically by holding BA's accountable for managing and paying their own, "primary", inadvertent Interchange (PII) energy accumulations back to the interconnection. So yes, assuming ATEC is accomplishing its intended goal, MTECs can be eliminated in theory for the WECC, but only after it's proven that WECC's ATEC implementation keeps Time Error to within boundary values of +/- 99.999 seconds. That's because WECC (PEAK RC) Symmetricom clocks that are used to track Time Error are only capable of measuring Time Error out to within +/- 99.999 seconds.

PWG is currently performing data analysis on this very topic. Since

	June 9, 2014, WECC's Time Error bandwidth was widened out from +/- 5 seconds to +/- 30 seconds, allowing the system to "breathe" more naturally. Accordingly, manual TEC events have been reduced significantly, however, we have experienced a few large Time Error swings (i.e. +20 down to -30 seconds within a month during fall 2014) due to significant payback swings of Primary Inadvertent energy by larger BA's. So I would like to see a staged elimination of MTEC in WECC, BUT ONLY triggered after most WECC BA's, particularly larger BA's, accumulated PII balances are much closer to zero. Otherwise, I'm afraid that once the larger BA's in WECC get their accumulations down to near zero, we might be sitting out in excess of +/- 99.999 seconds of time error, for example, without an ability to manually correct time back to within bounds of current clock technology. I would recommend continuing Manual TECs until sometime after these large PII accumulations are paid back, particularly by the larger BAs, and then verify that ATEC manages Time Error to within +/- 99.999 seconds. Additionally, tighter controls needs to be considered on the maximum PII accumulation threshold down from the current window of +/-150% Peak Load/Gen in order for ATEC to more effectively automatically manage Time Error to within these +/- 99.999 second bounds. Then MTECs can be considered for elimination and ATEC can go to work targeting a Time Error of zero seconds within a +/- 99.999 second Time Error window.
Document Name:	
Likes:	0
Dislikes:	0

Fuchsia Davis - Bonneville Power Administration - 1,3,5,6 - WECC

Selected Answer:	Yes

Answer Comment:

*NO: NOT YET for WECC**

BPA believes the manual TEC (MTEC) could be eliminated for all other interconnections, but not yet for WECC. In the WECC, Automatic Time Error Correction (ATEC) per BAL-004-WECC-2 is used to manage Time Error automatically by holding BA's accountable for managing and paying their own, "primary", inadvertent Interchange (PII) energy accumulations back to the interconnection. So yes, assuming ATEC is accomplishing its intended goal, MTECs can be eliminated in theory for the WECC, but only after proper analysis has been made. WECC PWG is currently performing data analysis on this very topic. Since June 9, 2014, WECC's Time Error bandwidth was widened out from +/- 5 seconds to +/- 30 seconds, with the intent of minimizing the number of equal and opposite Time Error Corrections. Accordingly, manual TEC events have been reduced significantly; however, we have experienced a few large Time Error swings (i.e. +20 down to -30 seconds within a month last fall). Once analysis for these large swings have been made, then consideration of phasing out MTECs for WECC would be satisfactory.

Another concern is if Time Error were to grow beyond +/- 99.999 seconds. WECC (PEAK RC) Symmetricom clocks that are used to track Time Error are only capable of measuring Time Error out to within +/- 99.999 seconds. Should Time Error grow to beyond +/- 99.999 seconds, then the ability to calculate an accurate Delta Time Error, as used in the BAL-004-WECC-2 standard, would be compromised.

Also, NERC BAL-001-1, E.B.1 would require modification to account for the removal of the +/-0.02Hz frequency schedule offsets from MTEC.

Document Name:

Likes: 0

Dislikes: 0

John Merrell - Tacoma Public Utilities (Tacoma, WA) - 1 -

Selected Answer: Yes

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

2. Do you know of any constituents that may have concerns with the retirement of standard BAL-004-0 – Time Error Correction? If yes, please explain.

Dan Roethemeyer - Dynegy Inc. - 5 -

Selected Answer: No

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - SPP

Selected Answer:

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

John Fontenot - Bryan Texas Utilities - 1 -

Selected Answer: Yes

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Dennis Minton - Florida Keys Electric Cooperative Assoc. - 1 -

Selected Answer: No

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Kaleb Brimhall - Colorado Springs Utilities - 5 -

Selected Answer: No

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Nick Vtyurin - Manitoba Hydro - 1,3,5,6 - MRO

Selected Answer: No

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Albert DiCaprio - PJM Interconnection, L.L.C. - 2 - RFC

Error: Subreport could not be shown.

Selected Answer: No

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Molly Devine - IDACORP - Idaho Power Company - 1 -

Selected Answer: No

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Marsha Morgan - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC

Error: Subreport could not be shown.

Selected Answer: No

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Terry BIlke - Midcontinent ISO, Inc. - 2 -

Selected Answer: Yes

Answer Comment:

NERC went through an exercise not long ago to try to eliminate manual TECs. There was significant pushback from multiple stakeholders (commerce and transportation commissions, Federal regulators, newspapers, a congressman, markets) as it could impact facilities that rely on grid frequency as their time reference.

We have heard of no call from the industry to eliminate manual TECs and it is unclear why we are spending resources to try this again. We should be finding ways to do fewer TECs and make them less intrusive in the frequency profile.

Document Name:

Likes: 0

Dislikes: 0

Rachel Coyne - Texas Reliability Entity, Inc. - 10 -

Selected Answer: No

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Randi Heise - Dominion - Dominion Resources, Inc. - 5 -

Error: Subreport could not be shown.

Selected Answer: No

Answer Comment:

Minor comment; neither of the links provided in the SAR work (Roster, IERP report).

Document Name:

Likes: 0

Dislikes: 0

Kathleen Black - DTE Energy - 3,4,5 - RFC

Selected Answer: No

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

christina bigelow - Electric Reliability Council of Texas, Inc. - 2 -

Selected Answer: Yes

Answer Comment:

Importantly, the White Paper assumes the availability and usage of alternate time sources by devices on the BES. However, this assumption may not be applicable to all stakeholders and all devices in the ERCOT Interconnection. For example, in the ERCOT Region, existing market guides have provisions for manual TEC to facilitate maintenance of meter equipment accuracy. Thus, where constituents have utilized manual TECs historically, the transition to an alternate time source may not be simple and may, in fact, be a complex, lengthy process requiring modifications to devices and associated cyber systems, data, software, and configurations. Accordingly, it is likely that constituents that currently rely on manual TEC would have significant concerns with retirement of the standard where there exists no commercial or other standard to govern the consistency of processes within and among Interconnections during the transition to alternate time sources.

Document Name:

Likes: 0

Dislikes: 0

Michael Lowman - Duke Energy - 1,3,5,6 - FRCC,SERC,RFC

Error: Subreport could not be shown.

Selected Answer: No

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Lee Pedowicz - Northeast Power Coordinating Council - 10 - NPCC

Error: Subreport could not be shown.

Selected Answer: No

Answer Comment:

The links are not established in the SAR for sarcomm@nerc.com, Roster, and Independent Expert Review Project report.

Document Name:

Likes: 0

Dislikes: 0

Leonard Kula - Independent Electricity System Operator - 2 -

Selected Answer: No

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Jason Smith - Southwest Power Pool, Inc. (RTO) - 2 - SPP

Error: Subreport could not be shown.

Selected Answer: No

Answer Comment:

There are no known concerns with retiring the Reliability Standard BAL-004-0. We are not stating here whether we support discontinuing the practice of manual TEC after retirement of the Standard.

Document Name:

Likes: 0

Dislikes: 0

Emily Rousseau - MRO - 1,2,3,4,5,6 - MRO

Error: Subreport could not be shown.

Selected Answer: Yes

Answer Comment:

NERC went through an exercise not long ago to try to eliminate manual TECs. There was significant pushback from multiple stakeholders (commerce commissions, Federal regulators, newspapers, a congressman, markets) as it could impact facilities that rely on grid frequency as their time reference.

We have heard of no call from the industry to eliminate manual TECs and it is unclear why we are spending resources to try this again. We should find ways to do fewer TECs and make them less intrusive in the frequency profile.

Document Name:

Likes: 0

Dislikes: 0

Brent Ingebrigtson - LG&E and KU Energy, LLC - 1,3,5,6 - MRO,WECC,NPCC,SERC,SPP,RFC

Error: Subreport could not be shown.

Selected Answer: No

Answer Comment:

These comments are submitted on behalf of the following PPL NERC Registered Affiliates: LG&E and KU Energy, LLC; PPL Electric Utilities Corporation, PPL EnergyPlus, LLC; PPL Generation, LLC; PPL Susquehanna, LLC and PPL Montana, LLC. The PPL NERC Registered Affiliates are registered in six regions (MRO, NPCC, RFC, SERC, SPP, and WECC) for one or more of the following NERC functions: BA, DP, GO, GOP, IA, LSE, PA, PSE, RP, TO, TOP, TP, and TSP.

Document Name:

Likes: 0

Dislikes: 0

Ben Engelby - ACES Power Marketing - 6 -

Error: Subreport could not be shown.

Selected Answer: No

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Craig Figart - Avista - Avista Utilities - NA - Not Applicable - WECC

Selected Answer: No

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Fuchsia Davis - Bonneville Power Administration - 1,3,5,6 - WECC

Selected Answer: No

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

John Merrell - Tacoma Public Utilities (Tacoma, WA) - 1 -

Selected Answer: No

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Consideration of Comments

Project Name: 2010-14.2.2 Phase 2 of BARC | BAL-004-0 SAR

Comment Period Start Date: 3/17/2015

Comment Period End Date: 4/16/2015

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 Information

Full Name	Entity Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Region	Group Member Segment(s)
Ben Engelby	ACES Power Marketing	6		ACES Standards Collaborators - BARC Project	John Shaver	Arizona Electric Power Cooperative, Inc. Southwest Transmission Cooperative, Inc.	WECC	1,4,5
					Shari Heino	Brazos Electric Power Cooperative, Inc.	TRE	1,5
					Mike Brytowski	Great River Energy	MRO	1,3,5,6
					Chip Koloini	Golden Spread Electric Cooperative, Inc.	SPP	3,5
					Bill Hutchison	Southern Illinois Power Cooperative	SERC	1,5
					Ellen Watkins	Sunflower Electric Power Corporation	SPP	1
					Bob Solomon	Hoosier Energy Rural Electric	RFC	1

Full Name	Entity Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Region	Group Member Segment(s)
						Cooperative, Inc.		
Randi Heise	Dominion - Dominion Resources, Inc.	5		Dominion - RCS	Larry Nash	Dominion Virginia Power	SERC	1
					Louis Slade	Dominion Resources, Inc.	SERC	6
					Connie Lowe	Dominion Resources, Inc.	RFC	3
					Randi Heise	Dominion Resources, Inc,	NPCC	5
Albert DiCaprio	PJM Interconnection, L.L.C.	2	RFC	ISO Standards Review Committee	Charles Yeung	SPP	SPP	2
					Ben Li	IESO	NPCC	2
					Mark Holman	PJM	RFC	2
					Mark Holman	PJM	RFC	2
					Kathleen Goodman	ISONE	NPCC	2
					Greg Campoli	NYISO	NPCC	2
					Christina V. Bigelow	ERCOT	TRE	2
					Ali Miremadi	CAISO	WECC	2
Michael Lowman	Duke Energy	1,3,5,6	FRCC,SERC, RFC	Mike Lowman on Behalf of Duke Energy	Doug Hils	Duke Energy	RFC	1
					Lee Schuster	Duke Energy	FRCC	3
					Dale Goodwine	Duke Energy	SERC	5
					Greg Cecil	Duke Energy	RFC	6

Full Name	Entity Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Region	Group Member Segment(s)
Emily Rousseau	MRO	1,2,3,4,5,6	MRO	MRO-NERC Standards Review Forum (NSRF)	Joe Depoorter	Madison Gas & Electric	MRO	3,4,5,6
					Amy Casucelli	Xcel Energy	MRO	1,3,5,6
					Chuck Lawrence	American Transmission Company	MRO	1
					Chuck Wicklund	Otter Tail Power Company	MRO	1,3,5
					Dan Inman	Minnkota Power Cooperative, Inc	MRO	1,3,5,6
					Dave Rudolph	Basin Electric Power Cooperative	MRO	1,3,5,6
					Kayleigh Wilkerson	Lincoln Electric System	MRO	1,3,5,6
					Jodi Jenson	Western Area Power Administration	MRO	1,6
					Larry Heckert	Alliant Energy	MRO	4
					Mahmood Safi	Omaha Public Utility District	MRO	1,3,5,6
					Marie Knox	Midwest ISO Inc.	MRO	2

Full Name	Entity Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Region	Group Member Segment(s)
					Mike Brytowski	Great River Energy	MRO	1,3,5,6
					Randi Nyholm	Minnesota Power	MRO	1,5
					Scott Nickels	Rochester Public Utilities	MRO	4
					Terry Harbour	MidAmerican Energy Company	MRO	1,3,5,6
					Tom Breene	Wisconsin Public Service Corporation	MRO	3,4,5,6
					Tony Eddleman	Nebraska Public Power District	MRO	1,3,5
Lee Pedowicz	Northeast Power Coordinating Council	10	NPCC	NPCC RSC 2010-14.2.2	Alan Adamson	New York State Reliability Council, LLC	NPCC	10
					David Burke	Orange and Rockland Utilities Inc.	NPCC	3
					Greg Campoli	New York Independent System Operator	NPCC	2

Full Name	Entity Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Region	Group Member Segment(s)
					Sylvain Clermont	Hydro-Quebec TransEnergie	NPCC	1
					Kelly Dash	Consolidated Edison Co. of New York, Inc.	NPCC	1
					Gerry Dunbar	Northeast Power Coordinating Council	NPCC	10
					Kathleen Goodman	ISO - New England	NPCC	2
					Mark Kenny	Northeast Utilities	NPCC	1
					Helen Lainis	Independent Electricity System Operator	NPCC	2
					Alan MacNaughton	New Brunswick Power Corporation	NPCC	9
					Paul Malozewski	Hydro One Networks Inc.	NPCC	1
					Bruce Metruck	New York Power Authority	NPCC	6

Full Name	Entity Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Region	Group Member Segment(s)
					Lee Pedowicz	Northeast Power Coordinating Council	NPCC	10
					Robert Pellegrini	The United Illuminating Company	NPCC	1
					Si Truc Phan	Hydro-Quebec TransEnergie	NPCC	1
					David Ramkalawan	Ontario Power Generation, Inc.	NPCC	5
					Brian Robinson	Utility Services	NPCC	8
					Wayne Sipperly	New York Power Authority	NPCC	5
					Ben Wu	Orange and Rockland Utilities Inc.	NPCC	1
					Peter Yost	Consolidated Edison Co. of New York, Inc.	NPCC	3
					Michael Jones	National Grid	NPCC	1
					Brian Shanahan	National Grid	NPCC	1

Full Name	Entity Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Region	Group Member Segment(s)
					Connie Lowe	Dominion Resources Services, Inc.	NPCC	5
					Silvia Parada Mitchell	NextEra Energy, LLC	NPCC	5
Brent Ingebrigtson	LG&E and KU Energy, LLC	1,3,5,6	MRO,WECC, NPCC,SERC, SPP,RFC	PPL NERC Registered Affiliates	Brent Ingebrigtson	LG&E and KU Energy, LLC	SERC	1,3,5,6
					Brenda Truhe	PPL Electric Utilities Corporation	RFC	1
					Charlie Freibert	LG&E and KU energy, LLC	SERC	3
					Elizabeth Davis	PPL Energy Plus, LLC	RFC	6
					Elizabeht Davis	PPL Energy Plus, LLC	MRO	6
					Elizabeth Davis	PPL Energy Plus, LLC	WECC	6
					Elizabeth Davis	PPL EnergyPlus, LLC	NPCC	6
					Elizabeth Davis	PPL EnergyPlus, LLC	SERC	6

Full Name	Entity Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Region	Group Member Segment(s)
					Elizabeth Davis	PPL EnergyPlus, LLC	SPP	6
					Aine Hasham-Lawrence	PPL Generation, LLC	RFC	5
					Aine Hasham-Lawrence	PPL Susquehanna, LLV	RFC	5
					Aine Hasham Lawrence	PPL Montana, LLC	WECC	6
Marsha Morgan	Southern Company - Southern Company Services, Inc.	1,3,5,6	SERC	Southern Company	Robert Schaffeld	Southern Company Services, Inc	SERC	1
					John Ciza	Southern Company Generation and Energy Marketing	SERC	6
					R Scott Moore	Alabama Power Company	SERC	3
					William Shultz	Southern Company Generation	SERC	5

Full Name	Entity Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Region	Group Member Segment(s)
Jason Smith	Southwest Power Pool, Inc. (RTO)	2	SPP	SPP Standards Review Group	Darryl Boggess	Western Farmers Electric Cooperative	SPP	1,5
					Shannon Mickens	Southwest Power Pool	SPP	2
					James Nail	City of Independence, Missouri	SPP	3,5
					Carl Stelly	Southwest Power Pool	SPP	2

1. Do you agree that BAL-004-0 – Time Error Correction should be retired and that the practice of manual Time Error Correction should be eliminated? If not, please explain.

Dan Roethemeyer - Dynegy Inc. - 5 -

Selected Answer: Yes

Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - SPP

Selected Answer: Yes

Answer Comment:

Action should be taken to meet with NERC and FERC representatives to determine need for a commercial or other alrernative standard.

So long as manual Time Error Correction continues under NAESB WEQ-006 or a similar business practice, Order 693 and the NOPR in Docket RM09-13 requires that a standard be in place to ensure that manual time error corrections be performed in a manner that does not adversely affect the Bulk Electric System.   The SDT is recommending, based on the technical analysis performed by the Periodic Review Team, that BAL-004-0 be retired as it does not contribute to reliability of the BES and in fact manual time error correction may be detrimental to the reliability of the Interconnection. It is characterized as contributing somewhat towards unreliable impacts such as moving system frequency closer to an unstable point including Under Frequency Load Shedding trip points as stated in the white paper. The SDT is coordinating with NAESB to have WEQ-006 retired concurrently with the retirement of BAL-004-0.

John Fontenot - Bryan Texas Utilities - 1 -

Selected Answer: Yes

Dennis Minton - Florida Keys Electric Cooperative Assoc. - 1 -

Selected Answer: Yes

Kaleb Brimhall - Colorado Springs Utilities - 5 -

Selected Answer: Yes

Nick Vtyurin - Manitoba Hydro - 1,3,5,6 - MRO

Selected Answer: Yes

Albert DiCaprio - PJM Interconnection, L.L.C. - 2 - RFC

Selected Answer: Yes

Answer Comment:

The SRC supports a Project to retire BAL-004-0.

Molly Devine - IDACORP - Idaho Power Company - 1 -

Selected Answer: Yes

Marsha Morgan - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC

Selected Answer: Yes

Terry BIlke - Midcontinent ISO, Inc. - 2 -

Selected Answer: No

Answer Comment:

While we agree that Manual Time Error Corrections (TEC) should be removed from the NERC standards, the practice of conducting TEC should continue as either a procedure in the NERC Operating Manual or affirmatively turned over to NAESB as a Business Practice Standard. The only thing that may need to be retained in a standard (and could be put in BAL—005 or BAL-006) is a requirement to set the maximum offset for TECs or unilateral Inadvertent Interchange Payback to either:

• A frequency offset of 20% of Frequency Bias Setting.

• An interchange schedule representing 20% of Frequency Bias Setting.

So long as manual Time Error Correction continues under NAESB WEQ-006 or a similar business practice, Order 693 and the NOPR in Docket RM09-13 requires that a standard be in place to ensure that manual time error corrections be performed in a manner that does not adversely affect the Bulk Electric System. The SDT is recommending, based on the technical analysis performed by the Periodic Review Team, that BAL-004-0 be retired as it does not contribute to reliability of the BES and in fact manual time error correction may be detrimental to the reliability of the Interconnection. It is characterized as contributing somewhat towards unreliable impacts such as moving system frequency closer to an unstable point including Under Frequency Load Shedding trip points as stated in the white paper. The SDT is coordinating with NAESB to have WEQ-006 retired concurrently with the retirement of BAL-004-0.

With regards to inadvertent interchange, it is stated in the White Paper "[manual] TEC and Inadvertent Interchange have been incorrectly linked, but the practices are independent. Eliminating [manual] TEC will have no impact on Inadvertent Interchange or its payback." There is currently a NERC Project 2010-14.2.1 that is addressing inadvertent interchange. In addition, NAESB business standard WEQ-007 addresses inadvertent interchange. Therefore, retirement of BAL-004-0 and WEQ-006 will not impact issues related to inadvertent interchange.

Paragraph 383 from FERC Order 693 is provided below for ease of reference.

383. Many commenters aver that the time error correction procedure belongs within the realm of NAESB and is not a reliability issue. The Commission disagrees, as BAL-004-0 is intended to ensure that time error corrections are performed in a manner that does not adversely affect the reliability of the Interconnection. The financial aspects of time error correction such as MISO's concern about the unilateral payback of interchange imbalances remain with NAESB. However, the technical details, including the means to carry out the procedure, are a reliability issue.

Rachel Coyne - Texas Reliability Entity, Inc. - 10 -

Selected Answer: Yes

Randi Heise - Dominion - Dominion Resources, Inc. - 5 -

Selected Answer: Yes

Kathleen Black - DTE Energy - 3,4,5 - RFC

Selected Answer: Yes

Answer Comment:

We agree that time error correction does not have an impact on BES reliability. No objection to eliminating time error correction and retiring BAL-004-

0.

christina bigelow - Electric Reliability Council of Texas, Inc. - 2 -

Selected Answer: Yes

Answer Comment:

ERCOT understands and agrees with the conclusion in the SAR and associated White Paper that Time Error Correction (TEC) is primarily a commercial function and, therefore, that the associated reliability standard (BAL-004) could be retired without materially impacting the reliability of the Bulk Electric System (BES). ERCOT does not, however, agree that the practice of manual TEC should be eliminated altogether and further disagrees that associated commercial business practices should be retired concurrently. Accordingly, ERCOT can support retirement of BAL-004 so long as there is an appropriate, applicable commercial standard to ensure that billing, settlements, and other aspects of wholesale markets are not adversely impacted by either the retirement of reliability standard BAL-004 or the time period needed to convert impacted BES devices to alternate time sources. Hence, ERCOT respectfully suggests that the SAR be modified to set forth an obligation for the SDT to ensure that there will not be a lapse in the provision of this commercial service.

The SDT recognizes ERCOT's concern and invites ERCOT to participate in the development of an implementation plan associated with TEC.

So long as manual Time Error Correction continues under NAESB WEQ-006 or a similar business practice, Order 693 and the NOPR in Docket RM09-13 requires that a standard be in place to ensure that manual time error corrections be performed in a manner that does not adversely affect the Bulk Electric

System. The SDT is recommending, based on the technical analysis performed by the Periodic Review Team, that BAL-004-0 be retired as it does not contribute to reliability of the BES and in fact manual time error correction may be detrimental to the reliability of the Interconnection. It is characterized as contributing somewhat towards unreliable impacts such as moving system frequency closer to an unstable point including Under Frequency Load Shedding trip points as stated in the white paper. The SDT is coordinating with NAESB to have WEQ-006 retired concurrently with the retirement of BAL-004-0.

Michael Lowman - Duke Energy - 1,3,5,6 - FRCC,SERC,RFC

Selected Answer: Yes

Answer Comment:

Duke Energy agrees with the retirement of BAL-004-0 and Time Error Correction.

Lee Pedowicz - Northeast Power Coordinating Council - 10 - NPCC

Selected Answer: Yes

Answer Comment:

The Drafting Team will have to evaluate whether the terms Time Error and Time Error
Correction can be removed from the NERC Glossary, and whether any other NERC documents are
impacted.

Part of process – not removing definitions (used in ATEC)

Leonard Kula - Independent Electricity System Operator - 2 -

Selected Answer: Yes

Jason Smith - Southwest Power Pool, Inc. (RTO) - 2 - SPP

Selected Answer: Yes

Answer Comment:

We agree that the NERC Reliability Standard BAL-004-0 should be retired as it serves no purpose towards maintaining a reliable Bulk Electric System. In fact it could be characterized as contributing somewhat towards unreliable impacts such as inadvertent interchange and reducing system frequency closer to an unstable point and Under Frequency Load Shedding trip points as stated in the white paper.

While we agree that some parties may feel there is a need to continue the use of Time Error Corrections in some form for certain needs, we feel that need does not rise to the level that requires a Reliability Standard. As such, BAL-004-0 should be retired. A separate means of establishing the need and process for conducting manual Time Error Corrections outside of Reliability Standards could be investigated. Perhaps there is a business practice or some other means to continue to accomplish the practice of TEC. Are there any potential impacts of discontinuing the practice of manual Time Error Corrections altogether? Can it impact timing references on equipment used to analyze performance of the BES? Prior to discontinuing the practice, a survey should be used to assess any reliability impacts.

So long as manual Time Error Correction continues under NAESB WEQ-006 or a similar business practice, Order 693 and the NOPR in Docket RM09-13 requires that a standard be in place to ensure that manual time error corrections be performed in a manner that does not adversely affect the Bulk Electric System. The SDT is recommending, based on the technical analysis performed by the Periodic Review Team, that BAL-004-0 be retired as it does not contribute to reliability of the BES and in fact manual time error correction may be detrimental to the reliability of the Interconnection. We agree that TEC can be characterized as contributing somewhat towards unreliable impacts such as moving system frequency closer to an unstable point including Under Frequency Load Shedding trip points. The SDT is coordinating with NAESB to have WEQ-006 retired concurrently with the retirement of BAL-004-0.

We agree that there may be potential impacts to industry participants that will need to be addressed during the implementation process. The SDT will be surveying the industry to gain a better understanding of these issues.

Emily Rousseau - MRO - 1,2,3,4,5,6 - MRO

Selected Answer: No

Answer Comment:

While we agree that Manual Time Error Corrections (TEC) should be removed from the NERC standards, the practice of conducting TEC should continue as either a procedure in the NERC Operating Manual or affirmatively turned over to NAESB as a Business Practice Standard. The only thing that may need to be retained in a standard (and could be put in BAL—005 or BAL-006) is a requirement to set the maximum offset for TECs or unilateral Inadvertent Interchange Payback to either:

1) A frequency offset of 20% of Frequency Bias Setting.

2) An interchange schedule representing 20% of Frequency Bias Setting.

So long as manual Time Error Correction continues under NAESB WEQ-006 or a similar business practice, Order 693 and the NOPR in Docket RM09-13 requires that a standard be in place to ensure that manual time error corrections be performed in a manner that does not adversely affect the Bulk Electric System. The SDT is recommending, based on the technical analysis performed by the Periodic Review Team, that BAL-004-0 be retired as it does not contribute to reliability of the BES and in fact manual time error correction may be detrimental to the reliability of the Interconnection. It is characterized as contributing somewhat towards unreliable impacts such as moving system frequency closer to an unstable point including Under Frequency Load Shedding trip points as stated in the white paper. The SDT is coordinating with NAESB to have WEQ-006 retired concurrently with the retirement of BAL-004-0.

With regards to inadvertent interchange, it is stated in the White Paper “[manual] TEC and Inadvertent Interchange have been incorrectly linked, but the practices are independent. Eliminating [manual] TEC will have no impact on Inadvertent Interchange or its payback." There is currently a NERC Project 2010-14.2.1 that is addressing inadvertent interchange. In addition, NAESB business standard WEQ-007 addresses inadvertent interchange. Therefore, retirement of BAL-004-0 and WEQ-006 will not impact issues related to inadvertent interchange.

Paragraph 383 from FERC Order 693 is provided below for ease of reference.

383. Many commenters aver that the time error correction procedure belongs within the realm of NAESB and is not a reliability issue. The Commission disagrees, as BAL-004-0 is intended to ensure that time error corrections are performed in a manner that does not adversely affect the reliability of the Interconnection. The financial aspects of time error correction such as MISO's concern about the unilateral payback of interchange imbalances remain with NAESB. However, the technical details, including the means to carry out the procedure, are a reliability issue.

Brent Ingebrigtson - LG&E and KU Energy, LLC - 1,3,5,6 - MRO,WECC,NPCC,SERC,SPP,RFC

Selected Answer: Yes

Answer Comment:

These comments are submitted on behalf of the following PPL NERC Registered Affiliates: LG&E and KU Energy, LLC; PPL Electric Utilities Corporation, PPL EnergyPlus, LLC; PPL Generation, LLC; PPL Susquehanna, LLC and PPL Montana, LLC. The PPL NERC Registered Affiliates are registered in six regions (MRO, NPCC, RFC, SERC, SPP, and WECC) for one or more of the following NERC functions: BA, DP, GO, GOP, IA, LSE, PA, PSE, RP, TO, TOP, TP, and TSP.

Ben Engelby - ACES Power Marketing - 6 -

Selected Answer: Yes

Answer Comment:

We support the SAR and retirement of the BAL-004-0. However, we are concerned that a NERC whitepaper recommends retirement of the associated NAESB standard. We do not believe the NERC whitepaper should make such a recommendation. Rather, NERC should, at most, notify NAESB of its intent to retire that standard. NAESB can then take appropriate action.

So long as manual Time Error Correction continues under NAESB WEQ-006 or a similar business practice, Order 693 and the NOPR in Docket RM09-13 requires that a standard be in place to ensure that manual time error corrections be performed in a manner that does not adversely affect the Bulk Electric System. The SDT is recommending, based on the technical analysis performed by the Periodic Review Team, that BAL-004-0 be retired as it does not contribute to reliability of the BES and in fact manual time error correction may be detrimental to the reliability of the Interconnection. It is characterized as contributing somewhat towards unreliable impacts such as moving system frequency closer to an unstable point including Under Frequency Load Shedding trip points as stated in the white paper. The SDT is coordinating with NAESB to have WEQ-006 retired concurrently with the retirement of BAL-004-0.

Craig Figart - Avista - Avista Utilities - NA - Not Applicable - WECC

Selected Answer: No

Answer Comment:

YES, Manual TEC (MTEC) could be eliminated for all other interconnections, but **NO**, not yet for WECC. In the WECC, Automatic Time Error Correction (ATEC) per BAL-004-WECC-2 is used to manage Time Error automatically by holding BA's accountable for managing and paying their own, "primary", inadvertent Interchange (PII) energy accumulations back to the interconnection. So yes, assuming ATEC is accomplishing its intended goal, MTECs can be eliminated in theory for the WECC, but only after it's proven that WECC's ATEC implementation keeps Time Error to within boundary values of +/- 99.999 seconds. That's because WECC (PEAK RC) Symmetricom clocks that are used to track Time Error are only capable of measuring Time Error out to within +/- 99.999 seconds.

PWG is currently performing data analysis on this very topic. Since June 9, 2014, WECC's Time Error bandwidth was widened out from +/- 5 seconds to +/- 30 seconds, allowing the system to "breathe" more naturally. Accordingly, manual TEC events have been reduced significantly, however, we have experienced a few large Time Error swings (i.e. +20 down to -30 seconds within a month during fall 2014) due to significant payback swings of Primary Inadvertent energy by larger BA's. So I would like to see a staged elimination of MTEC in WECC, BUT ONLY triggered after most WECC BA's, particularly larger BA's, accumulated PII balances are much closer to zero. Otherwise, I'm afraid that once the larger BA's in WECC get their accumulations down to near zero, we might be sitting out in excess of +/- 99.999 seconds of time error, for example, without an ability to manually correct time back to within bounds of current clock technology. I would recommend continuing Manual TECs until

sometime after these large PII accumulations are paid back, particularly by the larger BAs, and then verify that ATEC manages Time Error to within +/- 99.999 seconds. Additionally, tighter controls needs to be considered on the maximum PII accumulation threshold down from the current window of +/-150% Peak Load/Gen in order for ATEC to more effectively automatically manage Time Error to within these +/- 99.999 second bounds. Then MTECs can be considered for elimination and ATEC can go to work targeting a Time Error of zero seconds within a +/- 99.999 second Time Error window.
The SDT recognizes AVISTA's concern and invites AVISTA to participate in the development of an implementation plan associated with TEC.

We agree that there may be potential impacts to industry participants that will need to be addressed during the implementation process. The SDT will be surveying the industry to gain a better understanding of these issues.

So long as manual Time Error Correction continues under NAESB WEQ-006 or a similar business practice, Order 693 and the NOPR in Docket RM09-13 requires that a standard be in place to ensure that manual time error corrections be performed in a manner that does not adversely affect the Bulk Electric System. The SDT is recommending, based on the technical analysis performed by the Periodic Review Team, that BAL-004-0 be retired as it does not contribute to reliability of the BES and in fact manual time error correction may be detrimental to the reliability of the Interconnection. It is characterized as contributing somewhat towards unreliable impacts such as moving system frequency closer to an unstable point including Under Frequency Load Shedding trip points as stated in the white paper. The SDT is coordinating with NAESB to have WEQ-006 retired concurrently with the retirement of BAL-004-0.

Fuchsia Davis - Bonneville Power Administration - 1,3,5,6 - WECC

Selected Answer:	Yes

John Merrell - Tacoma Public Utilities (Tacoma, WA) - 1 -

Selected Answer:	Yes

2. Do you know of any constituents that may have concerns with the retirement of standard BAL-004-0 – Time Error Correction? If yes, please explain.

Dan Roethemeyer - Dynegy Inc. - 5 -

Selected Answer: No

John Fontenot - Bryan Texas Utilities - 1 -

Selected Answer: Yes

Dennis Minton - Florida Keys Electric Cooperative Assoc. - 1 -

Selected Answer: No

NERC

Kaleb Brimhall - Colorado Springs Utilities - 5 -

Selected Answer: No

Nick Vtyurin - Manitoba Hydro - 1,3,5,6 - MRO

Selected Answer: No

Albert DiCaprio - PJM Interconnection, L.L.C. - 2 - RFC

Selected Answer: No

Molly Devine - IDACORP - Idaho Power Company - 1 -

Selected Answer: No

Marsha Morgan - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC

Selected Answer: No

Terry BIlke - Midcontinent ISO, Inc. - 2 -

Selected Answer: Yes

Rachel Coyne - Texas Reliability Entity, Inc. - 10 -

Selected Answer: No

Randi Heise - Dominion - Dominion Resources, Inc. - 5 -

Selected Answer: No

Answer Comment:

Minor comment; neither of the links provided in the SAR work (Roster, IERP report).

Kathleen Black - DTE Energy - 3,4,5 - RFC

Selected Answer: No

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christina bigelow - Electric Reliability Council of Texas, Inc. - 2 -

Selected Answer: Yes

Answer Comment:

Importantly, the White Paper assumes the availability and usage of alternate time sources by devices on the BES. However, this assumption may not be applicable to all stakeholders and all devices in the ERCOT Interconnection. For example, in the ERCOT Region, existing market guides have provisions for manual TEC to facilitate maintenance of meter equipment accuracy. Thus, where constituents have utilized manual TECs historically, the transition to an alternate time source may not be simple and may, in fact, be a complex, lengthy process requiring modifications to devices and associated cyber systems, data, software, and configurations. Accordingly, it is likely that constituents that currently rely on manual TEC would have significant concerns with retirement of the standard where there exists no commercial or other standard to govern the consistency of processes within and among Interconnections during the transition to alternate time sources.

The SDT recognizes ERCOT's concern and invites ERCOT to participate in the development of an implementation plan associated with TEC.

So long as manual Time Error Correction continues under NAESB WEQ-006 or a similar business practice, Order 693 and the NOPR in Docket RM09-13 requires that a standard be in place to ensure that manual time error corrections be performed in a manner that does not adversely affect the Bulk Electric System. The SDT is recommending, based on the technical analysis performed by the Periodic Review Team, that BAL-004-0 be retired as it does not contribute to reliability of the BES and in fact manual time error correction may be detrimental to the reliability of the Interconnection. It is characterized as contributing somewhat towards unreliable impacts such as moving system frequency closer to an unstable point including Under Frequency Load Shedding trip points as stated in the white paper. The SDT is coordinating with NAESB to have WEQ-006 retired concurrently with the retirement of BAL-004-0.

Michael Lowman - Duke Energy - 1,3,5,6 - FRCC,SERC,RFC

Selected Answer: No

Lee Pedowicz - Northeast Power Coordinating Council - 10 - NPCC

Selected Answer: No

Answer Comment:

The links are not established in the SAR for sarcomm@nerc.com,
Roster, and Independent
Expert Review Project report.

Leonard Kula - Independent Electricity System Operator - 2 -

Selected Answer: No

Jason Smith - Southwest Power Pool, Inc. (RTO) - 2 - SPP

Selected Answer: No

Answer Comment:

There are no known concerns with retiring the Reliability Standard BAL-004-0. We are not stating here whether we support discontinuing the practice of manual TEC after retirement of the Standard.

Emily Rousseau - MRO - 1,2,3,4,5,6 - MRO

Selected Answer: Yes

Answer Comment:

NERC went through an exercise not long ago to try to eliminate manual TECs. There was significant pushback from multiple stakeholders (commerce commissions, Federal regulators, newspapers, a congressman, markets) as it could impact facilities that rely on grid frequency as their time reference.

We have heard of no call from the industry to eliminate manual TECs and it is unclear why we are spending resources to try this again. We should find ways to do fewer TECs and make them less intrusive in the frequency profile.

The previous effort related to TEC was not to retire BAL-004-0. The SDT believes that the resources expended would be less to eliminate BAL-004-0 rather than to modify the existing standard. There is currently a NERC Project 2010-14.2.1 that is addressing inadvertent interchange. In addition, NAESB business standard WEQ-007 addresses inadvertent interchange.

Brent Ingebrigtson - LG&E and KU Energy, LLC - 1,3,5,6 - MRO,WECC,NPCC,SERC,SPP,RFC

Selected Answer: No

Answer Comment:

These comments are submitted on behalf of the following PPL NERC Registered Affiliates: LG&E and KU Energy, LLC; PPL Electric Utilities Corporation, PPL EnergyPlus, LLC; PPL Generation, LLC; PPL Susquehanna, LLC and PPL Montana, LLC. The PPL NERC Registered Affiliates are registered in six regions (MRO, NPCC, RFC, SERC, SPP, and WECC) for one or more of the following NERC functions: BA, DP, GO, GOP, IA, LSE, PA, PSE, RP, TO, TOP, TP, and TSP.

Ben Engelby - ACES Power Marketing - 6 -

Selected Answer: No

Craig Figart - Avista - Avista Utilities - NA - Not Applicable - WECC

Selected Answer: No

Fuchsia Davis - Bonneville Power Administration - 1,3,5,6 - WECC

Selected Answer: No

John Merrell - Tacoma Public Utilities (Tacoma, WA) - 1 -

Selected Answer:	No

End of Report

Unofficial Nomination Form

Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls: Time Error Correction BAL-004-0

Supplemental Solicitation for Standard Drafting Team Nominations

DO NOT use this form for submitting nominations **Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls** standard drafting team (SDT or team) members. The electronic nomination form should be used to submit nominations and it is due prior to **8 p.m. Eastern, Monday, June 1, 2015.** This unofficial version is provided to assist nominees in compiling the information necessary to submit the electronic form.

If you have any questions, contact Senior Standards Developer, Darrel Richardson (via email) or at (609) 613-1848.

This is a supplemental solicitation to the initial which was held March 17-26, 2015. At their meeting on Wednesday, May 20, 2015, the Standards Committee (SC) approved the seating of the recommended nominees from the initial solicitation and requested that a supplemental nomination period be opened to garner additional team members. If you submitted a nomination form during the initial solicitation please **do not** re-submit your nomination form as you have already been selected for the SDT.

By submitting a nomination form, you are indicating your willingness and agreement to actively participate in the review or drafting team meetings if appointed by the SC. If appointed, you are expected to attend most of the face-to-face drafting team meetings as well as participate in all the team meetings held via conference calls.

The time commitment for these projects is expected to be up to two face-to-face meetings per quarter (on average two full working days each meeting) with conference calls scheduled as needed to meet the agreed upon timeline the review or drafting team sets forth. Review and drafting teams also will have side projects, either individually or by subgroup, to present to the larger team for discussion and review. Lastly, an important component of the review and drafting team efforts is outreach. Members of the team should be conducting outreach during development prior to posting to ensure all issues can be discussed and resolved.

Background

The Project 2010-14.2.2 was initiated by the SC in September 2013 as part of NERC's obligation to conduct periodic reviews of its standards. The Balancing Authority Reliability-based Control Phase 2 periodic review team (BARC 2 PRT) used background information on the standards and the questions set forth in the Periodic Review Template developed by NERC and approved by the SC, along with associated worksheets and reference documents, to determine whether BAL-004-0 should be: (1) affirmed as is (i.e., no changes needed); (2) revised (which may include revising or retiring one or more requirements); or (3) retired. During the development of the recommendation, the PRT also considered stakeholder recommendations for candidate Paragraph 81 requirements from Phase 1 of Paragraph 81, and applied the Paragraph 81 criteria to all of the requirements. The team also considered the Independent Expert Review Panel recommendations on the two standards.

After an extensive review, the BARC 2 PRT agreed with the Independent Expert Review Panel and is recommending that Reliability Standard BAL-004-0 be retired and that manual Time Error Correction (TEC) be eliminated as a continent-wide NERC requirement. The SAR for this project was posted for a 30-day industry comment period from March 17, 2015 through April 15, 2015. The BARC 2.2 standard drafting team (BARC 2.2 SDT) will consider comments from the SAR posting. The SDT will also consider any FERC directives and guidance, stakeholder input, and relevant industry reports prior to finalizing its recommendation.

Please provide the following information for the nominee:	
Name:	
Title:	
Organization:	
Address:	
Telephone:	
Email:	

Please briefly describe the nominee's experience and qualifications to serve on the selected project(s):

If you are currently a member of any NERC SAR or standard drafting team, please list each team here:

☐ Not currently on any active SAR or standard drafting team.

☐ Currently a member of the following SAR or standard drafting team(s):

If you previously worked on any NERC SAR or standard drafting team, please identify the team(s):

☐ No prior NERC SAR or standard drafting team.

☐ Prior experience on the following SAR or standard drafting team(s):

Select each NERC Region in which you have experience relevant to Project 2009-02:		
☐ ERCOT	☐ NPCC	☐ SPP
☐ FRCC	☐ RF	☐ WECC
☐ MRO	☐ SERC	☐ NA – Not Applicable

Select each Industry Segment that you represent:	
☐	1 — Transmission Owners

NERC

☐	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, and Provincial Regulatory or other Government Entities
☐	10 — Regional Reliability Organizations and Regional Entities
☐	NA – Not Applicable

Select each Function[1] in which you have current or prior expertise:

☐ Balancing Authority	☐ Transmission Operator
☐ Compliance Enforcement Authority	☐ Transmission Owner
☐ Distribution Provider	☐ Transmission Planner
☐ Generator Operator	☐ Transmission Service Provider
☐ Generator Owner	☐ Purchasing-selling Entity
☐ Interchange Authority	☐ Reliability Coordinator
☐ Load-serving Entity	☐ Reliability Assurer
☐ Market Operator	☐ Resource Planner
☐ Planning Coordinator	

Provide the names and contact information for two references who could attest to your technical qualifications and your ability to work well in a group:

Name:		Telephone:	
Organization:		Email:	
Name:		Telephone:	
Organization:		Email:	

[1] These functions are defined in the NERC Functional Model, which is available on the NERC web site.

Provide the names and contact information of your immediate supervisor or a member of your management who can confirm your organization's willingness to support your active participation.			
Name:		Telephone:	
Title:		Email:	

Standards Announcement

Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls: Time Error Correction
BAL-004-0

Supplemental Nomination Period Open through June 1, 2015

Now Available

Additional nominations are being sought for **Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls** standard drafting team (SDT or team) members through **8 p.m. Eastern, Monday, June 1, 2015**.

This is a supplemental solicitation to the initial which was held March 17-26, 2015. At their meeting on Wednesday, May 20, 2015, the Standards Committee (SC) approved the seating of the recommended nominees from the initial solicitation and requested that a supplemental nomination period be opened to garner additional team members. If you submitted a nomination form during the initial solicitation please **do not** re-submit your nomination form as you have already been selected for the SDT.

Previous drafting or review team experience is beneficial but not required. Detailed information is included on the unofficial Word version of the nomination form which can be found on the project page. Use the electronic form to submit nomination(s).

Next Steps

The SC is expected to review the nominee recommendations that are submitted and appoint additional SDT members at their next meeting scheduled for **June 10, 2015**. Nominees will be notified shortly after they have been appointed to the SDT**.** The first meeting of the new SDT is anticipated to be held early June 2015.

For information on the Standards Development Process, refer to the Standard Processes Manual**.**

For more information or assistance, contact Senior Standards Developer, Darrel Richardson (via email), or at (609) 613-1848.

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

A. Introduction

1. **Title:** Time Error Correction
2. **Number:** XXX-XXX-X
3. **Purpose:** The purpose of this standard is to ensure that Time Error Corrections are conducted in a manner that does not adversely affect the reliability of the Interconnection.
4. **Applicability:**
   - **4.1. Functional Entities:**
     - **4.1.1.** Reliability Coordinator
   - **4.2. Facilities:**
     - **4.2.1.** N/A

Effective Date: See Implementation Plan

B. Requirements and Measures

Rationale for Requirement R1:

R1. Reliability Coordinators in an Interconnection shall issue an Operating Instruction to the Balancing Authorities under their authority to implement a manual Time Error Correction. The Operating Instruction will include the Frequency Offset, the time to implement the offset, and the duration of the offset. *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*

M1.

Rationale for Requirement R2:

R2. Operating Instructions issued by a Reliability Coordinator related to a manual Time Error Correction for an Interconnection must match the Operating Instructions issued by all other Reliability Coordinators in the same Interconnection. *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*

M2.

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.

- The applicable entity shall keep data or evidence to show compliance for the current year, plus three previous calendar years.

1.3. Compliance Monitoring and Assessment Processes:

As defined in the NERC Rules of Procedure, “Compliance Monitoring and Assessment Processes” 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.

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.						
R2.						

D. Regional Variances

None.

E. Interpretations

None.

F. Associated Documents

None.

Version History

Version	Date	Action	Change Tracking
0			
0			

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NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Unofficial Survey Form

Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls: Time Error Correction

DO NOT use this form for submitting survey responses. Use the electronic form to submit survey responses for Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls: Time Error Correction. Responses must be submitted by **8 p.m. Eastern, Tuesday, August 25, 2015**.

Documents and information about this project are available on the project page. If you have questions, contact Senior Standards Developer, Darrel Richardson (via email), or at (609) 613-1848.

Background Information

This Project 2010-14.2.2 Phase 2 Balancing Authority Reliability-based Controls standard drafting team (BARC 2.2 SDT) is soliciting comments from the industry concerning the disposition of BAL-004-0. During the SAR comment phase the industry indicated support for the retirement of BAL-004-0, however it was unclear whether industry supported maintaining or eliminating manual Time Error Correction (the ability to operate with a frequency offset).

The Federal Energy Regulatory Commission ("Commission" or "FERC") has determined that manual Time Error Correction is a reliability issue, as a Reliability Standard is necessary to ensure that Time Error Corrections are performed in a manner that does not adversely affect reliability. Thus, while Time Error Corrections may not be necessary to ensure reliability, if Time Error Corrections are performed, FERC has clarified that there must be a Reliability Standard in place ensuring performance in a way that does not adversely affect reliability.

In Order No. 693, at P 383 the Commission stated:

> "Many commenters aver that the time error correction procedure belongs within the realm of NAESB and is not a reliability issue. The Commission disagrees, as BAL-004-0 is intended to ensure that time error corrections are performed in a manner that does not adversely affect the reliability of the Interconnection. The financial aspects of time error correction such as MISO's concern about the unilateral payback of interchange imbalances remain with NAESB. However, the technical details, including the means to carry out the procedure, are a reliability issue."
>
> *Mandatory Reliability Standards for the Bulk-Power System*, Order No. 693, 118 FERC ¶ 61,218, P 383 (2007)

Later, the Commission highlighted in a Notice of Proposed Rulemaking ("NOPR") on, now withdrawn, BAL-004-1:

"In Order No. 693, we disagreed with arguments that Time Error Correction is really more a NAESB business practice. Rather, we stated that the Time Error Correction Reliability Standard is intended to ensure that Time Error Corrections are performed in a manner that does not adversely affect reliability, and the technical details, including the means to carry out the procedure, are a reliability issue.

....

NERC has stated that in its view Time Error itself is not a reliability risk, and the purpose of the Time Error Correction Reliability Standard is not to account for Time Error, but to ensure Time Error Corrections are implemented in a reliable manner. Any time the Balancing Authorities within an Interconnection undertake an actual modification to their generation dispatch to correct for Time Error, it must be coordinated and monitored by a Reliability Coordinator to ensure that each Balancing Authority schedules the same frequency and preclude negative impacts on reliable operation, allowing the Reliability Coordinator to maintain a wide area view of other activities, planned or unplanned, occurring on the system at the time…."

Time Error Correction Reliability Standard, 130 FERC ¶ 61,201, P 25 and P 27 (2010) (FERC Docket No. RM09-13-000).

Questions

1. Based on comments related to the SAR, the industry supports the retirement of BAL-004-0, however it is unclear whether industry supports maintaining or eliminating manual Time Error Correction (the ability to operate with a frequency offset). Based on the SDT's interpretation of FERC Order No. 693 and the NOPR in RM09-13-000, FERC has clearly stated that implementation of a manual TEC would require a standard to be in place. The SDT has posted proposed requirement concepts that they believe address the reliability issues for implementation of a manual TEC. Based on these concepts, do you support (i) maintaining the ability to implement a TEC or (ii) do you prefer eliminating the standard and the ability to implement a manual TEC?

    Maintain the ability to implement manual TEC with requirements similar to those proposed.

    Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.

    Comments:

2. If the industry elects to maintain the ability to implement manual TEC, do you agree that the proposed requirements address the reliability issues surrounding implementing manual Time Error Correction?

    Yes:

    No:

    Comments:

3. If the industry elects to maintain the ability to implement manual TEC, the SDT recommends that these requirements be included in an IRO standard. Do you agree?

   Yes:

   No:

   Comments:

4. If you have any other comments or reliability concerns please provide them in the space below.

   Comments:

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Standards Announcement

Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls: Time Error Correction

Survey Being Conducted through August 25, 2015

Now Available

Based on comments received related to the Standard Authorization Request, the industry supports the retirement of BAL-004-0. However, the comments received were unclear whether the industry supported elimination of the process for manual Time Error Correction. The standard drafting team is looking for additional information and feedback to decide the project's next steps. Responses must be submitted by **8 p.m. Eastern, Tuesday, August 25, 2015**.

Use the electronic form to submit survey responses. If you experience any difficulties in using the electronic form, contact Wendy Muller.

For more information or assistance, contact Senior Standards Developer, Darrel Richardson (via email), or at (609) 613-1848.

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Individual or group. (24 Responses)
Name (16 Responses)
Organization (16 Responses)
Group Name (8 Responses)
Lead Contact (8 Responses)
Question 1 (23 Responses)
Question 1 Comments (24 Responses)
Question 2 (18 Responses)
Question 2 Comments (24 Responses)
Question 3 (19 Responses)
Question 3 Comments (24 Responses)
Question 4 Comments (24 Responses)

Individual
Nick Vtyurin
Manitoba Hydro
Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.
Yes
Yes
Group
Bonneville Power Administration
Andrea Jessup
Maintain the ability to implement manual TEC with requirements similar to those proposed.
BPA does not find manual TEC to be a burden and unless shown to be unnecessary by studies, should be maintained.
Yes
Yes
Individual
Matt Smelser
Imperial Irrigation District
Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.

Yes
No
Individual
John Tolo
Tucson Electric Power
Maintain the ability to implement manual TEC with requirements similar to those proposed.
In agreement that BAL-004 can be eliminated but retain the ability to do a manual time error correction outside of a Reliability Standard. When implementing a manual time error correction, strive for less of a reliability impact by narrowing the frequency offset band. Make certain that there is a distinction between manual time error correction (MTEC) and automatic time error correction (ATEC) as it is a regional standard in the WECC.
Yes
No
Look at other means of accomplishing manual time error corrections without having a Reliability Standard associated with that practice. Maybe look at a NAESB Business Practice or a Guideline of some sort.
The ability for comment and input is appreciated.
Individual
dan Roethemeyer
Dynegy
Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.
Yes
Yes
Individual
Maryclaire Yatsko
Seminole Electric Cooperative, Inc.
Maintain the ability to implement manual TEC with requirements similar to those proposed.
Yes

Yes
Individual
Kathleen Goodman
ISO New England Inc
Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.
ISO-NE believes that this should no longer be a standard, and, if needed, a NAESB business practice
Individual
Terry Bilke
MISO
Maintain the ability to implement manual TEC with requirements similar to those proposed.
We disagree with the assertion that Order No. 693 clearly states we have to follow a mandated path. NERC is allowed to point out technical deficiencies based on new information or provide equally effective alternatives. NERC standards should set a maximum allowable offset for TECs. NERC should remove some of the overheard of TECs in the standards. For example, there are procedural steps regarding TECs in the NERC Operating Manual that work quite effectively. Most of what we do today regarding TECs could be in a procedural document in the NERC Operating Manual. While giving it to NAESB might work, there would be gaps in that not all BAs are FERC jurisdictional transmission providers. Additionally there are viable and useful things NERC could do to reduce the number and impact of manual TECs and make them less error prone (full day corrections at a 0.0Hz offset with the ability to do small unilateral paybacks that help manage time).
No
Only 1 RC should issue TECs. R2 isn't necessary. Additionally, you could just put a requirement in BAL-004,5 or 6 that the maximum frequency offset for an RC issued TEC is +/- 0.02 Hz.
No
No, just because Commission Staff erred in overestimating the impact of TECs, does not mean we should propagate that misunderstanding.
Manual TECs have become infrequent events in the East. We could further improve control, better manage Inadvertent Interchange, and improve the frequency profile if we made a few simple changes (clock day corrections with a 0.01Hz offset, 30 second TEC window, allow unilateral payback of 5MW or 10% of bias if it assisted in managing Time Error).
Individual
Craig Figart
Avista Corp

Maintain the ability to implement manual TEC with requirements similar to those proposed.
Yes
not sure
Now that WECC has widened our Time Error Correction window from +/-5 to +/-30 seconds, I would like to continue to monitor how effectively ATEC manages automatically manages Time Error and payback of Primary and Total Inadvertent Interchange energy. The number of MTECs have already been significantly reduced as a result. MTECs keep Time Error bounded within existing WECC Interconnection Time Monitor's Symmetricom clock capabilities of +/-99 seconds. Without MTECs, modifications to current Time Error calculation processes and software would have to be devised and implemented (i.e. WIT Tool software, WECC's ITM Time Error calcs, each BA's ATEC calculations, etc).
Individual
Oliver Burke
Entergy Services, Inc.
Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.
Entergy is in favor of eliminating Time Error Corrections. This practice has become outdated and inefficient as the advancements of today's technology has eliminated the need for such practices.
No
Yes
Individual
Angela P Gaines
Portland General Electric
Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.
No
There is no need to maintain Manual Time Error Correction.
From a reliability of the interconnection perspective, BAL-004-0 serves no purpose. The only positive impact that it has is for clocks and timing devices that rely on the frequency of the grid to maintain an accurate time which are probably few and minimally impacted. There is no need to maintain Manual Time Error Correction (TEC). Get rid of this standard.
Group
Northeast Power Coordinating Council

Guy Zito
Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.
We support the elimination of BAL-004 and its requirement to perform time error correction since time error correction is not necessary to maintain reliability. This should no longer be a standard, and if determined to be needed, should be made a NAESB business practice.
Yes
Yes
Individual
Joel Wise
Tennessee Valley Authority
Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.
TVA supports the elimination of the ability to implement manual TEC and the Reliability Standard BAL-004-0.
Individual
David Kimmel
PJM Interconnection
Maintain the ability to implement manual TEC with requirements similar to those proposed.
R1 has some unclear language. It states that the Reliability Coordinator will issue an Operating Instruction to its Balancing Authorities that will include the time to implement the offset. Does this include the termiantion time of the TEC? Usually a termination time is issued later into the Time Error Correction once Time Error has been reduced to a lower value. An R3 should be written to allow Reliability Coordinators to request to terminate a manual Time Error correction that is in progress or that is scheduled to start if they have reliability considerations.
No
The process to determine and agree on a termination time is unclear. As it is written, Reliability Coordinators do not appear to have authority to issue a manual Time Error Correction termination when the Time Error has returned to a near zero value. Any Reliability Coordinator in an Interconnection should have the authority to request the other Reliability Coordinators within its Interconnection to terminate a manual Time Error Correction in progress or cancel a scheduled manual Time Error Correction that has not begun, for reliability considerations.
Yes

Individual
Glenn Barry
LADWP
Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.
Yes
Yes
Individual
David Jendras
Ameren
Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.
No
In addition to the proposed requirements a +/- limit on frequency offset should be set, such as +/- 0.010 Hertz.
Yes
Individual
LeRoy Patterson
GCPD
Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.
Manual Time Error corrections create reliability risk by intentionally offsetting frequency (moving frequency closer to manual load shed points) to compensate for past poor frequency performance. Instead of manual time error corrections, mandate or incent suitable frequency performance at all times rather than causing intentional frequency offsets to "adjust" time error.
Yes
Yes
Manual time error correction creates reliability issues. Inadvertent accumulations should be managed without manual time error corrections. If time error must be managed to zero over time, then automatic time error correction methods that reduce inadvertent accumulations while supporting 60 Hz frequency should be used rather than manual corrections that intentionally offset frequency.

Individual
Ernesto Martinez
El Paso Electric Company
Maintain the ability to implement manual TEC with requirements similar to those proposed.
Yes
Yes
Group
ISO/RTO Standards Review Committee
Albert DiCaprio
The ISO/RTO SRC members believe that Time Error Correction does not rises up to the level of a NERC Reliability Standard level and that BAL-004 should be retired and either be referred to NAESB for its consideration as a Business Practice or converted to a NERC reference document (e.g. Operating Guideline)
The ISO/RTO SRC members believe that Time Error Correction does not rises up to the level of a NERC Reliability Standard level and that BAL-004 should be retired and either be referred to NAESB for its consideration as a Business Practice or converted to a NERC reference document (e.g. Operating Guideline)
No
The ISO/RTO SRC members believe that Time Error Correction does not rises up to the level of a NERC Reliability Standard level and that BAL-004 should be retired and either be referred to NAESB for its consideration as a Business Practice or converted to a NERC reference document (e.g. Operating Guideline)
Group
SPP Standards Review Group
Jason Smith
Maintain the ability to implement manual TEC with requirements similar to those proposed.
We agree that coordinated, manual frequency offsets may need to be implemented, but only for non-BES reliability purposes. The question of whether or not TEC, or manual frequency offsets, is needed is a non-electric industry question and should be directed to those entities. If those entities agree that TEC is still needed, then at minimum some coordination and oversight should remain. However, placing this obligation to coordinate activities for a non-BES reliability issue in NERC Reliability Standards is a mis-placement of the issue. An un-coordinated, manual frequency offset would only result in inadvertent interchange between Balancing Authorities which itself is not a reliability issue. Simply offsetting a BA's target, scheduled frequency will not result in direct reliability impacts. The interconnections between

BAs in today's world are much stronger than they were 25-30 years ago. When TECs were originally implemented and BAs were only interconnected by minimal ties, the impact of frequency offset, and the resulting inadvertent interchange, would have been much more impactful. In today's interconnections, the ties are much stronger and BAs generally have many ties with the rest of the interconnection. The amount of inadvertent interchange between BAs due to an uncoordinated offset would result in only minimal amounts of MWs on those ties and should not be characterized as a reliability issue.
Yes
There are no reliability issues associated with an uncoordinated manual Time Error Correction. Only the possibility of introducing inadvertent interchange between Balancing Authorities is introduced. While we feel there are no reliability issues, the proposed requirements are sufficient to coordinate manual frequency offsets.
Yes
We feel that this does not belong in Reliability Standards at all. Coordinating TEC's purpose would be only to minimize the creation of inadvertent interchange. However, if it is determined that the implementation of TEC is maintained within the Standards, placing it in the IRO family of Standards would be appropriate.
Group
Southern Company
Bob Schaffeld
Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.
Yes
It seems the requirement should be on the RCs in the interconnection, not the Interconnection RC Time Monitor (that rotates among the different RCs in the Interconnection periodically). How would the Interconnection Time Monitor RC prove compliance with this requirement? It would be easier for the 'local RC's to prove that their instructions match the one issued on the Interconnection Time Monitor. We suggest the standard be written in this manner, "Operating Instructions issued by the RCs in the same Interconnection must match the Operating Instruction issued by the Reliability Coordinator related to a manual Time Error Correction for that Interconnection".
Yes
Group
ACES Standards Collaborators
Brian Van Gheem
Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.

Our preference is to eliminate the standard entirely, as we feel it puts an undue risk on the reliability of the BES. An Interconnection under a Fast Time Error Correction that suddenly loses a large generation resource increases the probability of a frequency excursion occurring below 59.95 Hz. We struggle to identify any reliability reasons why an entity would offset their scheduled frequency for this purpose. Previous positions that support the use of Time Error Corrections focus on maintaining the time accuracy of the remaining synchronous motor electric clocks still in use. However, we continue to find flaw with such arguments, as the corresponding NAESB Standard identified that the Interconnection Time Monitor should make a reasonable effort to initiate and terminate a corrective action order within a specific tolerance. Over the past decade, Industry has moved on to more accurate methods for keeping time instead of synchronous motor electric clocks. Moreover, Industry is often accused of not updating its facilities to 21st century standards and expectations, yet the purpose of Time Error Correction is to help a clock invented in the early 20th century stay accurate.
No
(1) We have concerns that NERC and the SDT has posted an incomplete package of documents (e.g. missing implementation plan, missing VSLs in standard, etc.) for review. We understand the SDT’s intention to move this standard under the IRO set of standards. However, based on the significant depth of this survey and its request to review a proposed standard, Industry is still obligated to follow its internal standards development and commenting mechanism based on the materials provided. (2) We applaud the SDT for removing Balancing Authorities from the applicability of this standard. However, we are concerned that Requirement R1 doesn’t clearly identify one Reliability Coordinator as the Interconnection Time Error Monitor. Without having one entity identified to take the lead and responsibility for initiating a Time Error Correction, this could cause additional burden on tracking and coordination to when the initiation should occur and by whom. We recommend identifying a standard-specific definition for Interconnection Time Error Monitor that identifies a NERC Technical Committee (i.e. NERC Operating Committee) to assign these responsibilities to a specific Reliability Coordinator on a periodic basis. (3) We recommend Requirement R1 is revised to the develop-maintain-implement approach used for Geomagnetic Disturbances in Reliability Standard EOP-010-1. Reliability Coordinators already provide some guidance within their Reliability Plans on how they will communicate the initiation of Time Error Corrections. Operating Procedures and Operating Processes could further support the need for additional information. (4) We question how a CEA would enforce Requirement R2, as written. An auditor could interpret that the Reliability Coordinator who issues the initiation of a Time Error Correction would also be responsibility for all other Reliability Coordinators within its Interconnection to issue the same Operating Instructions. We recommend rewording the requirement to “Each Reliability Coordinator shall communicate identical Operating Instructions for Time Error Corrections issued by other Reliability Coordinators within the same Interconnection.”
Yes

Although we agree with this recommendation, we caution the SDT that the IRO standards recently went through extensive revisions and any further revisions should be narrow in scope.
We believe that NERC should build a stronger case for the removal of the Time Error Correction standard. This standard puts unnecessary maintenance costs related to software and implementation of Time Error Correction operations. It also puts a burden on Reliability Coordinators to identify the initiation and termination of Time Error Corrections as reliability-related tasks, which then are required training for System Operators, per NERC Standard PER-005-1.
Group
Duke Energy
Colby Bellville
Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.
Group
Peak Reliability
Jared Shakespeare
Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.
Peak Reliability (Peak) is in favor of retiring BAL-004-0 as it is a legacy commercial service. Peak does not support keeping a process for implementing manual time error correction as a standalone standard. The existing suite of BAL Reliability Standards should keep frequency within proper bounds to create a reliable Interconnection (BAL-001 and BAL-003 in particular). Additionally, Reliability Coordinators have other mechanisms to manage frequency drift (ACE, interchange, etc.). Manual Time Error Correction is not, nor should it be, one of these mechanisms.

Consideration of Comments

2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls: Time Error Correction BAL-004-0 Survey

The Project 2010-14.2.2 Phase 2 Balancing Authority Reliability-based Controls standard drafting team would like to thank all who submitted comments on the survey concerning the disposition of BAL-004-0. The survey was posted August 12-25, 2015 for stakeholders to provide feedback through a special electronic comment form. There were 24 sets of responses, including comments from approximately 76 different people from approximately 55 companies representing 9 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 project page.

If you feel that your comment has been overlooked, please let us know immediately. Our 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 Director of Standards, Howard Gugel (via email) or at (404) 446-9693. In addition, there is a NERC Reliability Standards Appeals Process.[1]

[1] The appeals process is in the Standard Processes Manual: http://www.nerc.com/comm/SC/Documents/Appendix_3A_StandardsProcessesManual.pdf

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	Andrea Jessup	Bonneville Power Administration	X		X		X	X				

	Additional Member	Additional Organization	Region	Segment Selection
1.	Curtis Holland	Dittmer Dispatch	WECC	1

	Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
2.	Group	Guy Zito	Northeast Power Coordinating Council	X	X	X		X	X		X	X	X

	Additional Member	Additional Organization	Region	Segment Selection
1.	Alan Adamson	New York State Reliability Council	NPCC	10
2.	Edward Bedder	Orange and Rockland Utilities, Inc.	NPCC	1
3.	David Burke	Orange and Rockland Utilities, Inc.	NPCC	3
4.	Greg Campoli	New York Independent System Operator	NPCC	2
5.	Sylvain Clermont	Hydro-Quebec TransEnergie	NPCC	1
6.	Kelly Dash	Consolidated Edison Co. of New York, Inc.	NPCC	1
7.	Gerry Dunbar	Northeast Power Coordinating Council	NPCC	10
8.	Michael Forte	Consolidated Edison Co. of New York, Inc.	NPCC	1
9.	Kathleen Goodman	ISO - New England	NPCC	2
10.	Michael Jones	National Grid	NPCC	1
11.	Mark Kenny	Eversource	NPCC	1
12.	Helen Lainis	Independent Electricity System Operator	NPCC	2

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10

13. Connie Lowe	Dominion Resources Services, Inc.	NPCC	5
14. Paul Malozewski	Hydro One Networks Inc.	NPCC	1
15. Bruce Metruck	New York Power Authority	NPCC	6
16. Brian O'Boyle	Consolidated Edison Co. of New York, Inc.	NPCC	8
17. Silvia Parada Mitchell	NextEra Energy, LLC	NPCC	5
18. Lee Pedowicz	Notheast Power Coordinating Council	NPCC	10
19. Robert Pellegrini	The United Illuminating Company	NPCC	1
20. Si Truc Phan	Hydro-Quebec TransEnergie	NPCC	1
21. David Ramkalawan	Ontario Power Generation, Inc.	NPCC	5
22. Brian Robinson	Utility Services	NPCC	8
23. Brian Shanahan	National Grid	NPCC	1
24. RuiDa Shu	Northeast Power Coordinating Council	NPCC	10
25. Wayne Sipperly	New York Power Authority	NPCC	5
26. Glen Smith	Entergy Services, Inc.	NPCC	5
27. Rob Vance	New Brunswick Power Corporation	NPCC	9

				1	2	3	4	5	6	7	8	9	10
3.	Group	Albert DiCaprio	ISO/RTO Standards Review Committee		X								

Additional Member	Additional Organization	Region	Segment Selection
1. Charles Yeung	SPP	SPP	2
2. Ben Li	IESO	NPCC	2
3. Kathleen Goodman	ISONE	NPCC	2
4. Greg Campoli	NYISO	NPCC	2
5. Mike Bryson	PJM	RFC	2
6. Terry Bilke	MISO	RFC	2
7. Christina Bigelow	ERCOT	ERCOT	2
8. Ali Miremadi	CAISO	WECC	2

				1	2	3	4	5	6	7	8	9	10
4.	Group	Jason Smith	SPP Standards Review Group	X	X	X		X					

Additional Member	Additional Organization	Region	Segment Selection
1. Shannon Mickens	Southwest Power Pool	SPP	2
2. Carl Stelly	Southwest Power Pool	SPP	2
3. Donald Hargrove	Oklahoma Gas & Electric	SPP	1, 3, 5, 6

				1	2	3	4	5	6	7	8	9	10
5.	Group	Bob Schaffeld	Southern Company	X		X		X	X				

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10

	Additional Member	Additional Organization	Region	Segment Selection
1.	Rob Watson	Choctaw Generation Limited Partnership, LLLP	SERC	5
2.	Scott Moore	Alabama Power Company	SERC	3
3.	Bill Shultz	Southern Company Generation	SERC	5
4.	John Ciza	Southern Company Generation and Energy Marketing	SERC	6

				1	2	3	4	5	6	7	8	9	10
6.	Group	Brian Van Gheem	ACES Standards Collaborators	X			X		X				

	Additional Member	Additional Organization	Region	Segment Selection
1.	Bob Solomon	Hoosier Energy Rural Electric Cooperative, Inc.	RFC	1
2.	John Shaver	Arizona Electric Power Cooperative, Inc.	WECC	4, 5
3.	John Shaver	Southwest Transmission Cooperative, Inc.	WECC	1
4.	William Hutchison	Southern Illinois Power Cooperative	SERC	1
5.	Ellen Watkins	Sunflower Electric Power Corporation	SPP	1

				1	2	3	4	5	6	7	8	9	10
7.	Group	Colby Bellville	Duke Energy	X		X		X	X				

Additional Member	Additional Organization	Region	Segment Selection	
1.	Doug Hils	Duke Energy	RFC	1
2.	Lee Schuster	Duke Energy	FRCC	3
3.	Dale Goodwine	Duke Energy	SERC	5
4.	Greg Cecil	Duke Energy	RFC	6

				1	2	3	4	5	6	7	8	9	10
8.	Individual	Jared Shakespeare	Peak Reliability	X									
9.	Individual	Nick Vtyurin	Manitoba Hydro	X		X		X	X				
10.	Individual	Matt Smelser	Imperial Irrigation District	X		X		X				X	
11.	Individual	John Tolo	Tucson Electric Power	X									
12.	Individual	dan Roethemeyer	Dynegy	X				X					
13.	Individual	Maryclaire Yatsko	Seminole Electric Cooperative, Inc.	X		X	X	X	X				
14.	Individual	Kathleen Goodman	ISO New England Inc		X								
15.	Individual	Terry Bilke	MISO		X								
16.	Individual	Craig Figart	Avista Corp	X		X							

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
17.	Individual	Oliver Burke	Entergy Services, Inc.	X		X		X					
18.	Individual	Angela P Gaines	Portland General Electric	X		X		X	X				
19.	Individual	Joel Wise	Tennessee Valley Authority	X		X		X	X				
20.	Individual	David Kimmel	PJM Interconnection		X								
21.	Individual	Glenn Barry	LADWP	X		X		X				X	
22.	Individual	David Jendras	Ameren	X		X		X	X				
23.	Individual	LeRoy Patterson	GCPD	X			X	X					
24.	Individual	Ernesto Martinez	El Paso Electric Company	X		X							

1. **Based on comments related to the SAR, the industry supports the retirement of BAL-004-0, however it is unclear whether industry supports maintaining or eliminating manual Time Error Correction (the ability to operate with a frequency offset). Based on the SDT's interpretation of FERC Order No. 693 and the NOPR in RM09-13-000, FERC has clearly stated that implementation of a manual TEC would require a standard to be in place. The SDT has posted proposed requirement concepts that they believe address the reliability issues for implementation of a manual TEC. Based on these concepts, do you support (i) maintaining the ability to implement a TEC or (ii) do you prefer eliminating the standard and the ability to implement a manual TEC?**

Summary Consideration:

Based on the comments received the vast majority of the industry supports retirement and elimination of manual Time Error Correction (TEC). Most of the entities that want to keep TEC were supportive of retiring the standard but keeping the process of manual TEC in some form. The SDT was not supportive of this position based on the fact that the Federal Energy Regulatory Commission ("Commission" or "FERC") has determined that manual Time Error Correction is a reliability issue, as a Reliability Standard is necessary to ensure that Time Error Corrections are performed in a manner that does not adversely affect reliability. Thus, while Time Error Corrections may not be necessary to ensure reliability, if Time Error Corrections are performed, FERC has clarified that there must be a Reliability Standard in place ensuring performance in a way that does not adversely affect reliability.

Organization	Question 1 Answer	Question 1 Comment
Entergy Services, Inc.	Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.	Entergy is in favor of eliminating Time Error Corrections. This practice has become outdated and inefficient as the advancements of today's technology has eliminated the need for such practices.
Response:		
ISO New England Inc	Eliminate the ability to implement manual TEC and	ISO-NE believes that this should no longer be a standard, and, if needed, a NAESB business practice

Organization	Question 1 Answer	Question 1 Comment
	standard BAL-004-0 Time Error Correction.	
Response:		
GCPD	Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.	Manual Time Error corrections create reliability risk by intentionally offsetting frequency (moving frequency closer to manual load shed points) to compensate for past poor frequency performance. Instead of manual time error corrections, mandate or incent suitable frequency performance at all times rather than causing intentional frequency offsets to "adjust" time error.
Response:		
ACES Standards Collaborators	Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.	Our preference is to eliminate the standard entirely, as we feel it puts an undue risk on the reliability of the BES. An Interconnection under a Fast Time Error Correction that suddenly loses a large generation resource increases the probability of a frequency excursion occurring below 59.95 Hz. We struggle to identify any reliability reasons why an entity would offset their scheduled frequency for this purpose. Previous positions that support the use of Time Error Corrections focus on maintaining the time accuracy of the remaining synchronous motor electric clocks still in use. However, we continue to find flaw with such arguments, as the corresponding NAESB Standard identified that the Interconnection Time Monitor should make a reasonable effort to initiate and terminate a corrective action order within a specific tolerance. Over the past decade, Industry has moved on to more accurate methods for keeping time instead of synchronous motor electric clocks. Moreover, Industry is often accused of not updating its facilities to 21st century standards and expectations, yet the purpose of Time Error Correction is to help a clock invented in the early 20th century stay accurate.

Organization	Question 1 Answer	Question 1 Comment
Response:		
Peak Reliability	Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.	Peak Reliability (Peak) is in favor of retiring BAL-004-0 as it is a legacy commercial service. Peak does not support keeping a process for implementing manual time error correction as a standalone standard. The existing suite of BAL Reliability Standards should keep frequency within proper bounds to create a reliable Interconnection (BAL-001 and BAL-003 in particular). Additionally, Reliability Coordinators have other mechanisms to manage frequency drift (ACE, interchange, etc.). Manual Time Error Correction is not, nor should it be, one of these mechanisms.
Response:		
Tennessee Valley Authority	Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.	TVA supports the elimination of the ability to implement manual TEC and the Reliability Standard BAL-004-0.
Response:		
Northeast Power Coordinating Council	Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.	We support the elimination of BAL-004 and its requirement to perform time error correction since time error correction is not necessary to maintain reliability. This should no longer be a standard, and if determined to be needed, should be made a NAESB business practice.
Response:		
Southern Company	Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.	

Organization	Question 1 Answer	Question 1 Comment
Duke Energy	Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.	
Manitoba Hydro	Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.	
Imperial Irrigation District	Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.	
Dynegy	Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.	
Portland General Electric	Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.	
LADWP	Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.	

Organization	Question 1 Answer	Question 1 Comment
Ameren	Eliminate the ability to implement manual TEC and standard BAL-004-0 Time Error Correction.	
Bonneville Power Administration	Maintain the ability to implement manual TEC with requirements similar to those proposed.	BPA does not find manual TEC to be a burden and unless shown to be unnecessary by studies, should be maintained.
Response:		
Tucson Electric Power	Maintain the ability to implement manual TEC with requirements similar to those proposed.	In agreement that BAL-004 can be eliminated but retain the ability to do a manual time error correction outside of a Reliability Standard. When implementing a manual time error correction, strive for less of a reliability impact by narrowing the frequency offset band. Make certain that there is a distinction between manual time error correction (MTEC) and automatic time error correction (ATEC) as it is a regional standard in the WECC.
Response:		
PJM Interconnection	Maintain the ability to implement manual TEC with requirements similar to those proposed.	R1 has some unclear language. It states that the Reliability Coordinator will issue an Operating Instruction to its Balancing Authorities that will include the time to implement the offset. Does this include the termiantion time of the TEC? Usually a termination time is issued later into the Time Error Correction once Time Error has been reduced to a lower value.An R3 should be written to allow Reliability Coordinators to request to terminate a manual Time Error correction that is in progress or that is scheduled to start if they have reliability considerations.

Organization	Question 1 Answer	Question 1 Comment
Response:		
SPP Standards Review Group	Maintain the ability to implement manual TEC with requirements similar to those proposed.	We agree that coordinated, manual frequency offsets may need to be implemented, but only for non-BES reliability purposes. The question of whether or not TEC, or manual frequency offsets, is needed is a non-electric industry question and should be directed to those entities. If those entities agree that TEC is still needed, then at minimum some coordination and oversight should remain. However, placing this obligation to coordinate activities for a non-BES reliability issue in NERC Reliability Standards is a mis-placement of the issue. An un-coordinated, manual frequency offset would only result in inadvertent interchange between Balancing Authorities which itself is not a reliability issue. Simply offsetting a BA's target, scheduled frequency will not result in direct reliability impacts. The interconnections between BAs in today's world are much stronger than they were 25-30 years ago. When TECs were originally implemented and BAs were only interconnected by minimal ties, the impact of frequency offset, and the resulting inadvertent interchange, would have been much more impactful. In today's interconnections, the ties are much stronger and BAs generally have many ties with the rest of the interconnection. The amount of inadvertent interchange between BAs due to an uncoordinated offset would result in only minimal amounts of MWs on those ties and should not be characterized as a reliability issue.
Response:		
MISO	Maintain the ability to implement manual TEC with requirements similar to those proposed.	We disagree with the assertion that Order No. 693 clearly states we have to follow a mandated path. NERC is allowed to point out technical deficiencies based on new information or provide equally effective alternatives. NERC standards should set a maximum allowable offset for

Organization	Question 1 Answer	Question 1 Comment
		TECs. NERC should remove some of the overheard of TECs in the standards. For example, there are procedural steps regarding TECs in the NERC Operating Manual that work quite effectively. Most of what we do today regarding TECs could be in a procedural document in the NERC Operating Manual. While giving it to NAESB might work, there would be gaps in that not all BAs are FERC jurisdictional transmission providers.Additionally there are viable and useful things NERC could do to reduce the number and impact of manual TECs and make them less error prone (full day corrections at a 0.0Hz offset with the ability to do small unilateral paybacks that help manage time).
Response:		
Seminole Electric Cooperative, Inc.	Maintain the ability to implement manual TEC with requirements similar to those proposed.	
Avista Corp	Maintain the ability to implement manual TEC with requirements similar to those proposed.	
El Paso Electric Company	Maintain the ability to implement manual TEC with requirements similar to those proposed.	
ISO/RTO Standards Review Committee		The ISO/RTO SRC members believe that Time Error Correction does not rises up to the level of a NERC Reliability Standard level and that BAL-004 should be retired and either be referred to NAESB for its consideration as

Organization	Question 1 Answer	Question 1 Comment
		a Business Practice or converted to a NERC reference document (e.g. Operating Guideline)
Response:		

2. **If the industry elects to maintain the ability to implement manual TEC, do you agree that the proposed requirements address the reliability issues surrounding implementing manual Time Error Correction?**

Summary Consideration:

The SDT is not providing a response to the comments received from this question since the question concerns actions that would occur if the standard were modified and the SDT is recommending that the standard be retired.

Organization	Question 2 Answer	Question 2 Comment
ACES Standards Collaborators	No	(1) We have concerns that NERC and the SDT has posted an incomplete package of documents (e.g. missing implementation plan, missing VSLs in standard, etc.) for review. We understand the SDT's intention to move this standard under the IRO set of standards. However, based on the significant depth of this survey and its request to review a proposed standard, Industry is still obligated to follow its internal standards development and commenting mechanism based on the materials provided.(2) We applaud the SDT for removing Balancing Authorities from the applicability of this standard. However, we are concerned that Requirement R1 doesn't clearly identify one Reliability Coordinator as the Interconnection Time Error Monitor. Without having one entity identified to take the lead and responsibility for initiating a Time Error Correction, this could cause additional burden on tracking and coordination to when the initiation should occur and by whom. We recommend identifying a standard-specific definition for Interconnection Time Error Monitor that identifies a NERC Technical Committee (i.e. NERC Operating Committee) to assign these responsibilities to a specific Reliability Coordinator on a periodic basis.(3) We recommend Requirement R1 is revised to the develop-maintain-implement approach used for Geomagnetic Disturbances in Reliability Standard EOP-010-1. Reliability Coordinators already provide some guidance within their Reliability Plans on how they will communicate the

Organization	Question 2 Answer	Question 2 Comment
		initiation of Time Error Corrections. Operating Procedures and Operating Processes could further support the need for additional information.(4) We question how a CEA would enforce Requirement R2, as written. An auditor could interpret that the Reliability Coordinator who issues the initiation of a Time Error Correction would also be responsibility for all other Reliability Coordinators within its Interconnection to issue the same Operating Instructions. We recommend rewording the requirement to "Each Reliability Coordinator shall communicate identical Operating Instructions for Time Error Corrections issued by other Reliability Coordinators within the same Interconnection."
Response:		
Ameren	No	In addition to the proposed requirements a +/- limit on frequency offset should be set, such as +/- 0.010 Hertz.
Response:		
MISO	No	Only 1 RC should issue TECs. R2 isn't necessary. Additionally, you could just put a requirement in BAL-004,5 or 6 that the maximum frequency offset for an RC issued TEC is +/- 0.02 Hz.
Response:		
PJM Interconnection	No	The process to determine and agree on a termination time is unclear. As it is written, Reliability Coordinators do not appear to have authority to issue a manual Time Error Correction termination when the Time Error has returned to a near zero value.Any Reliability Coordinator in an Interconnection should have the authority to request the other Reliability Coordinators within its Interconnection to terminate a manual Time Error Correction in progress or

Organization	Question 2 Answer	Question 2 Comment
		cancel a scheduled manual Time Error Correction that has not begun, for reliability considerations.
Response:		
Entergy Services, Inc.	No	
Southern Company	Yes	It seems the requirement should be on the RCs in the interconnection, not the Interconnection RC Time Monitor (that rotates among the different RCs in the Interconnection periodically). How would the Interconnection Time Monitor RC prove compliance with this requirement? It would be easier for the 'local RC's to prove that their instructions match the one issued on the Interconnection Time Monitor. We suggest the standard be written in this manner, "Operating Instructions issued by the RCs in the same Interconnection must match the Operating Instruction issued by the Reliability Coordinator related to a manual Time Error Correction for that Interconnection".
Response:		
SPP Standards Review Group	Yes	There are no reliability issues associated with an uncoordinated manual Time Error Correction. Only the possibility of introducing inadvertent interchange between Balancing Authorities is introduced. While we feel there are no reliability issues, the proposed requirements are sufficient to coordinate manual frequency offsets.
Response:		
Bonneville Power Administration	Yes	

Organization	Question 2 Answer	Question 2 Comment
Northeast Power Coordinating Council	Yes	
Manitoba Hydro	Yes	
Imperial Irrigation District	Yes	
Tucson Electric Power	Yes	
Dynegy	Yes	
Seminole Electric Cooperative, Inc.	Yes	
Avista Corp	Yes	
LADWP	Yes	
GCPD	Yes	
El Paso Electric Company	Yes	
ISO/RTO Standards Review Committee		The ISO/RTO SRC members believe that Time Error Correction does not rises up to the level of a NERC Reliability Standard level and that BAL-004 should be retired and either be referred to NAESB for its consideration as a Business Practice or converted to a NERC reference document (e.g. Operating Guideline)
Response:		

3. **If the industry elects to maintain the ability to implement manual TEC, the SDT recommends that these requirements be included in an IRO standard. Do you agree?**

Summary Consideration:

The SDT is not providing a response to the comments received from this question since the question concerns actions that would occur if the standard were modified and the SDT is recommending that the standard be retired.

Organization	Question 3 Answer	Question 3 Comment
Tucson Electric Power	No	Look at other means of accomplishing manual time error corrections without having a Reliability Standard associated with that practice. Maybe look at a NAESB Business Practice or a Guideline of some sort.
Response:		
MISO	No	No, just because Commission Staff erred in overestimating the impact of TECs, does not mean we should propagate that misunderstanding.
Response:		
ISO/RTO Standards Review Committee	No	The ISO/RTO SRC members believe that Time Error Correction does not rises up to the level of a NERC Reliability Standard level and that BAL-004 should be retired and either be referred to NAESB for its consideration as a Business Practice or converted to a NERC reference document (e.g. Operating Guideline)
Response:		
Portland General Electric	No	There is no need to maintain Manual Time Error Correction.

Organization	Question 3 Answer	Question 3 Comment
Response:		
Imperial Irrigation District	No	
ACES Standards Collaborators	Yes	Although we agree with this recommendation, we caution the SDT that the IRO standards recently went through extensive revisions and any further revisions should be narrow in scope.
Response:		
SPP Standards Review Group	Yes	We feel that this does not belong in Reliability Standards at all. Coordinating TEC's purpose would be only to minimize the creation of inadvertent interchange. However, if it is determined that the implementation of TEC is maintained within the Standards, placing it in the IRO family of Standards would be appropriate.
Response:		
Bonneville Power Administration	Yes	
Northeast Power Coordinating Council	Yes	
Southern Company	Yes	
Manitoba Hydro	Yes	
Dynegy	Yes	

Organization	Question 3 Answer	Question 3 Comment
Seminole Electric Cooperative, Inc.	Yes	
Entergy Services, Inc.	Yes	
PJM Interconnection	Yes	
LADWP	Yes	
Ameren	Yes	
GCPD	Yes	
El Paso Electric Company	Yes	
Avista Corp		not sure
Response:		

4. **If you have any other comments or reliability concerns please provide them in the space below.**

Summary Consideration:

The majority of the comments received in this section are in support of eliminating TEC. A couple of commenters requested additional justification for eliminating TEC. The SDT has revised the white paper associated with this project to include additional information/justification for elimination of TEC.

Organization	Question 4 Comment
Portland General Electric	From a reliability of the interconnection perspective, BAL-004-0 serves no purpose. The only positive impact that it has is for clocks and timing devices that rely on the frequency of the grid to maintain an accurate time which are probably few and minimally impacted. There is no need to maintain Manual Time Error Correction (TEC). Get rid of this standard.
Response:	
MISO	Manual TECs have become infrequent events in the East. We could further improve control, better manage Inadvertent Interchange, and improve the frequency profile if we made a few simple changes (clock day corrections with a 0.01Hz offset, 30 second TEC window, allow unilateral payback of 5MW or 10% of bias if it assisted in managing Time Error).
Response:	
GCPD	Manual time error correction creates reliability issues. Inadvertent accumulations should be managed without manual time error corrections. If time error must be managed to zero over time, then automatic time error correction methods that reduce inadvertent accumulations while supporting 60 Hz frequency should be used rather than manual corrections that intentionally offset frequency.
Response:	

Organization	Question 4 Comment
Avista Corp	Now that WECC has widened our Time Error Correction window from +/-5 to +/-30 seconds, I would like to continue to monitor how effectively ATEC manages automatically manages Time Error and payback of Primary and Total Inadvertent Interchange energy. The number of MTECs have already been significantly reduced as a result.MTECs keep Time Error bounded within existing WECC Interconnection Time Monitor's Symmetricom clock capabilities of +/-99 seconds. Without MTECs, modifications to current Time Error calculation processes and software would have to be devised and implemented (i.e. WIT Tool software, WECC's ITM Time Error calcs, each BA's ATEC calculations, etc).
Response:	
Tucson Electric Power	The ability for comment and input is appreciated.
Response:	
ACES Standards Collaborators	We believe that NERC should build a stronger case for the removal of the Time Error Correction standard. This standard puts unnecessary maintenance costs related to software and implementation of Time Error Correction operations. It also puts a burden on Reliability Coordinators to identify the initiation and termination of Time Error Corrections as reliability-related tasks, which then are required training for System Operators, per NERC Standard PER-005-1.
Response:	

END OF REPORT

Implementation Plan

Reliability Standard BAL-004-0

Project 2010-14.2.2 Balancing Authority Reliability-based Controls

Requested Approval

- **N/A**

Requested Retirement

- BAL-004-0 – Time Error Correction

Prerequisite Approval

- Retirement of NASEB standard WEQ-006

Revisions to Glossary Terms

- N/A

Applicable Entities

- Reliability Coordinator
- Balancing Authority

Applicable Facilities

- N/A

Effective Dates

Where approval by an applicable governmental authority is required, the standard shall be retired effective the later of (i) the first day of the first calendar quarter after the effective date of the applicable governmental authority's order approving the standard, (ii) the effective date of NAESB standard WEQ-006 retirement, (iii) or as otherwise provided for by the applicable governmental authority. Where approval by an applicable governmental authority is not required, the standard shall be retired effective the later of (i) the first day of the first calendar quarter after the date the standard is adopted by the NERC Board of Trustees, (ii) the effective date of NAESB standard WEQ-006 retirement, (iii) or as otherwise provided for in that jurisdiction.

Retirements

BAL-004-0 (Time Error Correction) shall be retired on the Effective Dates stated above.

NERC
NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Unofficial Comment Form

Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls
Recommended Retirement of BAL-004-0

DO NOT use this form for submitting comments. Use the electronic form to submit comments on the recommendation to retire **BAL-004-0 – Time Error Correction**. The form must be completed and submitted by **8 p.m. Eastern, Thursday, November 12, 2015.**

If you have questions, contact Senior Standards Developer, Darrel Richardson, (via email) or at (609) 613-1848.

The project page can be accessed by clicking here.

Background Information

This posting solicits comments on the recommendation of the Balancing Authority Reliability-based Controls 2.2 standard drafting team (BARC 2.2 SDT) to retire BAL-004-0 – Time Error Correction. To support its recommendation, the BARC 2.2 SDT has posted "Time Error Correction and Reliability White Paper".

The BARC 2.2 SDT reviewed the findings of the BARC 2 Primary Review Team. A survey was posted for comment August 12-25, 2015 to gain a better perspective as to any concerns the industry may have if the practice of manual Time Error Correction (TEC) was eliminated. The survey responses indicated support for retirement of manual TEC as a standard. Upon further review the BARC 2.2 SDT determined that manual TEC would not support the reliability of the BPS. Conducting manual TEC in any form directly contradicts NERC Reliability Principle 2: "The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand." The practice of using manual TEC to place the Interconnection closer to the settings for automatic underfrequency load shedding does not support or enhance reliability. Therefore, BAL-004-0 should be retired.

The survey responses also indicated that the accompanying North American Energy Standard Board (NAESB) WEQ Manual Time Error Correction Business Practice Standard – WEQ-006, should be retired contemporaneously with BAL-004-0. The BARC 2.2 SDT's recommendation for retirement of BAL-004-0 is contingent on simultaneous retirement of NAESB WEQ-006 to ensure clarity and to avoid inadvertent, uncoordinated, manual TEC. The BARC 2.2 SDT has been coordinating with NAESB on this issue. Upon retirement of BAL-004-0 and NAESB WEQ-006, currently or soon to be effective Reliability Standards BAL-003-1 and BAL-001-2 will incent continued adherence to a frequency approximating 60 Hz over long-term averages.

Questions

1. Based on comments received from the SAR posting and the BAL-004-0 Survey posting, the SDT is recommending that BAL-004-0 be retired and WEQ Manual Time Error Correction Business Practice Standard – WEQ-006, should also be retired contemporaneously with BAL-004-0. Do you agree that BAL-004-0 – Time Error Correction standard should be retired? If not, please explain.

   ☐ Yes

   ☐ No

   Comments:

Time Error Correction and Reliability White Paper

Recommendation of the Balancing Authority Reliability-based Controls 2.2 Standard Drafting Team to Retire BAL-004-0 – Time Error Correction

The Balancing Authority Reliability-based Controls 2 Periodic Review Team (BARC 2 PRT) was tasked with reviewing certain Reliability Standards and developing recommendations that each Reliability Standard be (1) reaffirmed as is (i.e., no changes needed); (2) revised (which may include revising or retiring one or more requirements); or (3) retired. After an extensive review, the BARC 2 PRT recommended that Reliability Standard BAL-004-0 be retired and that manual Time Error Correction (TEC) be eliminated as a continent-wide NERC standard. The Balancing Authority Reliability-based Controls 2.2 Standard Drafting Team (BARC 2.2 SDT) reviewed the findings of the BARC 2 PRT and issued a survey to the industry to gain a better perspective as to any concerns the industry may have if the practice of manual TEC was eliminated. The survey response indicated support for retirement of manual TEC as a standard. Upon review, as detailed below, the BARC 2.2 SDT determined that manual TEC would not support the reliability of the BPS. Conducting manual TEC in any form directly contradicts NERC Reliability Principle 2: “The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.” The practice of using manual TEC to place the Interconnection closer to the settings for automatic underfrequency load shedding does not support or enhance reliability. Therefore, BAL-004-0 should be retired.

The survey also indicated that the accompanying North American Energy Standard Board (NAESB) business practice standard, WEQ Manual Time Error Correction Business Practice Standard – WEQ-006, should be retired contemporaneously with BAL-004-0. The BARC 2.2 SDT’s recommendation for retirement of BAL-004-0 is contingent on simultaneous retirement of NAESB WEQ-006 to ensure clarity and to avoid inadvertent, uncoordinated, manual TEC. The BARC 2.2 SDT has been coordinating with NAESB on this issue. As discussed below, upon retirement of BAL-004-0 and NAESB WEQ-006, currently or soon to be effective Reliability Standards BAL-003-1 and BAL-001-2 will insent continued adherence to a frequency approximating 60 Hz over long-term averages.

This white paper reviews the history of manual TEC and BAL-004-0, outlines the key considerations of the BARC 2.2 SDT in developing its recommendation, and assesses whether the use of manual TEC supports the reliability of the Bulk Power System (BPS).

I. History of Time Error Correction and Reduced Reliance On Manual TEC Today

A. Invention of the Synchronous Motor Clock and Market Penetration

In 1916, Henry E. Warren invented the self-starting synchronous motor and three years later the motor was used for the production of the Telechron Clock. The Telechron Clock was a synchronous electric clock, which used alternating current electricity to measure time. Its accuracy depended on the frequency of the power grid. To incentivize electric system operators to regulate frequency in a way that kept the clocks running accurately, the Warren Clock Company, which was manufacturing the Telechron Clock at the time, gave electric clocks to electric system operators. The idea worked and system operators began regulating the frequency as desired by the Warren Clock Company.

During the 1920s, other companies developed synchronous motor clocks and used the same marketing strategy, giving electric clocks to system operators. As the penetration of the synchronous electric clock increased, the incremental electric revenue to utilities from the additional electric clock motors justified the relatively small cost to utilities to regulate system time by modifying system frequency. This additional revenue helped ensure that manual TEC would be an ongoing service provided by the electric utility industry.

B. Time Error Correction Practice and Improvements in Clock Accuracy

As the electric system became more interconnected, the service of providing manual TEC was incorporated into the industry's general operating practice. The current form of manual TEC is a legacy commercial practice that originated in the 1920s as a commercial service and was not related to the reliability of the electric grid. While documentation is available from as late as 1976 that synchronous electric clocks were still being used for important applications, by 1969, alternative methods of keeping accurate time penetrated the market and gradually displaced the electric clock. For example, the introduction of the first mass-produced quartz watch provided a more reliable and less expensive method to keep accurate time. Additionally, 15 years later, the United States made available for free the Global Positioning System, which is a space-based satellite navigation system that provides location and time information.

As discussed below in Section III.e., current Reliability Standards BAL-003-1 and BAL-001-2also ensure adherence to 60 Hz.

II. History of BAL-004-0

Reliability Standard BAL-004-0 – Time Error Correction became mandatory and enforceable on June 18, 2007. It contains four requirements:

- **R1** Only a Reliability Coordinator shall be eligible to act as an Interconnection Time Monitor. A single Reliability Coordinator in each Interconnection shall be designated by the NERC Operating Committee to serve as Interconnection Time Monitor.
- **R2** The Interconnection Time Monitor shall monitor Time Error and shall initiate or terminate corrective action orders in accordance with the NAESB Time Error Correction Procedure.
- **R3** Each Balancing Authority, when requested, shall participate in a Time Error Correction by one of the following methods:
  - **R3.1** The Balancing Authority shall offset its frequency schedule by 0.02 Hertz, leaving the Frequency Bias Setting normal; or
  - **R3.2** The Balancing Authority shall offset its Net Interchange Schedule (MW) by an amount equal to the computed bias contribution during a 0.02 Hertz Frequency Deviation (i.e. 20% of the Frequency Bias Setting).
- **R4** Any Reliability Coordinator in an Interconnection shall have the authority to request the Interconnection Time Monitor to terminate a Time Error Correction in progress, or a scheduled Time Error Correction that has not begun, for reliability considerations.
  - **R4.1** Balancing Authorities that have reliability concerns with the execution of a Time Error Correction shall notify their Reliability Coordinator and request the termination of a Time Error Correction in progress.

On July 11, 2007, a Standard Authorization Request (SAR) was submitted to NERC, proposing to revise BAL-004-0 to:

- Remove inappropriate compliance requirements on Reliability Coordinators who voluntarily agree to serve as Interconnection Time Monitors.
- Remove inappropriate compliance requirements on the NERC Operating Committee (OC), which is not a user, owner, or operator of the BPS.
- Remove inappropriate requirements to follow NAESB business practices.

The revised BAL-004-1 received 94.10% weighted segment approval on December 4, 2007, and was adopted by NERC's Board of Trustees on March 26, 2008. NERC filed a petition with the Federal Energy Regulatory Commission (FERC) on April 7, 2009, requesting approval for the revised BAL-004-1. In response, FERC issued a Notice of Proposed Rulemaking (NOPR) proposing to remand BAL-004-1 for further consideration. The NOPR requested that NERC:

- Change R2 to indicate that the Interconnection Time Monitor, designated according to a process described in a FERC approved document, is responsible for initiating or terminating a TEC in a reliable manner.
- Explain the circumstances under which the Time Monitor should start or end a TEC.

Between 2010 and 2012, NERC filed a series of petitions to defer action on the BAL-004-1 NOPR as it worked with the NERC Operating Committee (OC) to explore the possibility of eliminating manual TEC, using a field trial. In May and June of 2011, NERC held a webinar and issued a press release laying out a schedule to do a field trial in which manual TEC would have been stopped for a period of time. NERC's intention was to begin a phased elimination of TEC in ERCOT in August 2011.

After the webinar and issuance of the press release, and in part because NERC received feedback from private citizens, industry, and government entities expressing concern about the field trial, the trial was not conducted. Discussion of the data affecting these issues is included in Apendix I – Discussion of Correspondence attached.

On August 16, 2012, the NERC Board of Trustees withdrew its adoption of BAL-004-1, stating that:

- No Interconnection Time Monitor has ever incurred a violation.
- The NERC OC is not a registered entity, and therefore compliance actions are not a concern. Thus, it is acceptable to keep the OC reference in the Reliability Standard.
- There are no significant issues with the reference to NAESB in R2.

BAL-004-0 remains mandatory and enforceable. Since that time, BAL-004-0 has continued being examined, and the BARC 2.2 SDT has determined that under the current environment and rubric of Reliability Standards (discussed above), BAL-004-0 and NAESB WEQ-006 should be retired.

III. Key Considerations for BAL-004-0 Retirement

A. Manual TEC does not support the reliability of the BPS.

The frequency of an Interconnection is a contributor to the reliability of that Interconnection is. In North America, the system is designed to operate within a specified range, with 60 Hz as the center point of that range. Under and over frequency limits have been established to protect the equipment of both the providers and the users on the Interconnection from failure. As described above, Reliability Standards BAL-003-1 and BAL-001-2 support this by helping to ensure that frequency approximates 60 Hz in addition to modifications made to other standards, such as Interchange and Emergency Operations standards, increasing focus on data accuracy and frequency. As manual TEC is not required for reliability, a Reliability Standard focused on manual TEC is only necessary for ensuring that any manual TEC is implemented consistently across an Interconnection. The BARC 2.2 SDT maintains that elimination of manual TEC will allow each Interconnection to be operated closer to the design frequency of 60 Hz more often, by avoiding the over-corrections that arise in manual TEC accomplished under BAL-004-0 and NAESB WEQ-006.

Industry experts on the OC have stated that the practice of manual TEC does not support reliability, and is instead a strictly commercial service that does require a mandatory and enforceable Reliability Standard. [1] For instance, in an industry survey performed by the Balancing Authority Reliability-based Controls 1 Standard Drafting Team between September 12 and October 13, 2008, approximately 77% of respondents supported the discontinuation of manual TEC. Further, when revisions to BAL-004-0 were developed in the proposed BAL-004-1, "the underlying driver was that it was commonly understood that manual TECs were a commercial task."[2]

Because there is no additional benefit to reliability from the implementation of manual TEC, the BARC 2.2 SDT recommends the retirement of BAL-004-0.

B. *Manual TEC is occurring less frequently.*

Over the past ten years there has been a drastic decrease of the number of TEC called across all interconnections. There are a number of reasons for these decreases across the interconnections and these include but not limited to the following (see RS Meeting Presentations - January 28-29, 2015 (Coral Gables, FL), slides 50-53; http://www.nerc.com/comm/OC/Resources%20Subcommittee%20RS%202013/RS%20Meeting%20Presentations_January_28-29_2015.pdf):

- Economy (Recession)
- 2005 Energy Policy Act, creation of ERO as reliability enforcer
- The current suite of NERC Reliability Standards
- BAAL field trial participation
- Reduction in number of control areas in the Eastern and Western Interconnections
- Incremental steps in the expansion of PJM and MISO
- Development of Eastern largest Reserve Sharing Group
- Tools that better indicate current performance, such as the Intelligent Alarms from NERC-CERTS Resource Adequacy Application

[1] Minutes from the March 6-7, 2012 meeting of the Operating Committee. Posted at: http://www.nerc.com/comm/OC/Agendas%20Highlights%20and%20Minutes%20DL/Agendas,%20Highlights,%20and%20Minutes%20-%202012/Operating_Committee_Meeting_Minutes_Mar_6-7_2011_R1.pdf

[2] Minutes from the March 6-7, 2012 meeting of the Operating Committee.

• Inadvertent Interchange Tool, which gives BA's a heads up that their control may require some investigation

There exists no way of determining which of these factors may be the main factor in the decrease of manual TEC, but there has been a marked decrease since the factors listed above have taken place. This indicates that BAL-004-0 (and the NAESB corollary WEQ-006) are not materially assisting entities to maintain frequency at 60 Hz.

C. *The elimination of manual TEC is not expected to impact Inadvertent Interchange accumulations.*

In a FERC Order 693 directive related to BAL-004-0, FERC directed NERC "to perform whatever research it and the industry believe is necessary to provide a sound technical basis for either continuing with the present practice [of TEC] or identifying an alternative practice that is more effective and helps reduce inadvertent interchange." It should be noted that Time Error and Inadvertent Interchange are not necessarily linked, and therefore, eliminating manual TEC will not have negative imapcts on Inadvertent Interchange.

Time Error relates to the accumulated frequency drift of an Interconnection; whereas Inadvertent Interchange is an imbalance of scheduled and actual energy at a Balancing Authority's boundary in an Interconnection with other Balancing Authorities. Frequency drift is related to an imbalance between load and generation, which may be influenced by factors that include metering error, scheduling error, and the inability to instantaneously match load and generation.

Given the dynamics of load, generation, and Interconnection frequency, it is highly unlikely for any Balancing Authority to have an Area Control Error (ACE) of zero except by chance, so Inadvertent Interchange, positive and negative, is a fact of operation. In addition, the difference between the reliability requirement to ramp Interchange schedules and the business practice to account for Interchange schedules after the fact as "block schedules" (ramp not included) will also result in some amount of Inadvertent Interchange being accumulated each hour, even if the Balancing Authority could perfectly match load and generation throughout an hour. Like frequency drift, Inadvertent Interchange is influenced by the multiple factors that cause an imbalance between load and generation. Eliminating manual TEC will not impact Inadvertent Interchange accumulations.

D. Comments from non-electric power industry parties reflect misunderstanding regarding manual TEC.

When NERC and the NERC OC began exploring the possibility of conducting a field trial to eliminate manual TEC, they received feedback from private citizens, industry, and government representatives expressing concern about the impact of eliminating manual TEC. Some of these individuals expressed concern that eliminating manual TEC could affect billing meters or traffic lights that could rely on grid frequency.

However, for the reasons described in Section A of Part III above, such as Reliability Standards BAL-003-1 and BAL-001-2 , eliminating manual TEC will not adversely affect frequency. On average, frequency will approximate 60 Hz under these Reliability Standards, and eliminating BAL-004-0 and NAESB WEQ-006 will eliminate the over-corrections that are likely to cause deviation from 60 Hz in today's environment. [Further comments to address the types of concerns raised by non-electric power industry parties are included at Appendix I.]

Moreover, grid frequency is not the appropriate source for alignment to official time; there are other more appropriate sources available for that service. The National Institute of Standards and Technology and the U.S. Naval Observatory, for instance, maintain a website (www.time.gov) that could be used to correct time periodically, including after power outages. Manual TEC should not be required for the purpose of providing accurate time for synchronous electric clocks. Similarly, commercial or industrial processes dependent upon an exact duration of time could not rely on synchronous electric clocks, as any duration of time determined by such clocks can never be exact, and are negatively affected by each instance of manual TEC.

E. Other NERC Reliability Standards already require operation within a reliable frequency range.

NERC's suite of BAL Reliability Standards is designed to assure safe and reliable Interconnection operation within a defined frequency range, apart from any obligations associated with manual TEC in BAL-004-0. Reliability Standard BAL-003-1 – *Frequency Response and Frequency Bias Setting*, which became enforceable on April 1, 2015, requires sufficient Frequency Response from the Balancing Authority to maintain Interconnection Frequency within predefined bounds by arresting frequency deviations and supporting frequency until the frequency is restored to its scheduled value. This Reliability Standard ensures that each Interconnectionhas sufficient Frequency Response[3] to guard against underfrequency load shedding due to a credible event in that Interconnection. It ensures that Balancing Authorities provide the Frequency Response necessary to ensure that frequency does not reach the point where coordinated underfrequency load shedding relays curtail load. BAL-003-1 provides a reliability back stop for N-1-1 contigencies in that the standard requires the Balancing Authority to maintain frequency response to arrest frequency excursions following disturbance on the interconnection. The arresting of frequency allows the interconnection to stabilize and to make adjustments to be ready for the next disturbance.

In addition, the stated purpose of BAL-001-2 – Real Power Balancing Control Performance, which will become effective on July 1, 2016, is to control Interconnection frequency within defined limits. BAL-001

[3] Frequency Response is a measure of an Interconnection's ability to stabilize frequency immediately following the sudden loss of generation or load. Power system operators manage or control frequency primarily through adjustments to the output of generators with the goal of restoring balance between generation and load. Failure to maintain frequency can disrupt the operation of equipment and initiate disconnection of power plant equipment to prevent them from being damaged, which could lead to wide-spread blackouts.

Requirement R1 (CPS1) is the longer term measure of a Balancing Authorities control of frequency in the interconnection. Requirement R1 requires Balancing Authority to consistently over time adjust generation to improve frequency of the interconnection. BAL-001-2 Requirement R2, "Each Balancing Authority shall operate such that its clock-minute average of Reporting ACE does not exceed its clock-minute Balancing Authority ACE Limit (BAAL) for more than 30 consecutive clock-minutes", is the short term real-time feedback to the system operator of frequency control of the interconnection. Requirement R2 combines frequency versus ACE information to give the operator the immediate feedback to make corrections to move frequency back to within Frequency Trigger Limits.

F. Revising BAL-004-0 would not enhance the reliability of the BPS.

In minutes from its March 6-7, 2012 meeting, the NERC OC states that "there is a general consensus that the conduct of manual TECs is a commercial service and does not rise to the level of a reliability standard, with the exception of setting bounds on the magnitude of frequency offset."[4] But, recognizing that there are other ways to lessen the impact of manual TECs, the NERC OC did not pass a motion to move forward with a field trial to test the impact of eliminating Manual TECs. Further, some have suggested alternative methods of achieving TEC without a TEC Standard. These are discussed in Appendix II – Alternative TEC Methods Suggested.

When considering possible recommendations for BAL-004-0, the BARC 2.2 SDT discussed the option of revising BAL-004-0 to reduce the offset to allow for manual TEC to be implemented for a full load cycle over a consistent time period and lessen the burden on Interconnection Time Monitors. However, the BARC 2.2 SDT determined that would not support the reliability of the BPS. Conducting manual TEC in any form directly contradicts NERC Reliability Principle 2: "The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand." The practice of using manual TEC to place the Interconnection closer to the settings for automatic underfrequency load shedding does not support or enhance reliability. Therefore, in line with NERC's efforts to eliminate standards that do not promote reliability, BAL-004-0 should be retired.

IV. Summary

Manual TEC is a commercial service that does not support reliability, and accurate time can be obtained from alternative sources. As noted above, other Reliability Standards insent frequency to remain within defined limits. Accordingly, BAL-004-0 – Time Error Correction and the associated NAESB WEQ Manual Time Error Correction Business Practice Standard – WEQ-006 should be retired.

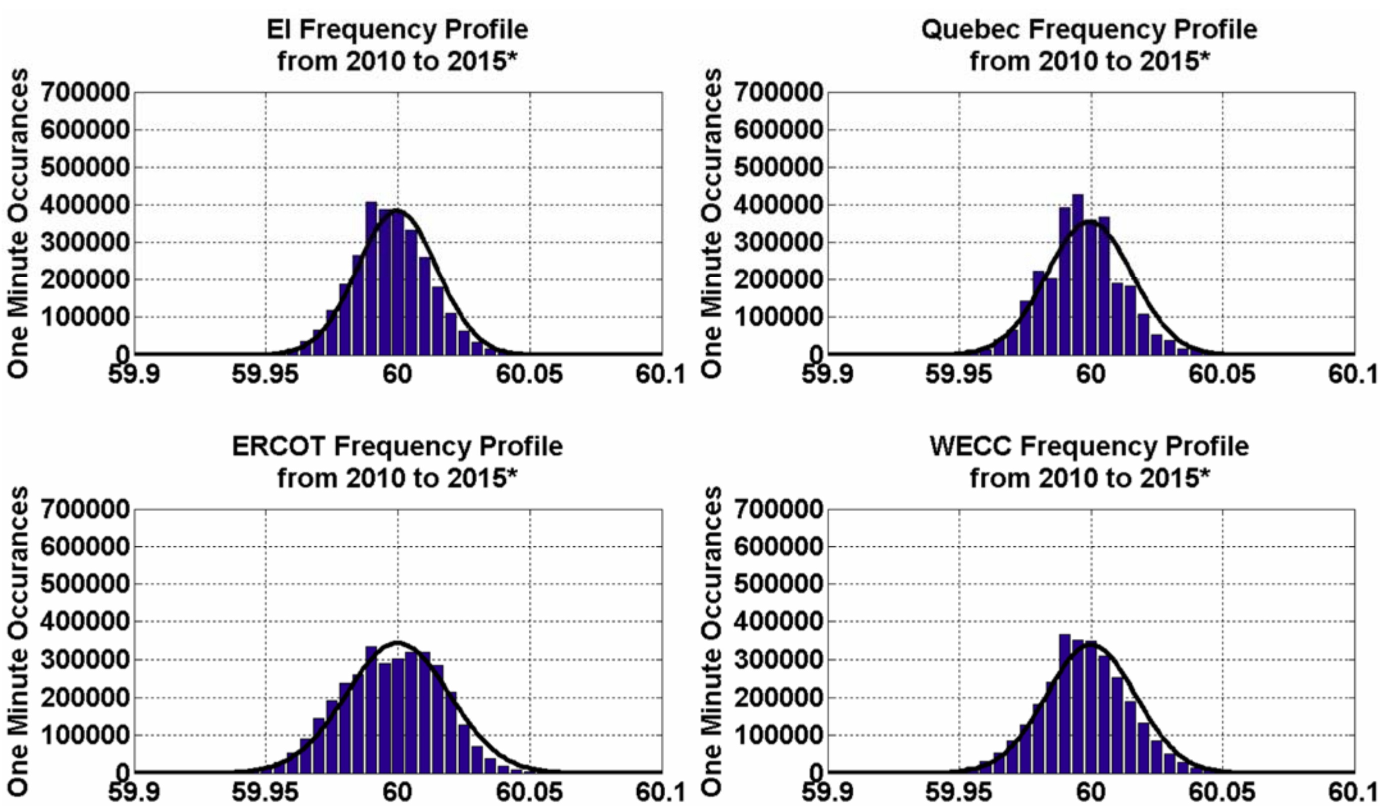
[4] Minutes from the March 6-7, 2012 meeting of the Operating Committee.

Appendix I – Discussion of Correspondence

Considerable correspondence was received by NERC in response to the announcement of the beginning of a trial to eliminate TEC. In most cases, those commenting on the trial admitted their lack of knowledge of interconnection frequency and its relation to Time Error and TEC. This appendix contains significant information to aid in the understanding of the issues related to time error correction.

Time Error Correction:

The North American Interconnections normally operate with a scheduled frequency of 60 Hz. As load and generation vary, actual frequency of the interconnection varies around this scheduled value. This variation is shown for one-minute average frequencies for the period from the beginning of 2010 through June 2015. This data shows that the one-minute frequency varies from a value of about 59.95 Hz to 60.05 Hz for the great majority of the time, over 99 % of the one-minute intervals. It also shows that the frequency error from 60 Hz is close to a Normal (Gaussian) Distribution.



These normal errors can be put into perspective by looking at the percentage the a 0.05 Hz error represents. This is obtained by dividing the 0.05 Hz error by the scheduled frequency of 60 Hz and

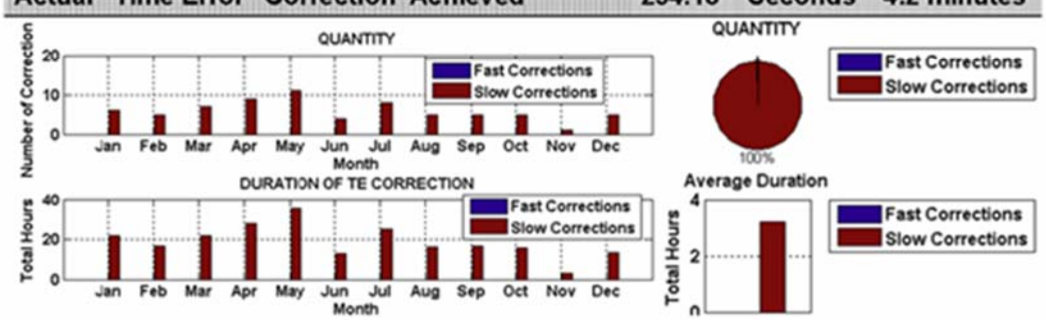
converting that number to a percentage. This gives an error of 0.083 %. The frequency error that the interconnections experience is less than one tenth of one percent. The elimination of TEC will have no significant effect on these error distributions, although it will move them slightly right or left so that the average error is slightly above or below 60 Hz.

Time error correction has historically been implemented by offsetting the scheduled frequency by 0.02 Hz above or below the normal frequency of 60 Hz. This scheduled offset moves the distribution closer to the relay limits for the interconnection, thus having a detrimental effect on reliability. The history of time error correction has been retained by the interconnections. This history for recent time error corrections is shown below for the Texas, Western, and Eastern Interconnections. This history shows that the total time error accumulated during the year 2014 was 4.2 minutes for the Texas Interconnection, 7.7 minutes for the Western Interconection, and 2.4 minutes for the Eastern Interconnection. An 8 minute annual error is an error of 0.0015%. When one considers that in most regions of the country, clocks are changed twice per year for Daylight Savings Time, these accumulated time errors are not significant. Although there are no guarantees that this experience will continue, it is expected to do so.

ERCOT TIME ERROR STATISTICS
2014 Summary

Annual Totals (YTD)

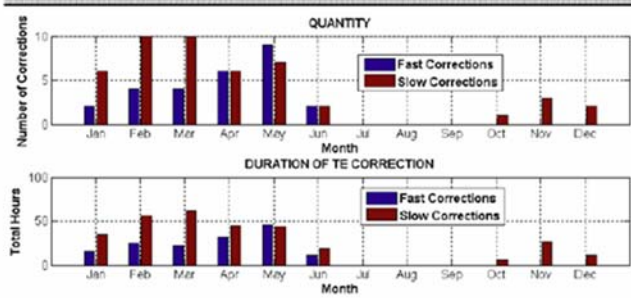
Total Number of Time Error Corrections	**71**		
"Fast" Time Error Corrections	0		
"Slow" Time Error Corrections	71		
Net Total Duration of TE Correction (Hrs)	**226.7**	**Hours**	
"Fast" Time Error Corrections	0	Hours	
"Slow" Time Error Corrections	226.7	Hours	
Average Duration of Time Error Corrections(Hrs)	**3.19**	**Hours**	
"Fast" Time Error Corrections			
"Slow" Time Error Corrections	3.19		
Actual "Time Error" Correction Achieved	**254.18**	**Seconds**	**4.2 minutes**

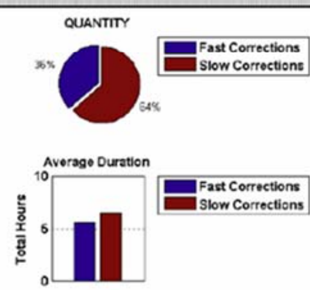


WECC TIME ERROR STATISTICS
2014 Summary

Annual Totals (YTD)

Total Number of Time Error Corrections	**74**		
"Fast" Time Error Corrections	27		
"Slow" Time Error Corrections	47		
Net Total Duration of TE Correction (Hrs)	**454.82**	**Hours**	
"Fast" Time Error Corrections	150.2	Hours	
"Slow" Time Error Corrections	304.6	Hours	
Average Duration of Time Error Corrections(Hrs)	**6.15**	**Hours**	
"Fast" Time Error Corrections	5.56		
"Slow" Time Error Corrections	6.48		
Actual "Time Error" Correction Achieved	**459.22**	**Seconds**	**7.7 minutes**

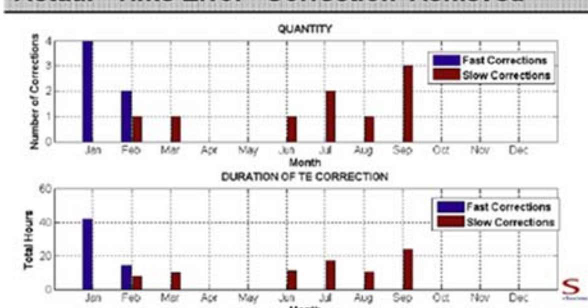


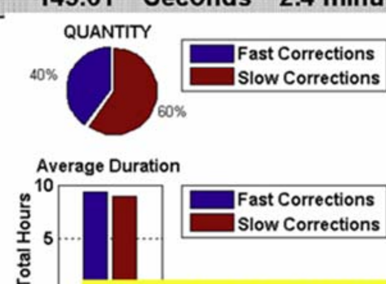


EI TIME ERROR STATISTICS
2014 Summary

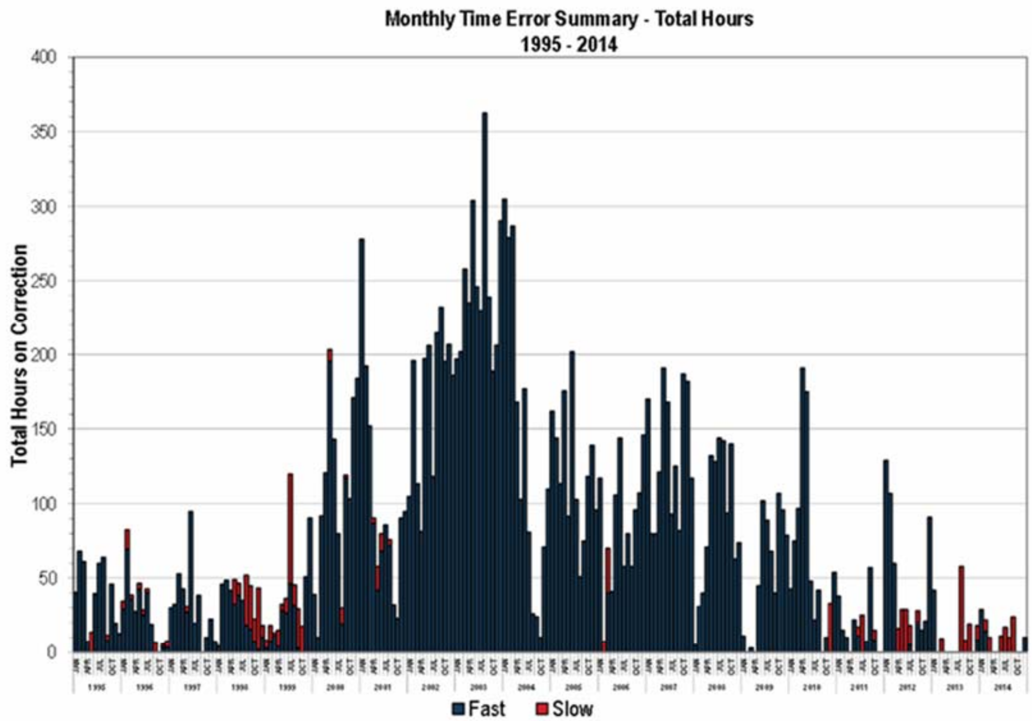
Annual Totals (YTD)

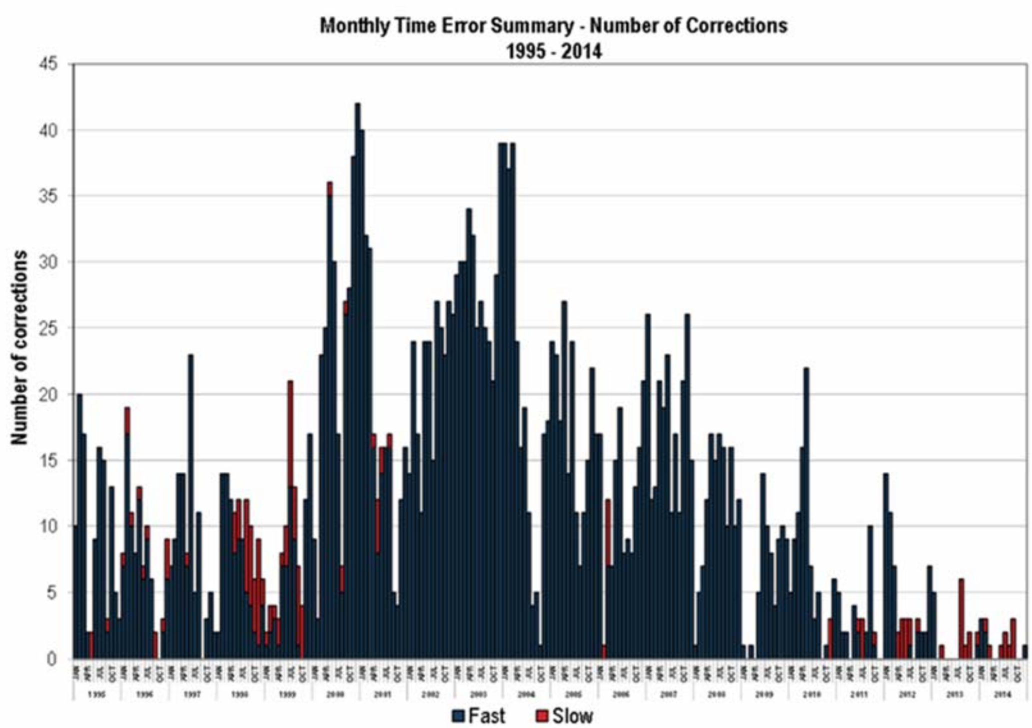
Total Number of Time Error Corrections	**15**		
"Fast" Time Error Corrections	6		
"Slow" Time Error Corrections	9		
Net Total Duration of TE Correction (Hrs)	**135.98**	**Hours**	
"Fast" Time Error Corrections	56.0	Hours	
"Slow" Time Error Corrections	80.0	Hours	
Average Duration of Time Error Corrections(Hrs)	**9.07**	**Hours**	
"Fast" Time Error Corrections	9.33		
"Slow" Time Error Corrections	8.89		
Actual "Time Error" Correction Achieved	**145.61**	**Seconds**	**2.4 minutes**





Data updated: 12/11/2014


Monthly Time Error Summary - Total Hours
1995 - 2014
Total Hours on Correction
0
50
100
150
200
250
300
350
400
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Fast
Slow


Monthly Time Error Summary - Number of Corrections
1995 - 2014
Number of corrections
0
5
10
15
20
25
30
35
40
45
Fast
Slow

These last two graphs show the history of TEC over the last twenty years. They show that, since NERC was named the Electric Reliability Organization in 2007, TECs have significantly declined to todays levels. Many feel that this reduction in TEC is a result of improvements in the operation of the North American interconnections resulting from improvements in the NERC Reliability Standards and improvements in best practices as described in the NERC Reliability Guidelines.

Appendix II – Alternative TEC Methods Suggested

Each time the elimination of TEC has been recommended, some in the industry have suggested that alternative methods can be used to achieve TEC without having a reliability standard. Some of the methods suggested are discussed in this appendix.

Allow Uncoordinated Frequency Offset for TEC:

The NERC definition of Reporting ACE requires, “The use of a common Scheduled Frequency (F_S) for all areas at all times.” The industry must investigate the effect of not following this part of the definition. When a BA uses a Scheduled Frequency different from the Scheduled Frequency in use by the remainder of the interconnection BAs, the use of this Scheduled Frequency affects the value of ACE. For example, if a BA offsets it Scheduled Frequency by +0.02 Hz when the remainder of the interconnection is using a Scheduled Frequency of 60 Hz, that BAs Reporting ACE will be reduced by an amount equal to its Frequency Bias times 0.02 Hz. This is relatively small effect, but there is an additional effect that most fail to consider.

When CPS1 and BAAL are calculated the value of Reporting ACE is multiplied by the value of the Frequency Error. The Frequency Error value also depends on the Scheduled Frequency. As a result, simply using a different Scheduled Frequency from the remainder of the interconnection will not only cause a small MW offset to Reporting ACE, but it may also cause a large change in CPS1 and BAAL measured performance. These large changes in performance measurement are the concern. causing its CPS1 and BAAL measure to change by more than just the change in the value of ACE. An example of this effect is provided as follows:

Example 1: Effect of Uncoordinated Frequency Offset
Assume that Time Error is fast indicating that a lower Scheduled Frequency will help to correct Time Error. Assume that Actual Frequency of the interconnection is 59.990 Hz and Scheduled Frequency is 60 Hz. Assume that a BA with a Frequency Bias Setting of 100 MW/0.1 Hz has a Tie Error of -290 MW. Using the Scheduled Frequency of 60 Hz, this BA will have the following performance measurements:

ACE = Tie Error (10B)($F_A – F_S$) = -290 -10 x -100 x (59.990 – 60.000) = -300 MW
CPS1 = (2 – ((-300 /-10(-100)) x -0.010) / ε_1^2) x 100% = 2-(0.003 / 0.000324) x 100% = -725%
$BAAL_{Low}$ = -10 (-100) x ($FTL_{Low} – F_S)^2$ / ($F_A – F_S$) = 1000 x (3 x $\varepsilon_1)^2$ / (-0.01) = 1000 x 9 x ε_1^2 / (-0.01) = -291.6

If an uncoordinated frequency offset is allowed, then this BA could offset its Scheduled Frequency -.02 Hz. Using this new scheduled frequency in the above measures will yield the following performance measurements:

ACE = Tie Error – $10(B)(F_A – F_S)$ = -290 -10 x -100 x (59.990 – 59.980) = -280 MW
CPS1 = (2 – ((-280 /-10(-100)) x 0.010) / ε_1^2) x 100% = 2-(-0.0028 / 0.000324) x 100% = 964%
$BAAL_{Low}$ = -10 (-100) x $(FTL_{Low} – F_S)^2 / (F_A – F_S)$ = 1000 x (3 x $\varepsilon_1)^2$ / (-0.01) = 1000 x 9 x ε_1^2 / (-0.01) = -291.6

By making this simple change in Scheduled Frequency, the BA reduces its ACE by 20 MW, the BA improves its CPS1 performance by 1,689 %, and it improves its BAAL performance enough to avoid a BAAL non-compliance. Although on first look, it would appear that allowing uncoordinated frequency offsets to enable TEC is beneficial, allowing this practice would make all of the current performance measurements that rely on ACE unreliable.

Allow Unilateral Inadvertent Payback for TEC:

Another suggestion that has been made is that unilateral inadvertent payback be included in Reporting ACE allowing up to 5 MW or 10% of the Frequency Bias Setting in the direction to correct time error. This practice is also addressed in the Reporting ACE definition, "The algebraic sum of all area Net Interchange Schedules and all Net Interchange actual values is equal to zero at all times." It has further been suggested that enabling a unilateral inadvertent payback of this magnitude would have little effect on the current performance measures. As with the previous analysis for uncoordinated frequency offset, the effect of including a unilateral inadvertent payback term in Reporting ACE is evaluated in the following Example 2:

Example 2: Effect of Unilateral Inadvertent Payback
Assume that Time Error is fast indicating that a lower Scheduled Frequency will help to correct Time Error.
Assume that Actual Frequency of the interconnection is 59.990 Hz and Scheduled Frequency is 60 Hz.
Assume that a BA with a Frequency Bias Setting of 100 MW/0.1 Hz has a Tie Error of -290 MW.
Using the Scheduled Frequency of 60 Hz, this BA will have the following performance measurements:

ACE = Tie Error – $10(B)(F_A – F_S)$ = -290 -10 x -100 x (59.990 – 60.000) = -300 MW
CPS1 = (2 – ((-300 /-10(-100)) x -0.010) / ε_1^2) x 100% = 2-(0.003 / 0.000324) x 100% = -725%
$BAAL_{Low}$ = -10 (-100) x $(FTL_{Low} – F_S)^2 / (F_A – F_S)$ = 1000 x (3 x $\varepsilon_1)^2$ / (-0.01) = 1000 x 9 x ε_1^2 / (-0.01) = -291.6

If a unilateral inadvertent payback term is allowed, then this BA could modify its Reporting ACE by 10 MW in the above calculation of performance measures. The performance calculations would change as follows:

ACE = Tie Error – $10(B)(F_A – F_S)$ = -290 -10 x -100 x (59.990 – 60.000) + 10 = -290 MW
CPS1 = (2 – ((-290 /-10(-100)) x 0.010) / ε_1^2) x 100% = 2-(0.0029 / 0.000324) x 100% = -695%
$BAAL_{Low}$ = -10 (-100) x $(FTL_{Low} – F_S)^2 / (F_A – F_S)$ = 1000 x (3 x $\varepsilon_1)^2$ / (-0.01) = 1000 x 9 x ε_1^2 / (-0.01) = -291.6

By making this simple change by adding 10 MW of unilateral inadvertent payback, the BA reduces its ACE by 10 MW, the BA improves its CPS1 performance by 30 %, and it improves its BAAL performance enough to avoid a BAAL non-compliance. Although on first look, it would appear that allowing unilateral inadvertent payback to enable TEC causes only small changes in performance, and it therefore, should be enabled to address TEC. This position has been supported by a study that implemented unilateral inadvertent payback on a continuous basis at 10% of the Frequency Bias Setting would cause a change of less than 1% in CPS1 performance.

The problem with the above analysis is that unilateral inadvertent payback would only need to be implemented a small percentage of the time. Under these conditions, it is important to consider the factors that could influence when to implement a unilateral payback schedule. One factor is the Actual Frequency at the time the unilateral inadvertent payback schedule is implemented.

Example 3: Effect of Unilateral Inadvertent Payback
Assume that Time Error is fast indicating that a lower Scheduled Frequency will help to correct Time Error. Assume that Actual Frequency of the interconnection is 59.940 Hz and Scheduled Frequency is 60 Hz. Assume that a BA with a Frequency Bias Setting of 100 MW/0.1 Hz has a Tie Error of 10 MW.
Using the Scheduled Frequency of 60 Hz, this BA will have the following performance measurements:

ACE = Tie Error – 10(B)(F_A – F_S) = 10 -10 x -100 x (59.940 – 60.000) = -50 MW
CPS1 = (2 – ((-50 /-10(-100)) x -0.060) / $\varepsilon_1{}^2$) x 100% = 2-(0.003 / 0.000324) x 100% = -726%
$BAAL_{Low}$ = -10 (-100) x (FTL_{Low} – F_S)^2 / (F_A – F_S) = 1000 x (3 x ε_1)^2 / (-0.01) = 1000 x 9 x $\varepsilon_1{}^2$ / (-0.06) = -48.6

If a unilateral inadvertent payback term is allowed, then this BA could modify its Reporting ACE by 10 MW in the above calculation of performance measures. The performance calculations would change as follows:

ACE = Tie Error – 10(B)(F_A – F_S) = 10 -10 x -100 x (59.940 – 60.000) + 10 = -40 MW
CPS1 = (2 – ((-40 /-10(-100)) x 0.060) / $\varepsilon_1{}^2$) x 100% = 2-(0.0024 / 0.000324) x 100% = -541%
$BAAL_{Low}$ = -10 (-100) x (FTL_{Low} – F_S)^2 / (F_A – F_S) = 1000 x (3 x ε_1)^2 / (-0.01) = 1000 x 9 x $\varepsilon_1{}^2$ / (-0.06) = -48.6

By making this simple change of adding 10 MW of unilateral inadvertent payback, the BA reduces its ACE by 10 MW, the BA improves its CPS1 performance by 185 %, and easily meets its BAAL limit. Since the suggested change when implemented across all time has very little effect on CPS1 and BAAL, it would make sense to require unilateral inadvertent payback to be excluded from Reporting ACE to encourage that unilateral inadvertent payback to be implemented at times when it will have little to no effect on the CPS1 and BAAL performance measures. In other words, unilateral inadvertent payback should only be implemented when it will benefit the interconnection by moving Actual Frequency toward 60 Hz or when Actual Frequency is near 60 Hz and it will not contribute to reliability problems. Under these conditions, unilateral inadvertent payback will be able to be implemented almost 50% of the time.

Standards Announcement Reminder

Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls
Recommended Retirement of BAL-004-0

Initial Ballot Open through November 12, 2015

Now Available

An initial ballot for the recommended retirement of **BAL-004-0 – Time Error Correction** is open through **8 p.m. Eastern, Thursday, November 12, 2015**.

The Balancing Authority Reliability-based Controls 2.2 Standard Drafting Team (BARC 2.2 SDT) reviewed the findings of the BARC 2 Primary Review Team. A survey was posted for comment August 12-25, 2015 to gain a better perspective as to any concerns the industry may have if the practice of manual Time Error Correction (TEC) was eliminated. The survey responses indicated support for retirement of manual TEC as a standard. Upon further review the BARC 2.2 SDT determined that manual TEC would not support the reliability of the BPS. Conducting manual TEC in any form directly contradicts NERC Reliability Principle 2: “The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.” The practice of using manual TEC to place the Interconnection closer to the settings for automatic underfrequency load shedding does not support or enhance reliability. Therefore, BAL-004-0 should be retired.

The survey responses also indicated that the accompanying North American Energy Standard Board (NAESB) WEQ Manual Time Error Correction Business Practice Standard – WEQ-006, should be retired contemporaneously with BAL-004-0. The BARC 2.2 SDT’s recommendation for retirement of BAL-004-0 is contingent on simultaneous retirement of NAESB WEQ-006 to ensure clarity and to avoid inadvertent, uncoordinated, manual TEC. The BARC 2.2 SDT has been coordinating with NAESB on this issue. Upon retirement of BAL-004-0 and NAESB WEQ-006, currently or soon to be effective Reliability Standards BAL-003-1 and BAL-001-2 will incent continued adherence to a frequency approximating 60 Hz over long-term averages.

Next Steps

The ballot results will be announced and posted on the project page. The drafting team will consider all comments received during the formal comment period and determine the next steps for the project.

For more information on the Standards Development Process, refer to the Standard Processes Manual.

For more information or assistance, contact Senior Standards Developer, Darrel Richardson (via email), or at (609) 613-1848.

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NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standards Announcement

Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls
Recommended Retirement of BAL-004-0

Formal Comment Period Open through November 12, 2015

Now Available

A 45-day formal comment period for the recommended retirement of **BAL-004-0 – Time Error Correction** is open through **8 p.m. Eastern, Thursday, November 12, 2015**.

The Balancing Authority Reliability-based Controls 2.2 Standard Drafting Team (BARC 2.2 SDT) reviewed the findings of the BARC 2 Primary Review Team. A survey was posted for comment August 12-25, 2015 to gain a better perspective as to any concerns the industry may have if the practice of manual Time Error Correction (TEC) was eliminated. The survey responses indicated support for retirement of manual TEC as a standard. Upon further review the BARC 2.2 SDT determined that manual TEC would not support the reliability of the BPS. Conducting manual TEC in any form directly contradicts NERC Reliability Principle 2: “The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.” The practice of using manual TEC to place the Interconnection closer to the settings for automatic underfrequency load shedding does not support or enhance reliability. Therefore, BAL-004-0 should be retired.

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Commenting

Use the electronic form to submit comments on the recommended retirement of the standard. If you experience any difficulties in using the electronic form, contact Wendy Muller. An unofficial Word version of the comment form is posted on the project page.

Join the Ballot Pool

A ballot pool is being formed through **8 p.m. Eastern, Friday, October 23, 2015**. Registered Ballot Body members may join the ballot pool here.

If you are having difficulty accessing the SBS due to a forgotten password, incorrect credential error messages, or system lock-out, contact NERC IT support directly at EROhelpdesk@nerc.net (Monday – Friday, 8 a.m. - 8 p.m. Eastern).

Next Steps

An initial ballot for the recommended retirement of the standard will be conducted **November 3-12, 2015.**

For more information on the Standards Development Process, refer to the Standard Processes Manual.

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Standards Announcement

Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls
Recommended Retirement of BAL-004-0

Formal Comment Period Open through November 12, 2015

Now Available

A 45-day formal comment period for the recommended retirement of **BAL-004-0 – Time Error Correction** is open through **8 p.m. Eastern, Thursday, November 12, 2015**.

The Balancing Authority Reliability-based Controls 2.2 Standard Drafting Team (BARC 2.2 SDT) reviewed the findings of the BARC 2 Primary Review Team. A survey was posted for comment August 12-25, 2015 to gain a better perspective as to any concerns the industry may have if the practice of manual Time Error Correction (TEC) was eliminated. The survey responses indicated support for retirement of manual TEC as a standard. Upon further review the BARC 2.2 SDT determined that manual TEC would not support the reliability of the BPS. Conducting manual TEC in any form directly contradicts NERC Reliability Principle 2: "The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand." The practice of using manual TEC to place the Interconnection closer to the settings for automatic underfrequency load shedding does not support or enhance reliability. Therefore, BAL-004-0 should be retired.

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Next Steps

An initial ballot for the recommended retirement of the standard will be conducted **November 3-12, 2015.**

For more information on the Standards Development Process, refer to the Standard Processes Manual.

For more information or assistance, contact Senior Standards Developer, Darrel Richardson (via email), or at (609) 613-1848.

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Standards Announcement

Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls
BAL-004-0

Initial Ballot Results

Now Available

A formal comment period and initial ballot for the recommended retirement of **BAL-004-0 – Time Error Correction** concluded **8 p.m. Eastern, Thursday, November 12, 2015.**

The ballot received sufficient affirmative votes for approval. Voting statistics are listed below, and the Ballot Results page provides the detailed results.

Ballot
Quorum / Approval
84.40% / 98.17%

Next Steps
The drafting team will consider all comments received during the formal comment period and determine the next steps of the project.

Standards Development Process
For more information on the Standards Development Process, refer to the Standard Processes Manual.

For more information or assistance, contact Senior Standards Developer, Darrel Richardson (via email) or at (609) 613-1848.

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BALLOT RESULTS

Survey: View Survey Results (/SurveyResults/Index/35)
Ballot Name: 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls BAL-004-0 IN 1 ST
Voting Start Date: 11/3/2015 12:01:00 AM
Voting End Date: 11/12/2015 8:00:00 PM
Ballot Type: ST
Ballot Activity: IN
Ballot Series: 1
Total # Votes: 238
Total Ballot Pool: 281
Quorum: 84.7
Weighted Segment Value: 98.17

Segment	Ballot Pool	Segment Weight	Affirmative Votes	Affirmative Fraction	Negative Votes w/ Comment	Negative Fraction w/ Comment	Negative Votes w/o Comment	Abstain	No Vote
Segment: 1	70	1	52	0.981	1	0.019	0	5	12
Segment: 2	10	0.6	5	0.5	1	0.1	0	2	2
Segment: 3	63	1	49	1	0	0	0	5	9
Segment: 4	20	1	18	1	0	0	0	0	2
Segment: 5	61	1	45	1	0	0	0	5	11
Segment: 6	47	1	38	1	0	0	1	2	6
Segment: 7	0	0	0	0	0	0	0	0	0
Segment: 8	2	0.2	2	0.2	0	0	0	0	0
Segment: 9	2	0.1	1	0.1	0	0	0	0	1

Segment	Ballot Pool	Segment Weight	Affirmative Votes	Affirmative Fraction	Negative Votes w/ Comment	Negative Fraction w/ Comment	Negative Votes w/o Comment	Abstain	No Vote
Segment: 10	6	0.6	6	0.6	0	0	0	0	0
Totals:	281	6.5	216	6.381	2	0.119	1	19	43

BALLOT POOL MEMBERS

Show All entries Search: Search

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	AEP - AEP Service Corporation	paul johnson		None	N/A
1	Ameren - Ameren Services	Eric Scott		Affirmative	N/A
1	APS - Arizona Public Service Co.	Michelle Amarantos		Affirmative	N/A
1	Arizona Electric Power Cooperative, Inc.	John Shaver		Affirmative	N/A
1	Associated Electric Cooperative, Inc.	Phil Hart		Affirmative	N/A
1	Austin Energy	Thomas Standifur		None	N/A
1	Avista - Avista Corporation	Bryan Cox	Rich Hydzik	Affirmative	N/A
1	Balancing Authority of Northern California	Kevin Smith	Joe Tarantino	Affirmative	N/A
1	BC Hydro and Power Authority	Patricia Robertson		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Beaches Energy Services	Don Cuevas		Affirmative	N/A
1	Berkshire Hathaway Energy - MidAmerican Energy Co.	Terry Harbour		Affirmative	N/A
1	Black Hills Corporation	Wes Wingen		Abstain	N/A
1	Bonneville Power Administration	Donald Watkins		None	N/A
1	Bryan Texas Utilities	John Fontenot		Affirmative	N/A
1	Cleco Corporation	John Lindsey	Louis Guidry	None	N/A
1	Colorado Springs Utilities	Shawna Speer		Affirmative	N/A
1	Con Ed - Consolidated Edison Co. of New York	Chris de Graffenried		Affirmative	N/A
1	Dairyland Power Cooperative	Robert Roddy		Negative	Third-Party Comments
1	Dominion - Dominion Virginia Power	Larry Nash		Affirmative	N/A
1	Duke Energy	Doug Hils		None	N/A
1	Edison International - Southern California Edison Company	Steven Mavis		Affirmative	N/A
1	Entergy - Entergy Services, Inc.	Oliver Burke		Affirmative	N/A
1	Exelon	Chris Scanlon		Affirmative	N/A
1	FirstEnergy - FirstEnergy Corporation	William Smith		Affirmative	N/A
1	Great Plains Energy - Kansas City Power and Light Co.	James McBee	Douglas Webb	Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Hydro One Networks, Inc.	Payam Farahbakhsh		Abstain	N/A
1	Hydro-Qu?bec TransEnergie	Martin Boisvert		Affirmative	N/A
1	IDACORP - Idaho Power Company	Johnny Anderson		None	N/A
1	International Transmission Company Holdings Corporation	Michael Moltane	Meghan Ferguson	Abstain	N/A
1	KAMO Electric Cooperative	Walter Kenyon		Affirmative	N/A
1	Lakeland Electric	Larry Watt		None	N/A
1	Long Island Power Authority	Robert Ganley		Affirmative	N/A
1	Los Angeles Department of Water and Power	faranak sarbaz		Affirmative	N/A
1	Lower Colorado River Authority	Teresa Cantwell		None	N/A
1	Manitoba Hydro	Mike Smith		Affirmative	N/A
1	MEAG Power	David Weekley	Scott Miller	Affirmative	N/A
1	Muscatine Power and Water	Andy Kurriger		Affirmative	N/A
1	N.W. Electric Power Cooperative, Inc.	Mark Ramsey		Affirmative	N/A
1	National Grid USA	Michael Jones		Affirmative	N/A
1	NB Power Corporation	Alan MacNaughton		Abstain	N/A
1	Nebraska Public Power District	Jamison Cawley		Affirmative	N/A
1	New York Power Authority	Salvatore Spagnolo		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	NextEra Energy - Florida Power and Light Co.	Mike ONeil		Affirmative	N/A
1	NiSource - Northern Indiana Public Service Co.	Charles Raney		Affirmative	N/A
1	Northeast Missouri Electric Power Cooperative	Kevin White		Affirmative	N/A
1	OGE Energy - Oklahoma Gas and Electric Co.	Terri Pyle		None	N/A
1	OTP - Otter Tail Power Company	Charles Wicklund		Affirmative	N/A
1	Peak Reliability	Jared Shakespeare		Affirmative	N/A
1	PHI - Potomac Electric Power Co.	David Thorne		Affirmative	N/A
1	Platte River Power Authority	John Collins		Affirmative	N/A
1	PNM Resources - Public Service Company of New Mexico	Laurie Williams		Affirmative	N/A
1	Portland General Electric Co.	John Walker		Affirmative	N/A
1	PPL Electric Utilities Corporation	Brenda Truhe		Affirmative	N/A
1	PSEG - Public Service Electric and Gas Co.	Joseph Smith		Affirmative	N/A
1	Public Utility District No. 1 of Snohomish County	Long Duong		Affirmative	N/A
1	Public Utility District No. 2 of Grant County, Washington	Michiko Sell		None	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Puget Sound Energy, Inc.	Theresa Rakowsky		Affirmative	N/A
1	Sacramento Municipal Utility District	Tim Kelley	Joe Tarantino	Affirmative	N/A
1	Salt River Project	Steven Cobb		Affirmative	N/A
1	Santee Cooper	Shawn Abrams		Affirmative	N/A
1	SCANA - South Carolina Electric and Gas Co.	Tom Hanzlik		Affirmative	N/A
1	Seattle City Light	Pawel Krupa		Affirmative	N/A
1	Southern Company - Southern Company Services, Inc.	Robert A. Schaffeld		Affirmative	N/A
1	Tacoma Public Utilities (Tacoma, WA)	John Merrell		Affirmative	N/A
1	Tallahassee Electric (City of Tallahassee, FL)	Scott Langston		Affirmative	N/A
1	Tennessee Valley Authority	Howell Scott		None	N/A
1	Tri-State G and T Association, Inc.	Tracy Sliman		Abstain	N/A
1	U.S. Bureau of Reclamation	Richard Jackson		None	N/A
1	United Illuminating Co.	Jonathan Appelbaum		Affirmative	N/A
1	Xcel Energy, Inc.	Dean Schiro		Affirmative	N/A
2	BC Hydro and Power Authority	Venkataramakrishnan Vinnakota		Abstain	N/A
2	California ISO	Richard Vine		Affirmative	N/A
2	Electric Reliability Council of Texas, Inc.	Elizabeth Axson		Abstain	N/A
2	Herb Schrayshuen	Herb Schrayshuen		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
2	Independent Electricity System Operator	Leonard Kula		Affirmative	N/A
2	ISO New England, Inc.	Michael Puscas	Kathleen Goodman	Affirmative	N/A
2	Midcontinent ISO, Inc.	Terry BIlke		Negative	Comments Submitted
2	New York Independent System Operator	Gregory Campoli		None	N/A
2	PJM Interconnection, L.L.C.	Mark Holman	William Temple	Affirmative	N/A
2	Southwest Power Pool, Inc. (RTO)	Charles Yeung		None	N/A
3	Ameren - Ameren Services	David Jendras		Affirmative	N/A
3	APS - Arizona Public Service Co.	Jeri Freimuth		Affirmative	N/A
3	Associated Electric Cooperative, Inc.	Todd Bennett		Affirmative	N/A
3	Austin Energy	Shuye Teng		Affirmative	N/A
3	Avista - Avista Corporation	Scott Kinney		Affirmative	N/A
3	BC Hydro and Power Authority	Pat Harrington		Abstain	N/A
3	Beaches Energy Services	Steven Lancaster		Affirmative	N/A
3	Berkshire Hathaway Energy - MidAmerican Energy Co.	Thomas Mielnik	Darnez Gresham	Affirmative	N/A
3	Bonneville Power Administration	Rebecca Berdahl		None	N/A
3	Central Electric Power Cooperative (Missouri)	Adam Weber		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	City of Green Cove Springs	Mark Schultz		Affirmative	N/A
3	City of Leesburg	Chris Adkins		Affirmative	N/A
3	City of Redding	Elizabeth Hadley	Bill Hughes	Affirmative	N/A
3	Clark Public Utilities	Jack Stamper		Affirmative	N/A
3	Cleco Corporation	Michelle Corley	Louis Guidry	None	N/A
3	Colorado Springs Utilities	Charles Morgan		Affirmative	N/A
3	Con Ed - Consolidated Edison Co. of New York	Peter Yost		Affirmative	N/A
3	Dominion - Dominion Resources, Inc.	Connie Lowe		Affirmative	N/A
3	DTE Energy - Detroit Edison Company	Kent Kujala		Affirmative	N/A
3	Duke Energy	Lee Schuster		Affirmative	N/A
3	Edison International - Southern California Edison Company	Romel Aquino		None	N/A
3	Exelon	John Bee		Affirmative	N/A
3	FirstEnergy - FirstEnergy Corporation	Theresa Ciancio		Affirmative	N/A
3	Florida Municipal Power Agency	Joe McKinney	Chris Gowder	Affirmative	N/A
3	Georgia System Operations Corporation	Scott McGough		Affirmative	N/A
3	Great Plains Energy - Kansas City Power and Light Co.	Jessica Tucker	Douglas Webb	Affirmative	N/A
3	Great River Energy	Brian Glover		Affirmative	N/A
3	Hydro One Networks, Inc.	Paul Malozewski	Oshani Pathirane	Abstain	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	JEA	Garry Baker		None	N/A
3	Lakeland Electric	David Hadzima		None	N/A
3	Lincoln Electric System	Jason Fortik		Abstain	N/A
3	Los Angeles Department of Water and Power	Mike Anctil		Affirmative	N/A
3	M and A Electric Power Cooperative	Stephen Pogue		Affirmative	N/A
3	Manitoba Hydro	Karim Abdel-Hadi		Affirmative	N/A
3	MEAG Power	Roger Brand	Scott Miller	Affirmative	N/A
3	Muscatine Power and Water	Seth Shoemaker		Affirmative	N/A
3	National Grid USA	Brian Shanahan		Affirmative	N/A
3	Nebraska Public Power District	Tony Eddleman		Affirmative	N/A
3	New York Power Authority	David Rivera		Affirmative	N/A
3	NiSource - Northern Indiana Public Service Co.	Ramon Barany		Affirmative	N/A
3	Northeast Missouri Electric Power Cooperative	Skyler Wiegmann		Affirmative	N/A
3	NW Electric Power Cooperative, Inc.	John Stickley		Affirmative	N/A
3	Ocala Utility Services	Randy Hahn		None	N/A
3	OGE Energy - Oklahoma Gas and Electric Co.	Donald Hargrove		Affirmative	N/A
3	Owensboro Municipal Utilities	Thomas Lyons		Affirmative	N/A
3	PHI - Potomac Electric Power Co.	Mark Yerger		Affirmative	N/A
3	PNM Resources	Michael Mertz		None	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	Portland General Electric Co.	Thomas Ward		Affirmative	N/A
3	PPL - Louisville Gas and Electric Co.	Charles Freibert		Affirmative	N/A
3	PSEG - Public Service Electric and Gas Co.	Jeffrey Mueller		Affirmative	N/A
3	Puget Sound Energy, Inc.	Andrea Basinski		None	N/A
3	Sacramento Municipal Utility District	Rachel Moore	Joe Tarantino	Affirmative	N/A
3	Santee Cooper	James Poston		Affirmative	N/A
3	Seattle City Light	Dana Wheelock		Affirmative	N/A
3	Snohomish County PUD No. 1	Mark Oens		Affirmative	N/A
3	Southern Company - Alabama Power Company	R. Scott Moore		Affirmative	N/A
3	Tacoma Public Utilities (Tacoma, WA)	Marc Donaldson		Affirmative	N/A
3	Tallahassee Electric (City of Tallahassee, FL)	John Williams		Affirmative	N/A
3	Tennessee Valley Authority	Ian Grant		Abstain	N/A
3	Tri-State G and T Association, Inc.	Janelle Marriott Gill		Abstain	N/A
3	Turlock Irrigation District	James Ramos		None	N/A
3	WEC Energy Group, Inc.	James Keller		Affirmative	N/A
3	Xcel Energy, Inc.	Michael Ibold		Affirmative	N/A

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4	Alliant Energy Corporation Services, Inc.	Kenneth Goldsmith		Affirmative	N/A
4	Austin Energy	Tina Garvey		Affirmative	N/A
4	Blue Ridge Power Agency	Duane Dahlquist		Affirmative	N/A
4	City of Clewiston	Lynne Mila		Affirmative	N/A
4	City of New Smyrna Beach Utilities Commission	Tim Beyrle		Affirmative	N/A
4	City of Redding	Nick Zettel	Bill Hughes	Affirmative	N/A
4	City Utilities of Springfield, Missouri	John Allen		None	N/A
4	DTE Energy - Detroit Edison Company	Daniel Herring		Affirmative	N/A
4	FirstEnergy - Ohio Edison Company	Doug Hohlbaugh		None	N/A
4	Florida Municipal Power Agency	Carol Chinn	Cara Gowan	Affirmative	N/A
4	Georgia System Operations Corporation	Guy Andrews		Affirmative	N/A
4	Keys Energy Services	Stanley Rzad		Affirmative	N/A
4	MGE Energy - Madison Gas and Electric Co.	Joseph DePoorter		Affirmative	N/A
4	Public Utility District No. 1 of Snohomish County	John Martinsen		Affirmative	N/A
4	Sacramento Municipal Utility District	Michael Ramirez	Joe Tarantino	Affirmative	N/A
4	Seattle City Light	Hao Li		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
4	Seminole Electric Cooperative, Inc.	Michael Ward		Affirmative	N/A
4	Tacoma Public Utilities (Tacoma, WA)	Hien Ho		Affirmative	N/A
4	Utility Services, Inc.	Brian Evans-Mongeon		Affirmative	N/A
4	WEC Energy Group, Inc.	Anthony Jankowski		Affirmative	N/A
5	Ameren - Ameren Missouri	Sam Dwyer		Affirmative	N/A
5	APS - Arizona Public Service Co.	Stephanie Little		Affirmative	N/A
5	Associated Electric Cooperative, Inc.	Matthew Finn		None	N/A
5	Austin Energy	Jeanie Doty		Affirmative	N/A
5	Avista - Avista Corporation	Steve Wenke		Affirmative	N/A
5	BC Hydro and Power Authority	Clement Ma		Affirmative	N/A
5	Berkshire Hathaway - NV Energy	Eric Schwarzrock	Jeffrey Watkins	Affirmative	N/A
5	Bonneville Power Administration	Francis Halpin		None	N/A
5	Brazos Electric Power Cooperative, Inc.	Shari Heino		Affirmative	N/A
5	Choctaw Generation Limited Partnership, LLLP	Rob Watson		Affirmative	N/A
5	City of Independence, Power and Light Department	Jim Nail		Affirmative	N/A
5	Cleco Corporation	Stephanie Huffman	Louis Guidry	None	N/A
5	Colorado Springs Utilities	Jeff Icke		None	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Con Ed - Consolidated Edison Co. of New York	Brian O'Boyle		Affirmative	N/A
5	Dominion - Dominion Resources, Inc.	Randi Heise		Affirmative	N/A
5	DTE Energy - Detroit Edison Company	Jeffrey DePriest		Affirmative	N/A
5	Duke Energy	Dale Goodwine		Affirmative	N/A
5	Dynegy Inc.	Dan Roethemeyer		Affirmative	N/A
5	Edison International - Southern California Edison Company	Thomas Rafferty		None	N/A
5	Entergy - Entergy Services, Inc.	Tracey Stubbs		Affirmative	N/A
5	Exelon	Vince Catania		Affirmative	N/A
5	FirstEnergy - FirstEnergy Solutions	Robert Loy		Affirmative	N/A
5	Florida Municipal Power Agency	David Schumann	Chris Gowder	Affirmative	N/A
5	Great Plains Energy - Kansas City Power and Light Co.	Harold Wyble	Douglas Webb	Affirmative	N/A
5	Great River Energy	Preston Walsh		Affirmative	N/A
5	Hydro-Qu?bec Production	Roger Dufresne		Affirmative	N/A
5	JEA	John Babik		Affirmative	N/A
5	Kissimmee Utility Authority	Mike Blough		Affirmative	N/A
5	Lincoln Electric System	Kayleigh Wilkerson		Abstain	N/A
5	Los Angeles Department of Water and Power	Kenneth Silver		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Lower Colorado River Authority	Dixie Wells		Abstain	N/A
5	Manitoba Hydro	Yuguang Xiao		Affirmative	N/A
5	Massachusetts Municipal Wholesale Electric Company	David Gordon		Abstain	N/A
5	MEAG Power	Steven Grego	Scott Miller	Affirmative	N/A
5	Muscatine Power and Water	Mike Avesing		None	N/A
5	NB Power Corporation	Rob Vance		Affirmative	N/A
5	Nebraska Public Power District	Don Schmit		Affirmative	N/A
5	New York Power Authority	Wayne Sipperly		Affirmative	N/A
5	NextEra Energy	Allen Schriver		Affirmative	N/A
5	OGE Energy - Oklahoma Gas and Electric Co.	Leo Staples		Affirmative	N/A
5	Omaha Public Power District	Mahmood Safi		Affirmative	N/A
5	OTP - Otter Tail Power Company	Cathy Fogale		Affirmative	N/A
5	Pacific Gas and Electric Company	Alex Chua		None	N/A
5	Platte River Power Authority	Tyson Archie		Affirmative	N/A
5	PSEG - PSEG Fossil LLC	Tim Kucey		Affirmative	N/A
5	Public Utility District No. 1 of Snohomish County	Sam Nietfeld		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Public Utility District No. 2 of Grant County, Washington	Alex Ybarra		Affirmative	N/A
5	Puget Sound Energy, Inc.	Lynda Kupfer		None	N/A
5	Sacramento Municipal Utility District	Susan Gill-Zobitz	Joe Tarantino	Affirmative	N/A
5	Salt River Project	Kevin Nielsen		Affirmative	N/A
5	Seattle City Light	Mike Haynes		Affirmative	N/A
5	Seminole Electric Cooperative, Inc.	Brenda Atkins		None	N/A
5	Southern Company - Southern Company Generation	William D. Shultz		Affirmative	N/A
5	Southern Indiana Gas and Electric Co.	Scotty Brown	Rob Collins	None	N/A
5	Tacoma Public Utilities (Tacoma, WA)	Chris Mattson		Affirmative	N/A
5	Talen Generation, LLC	Donald Lock		Affirmative	N/A
5	Tallahassee Electric (City of Tallahassee, FL)	Karen Webb		Affirmative	N/A
5	Tennessee Valley Authority	Brandy Spraker		Abstain	N/A
5	Tri-State G and T Association, Inc.	Mark Stein		Abstain	N/A
5	U.S. Bureau of Reclamation	Erika Doot		None	N/A
5	WEC Energy Group, Inc.	Linda Horn		Affirmative	N/A
6	AEP - AEP Marketing	Dan Ewing		None	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
6	Ameren - Ameren Services	Robert Quinlivan		Affirmative	N/A
6	APS - Arizona Public Service Co.	Bobbi Welch		Affirmative	N/A
6	Associated Electric Cooperative, Inc.	Brian Ackermann		Affirmative	N/A
6	Austin Energy	Andrew Gallo		Affirmative	N/A
6	Berkshire Hathaway - PacifiCorp	Sandra Shaffer		Affirmative	N/A
6	Bonneville Power Administration	Alex Spain		Affirmative	N/A
6	City of Redding	Marvin Briggs	Bill Hughes	Affirmative	N/A
6	Cleco Corporation	Robert Hirchak	Louis Guidry	None	N/A
6	Colorado Springs Utilities	Shannon Fair		Affirmative	N/A
6	Con Ed - Consolidated Edison Co. of New York	Robert Winston		Affirmative	N/A
6	Dominion - Dominion Resources, Inc.	Louis Slade		Affirmative	N/A
6	Duke Energy	Greg Cecil		Affirmative	N/A
6	Entergy	Julie Hall		Affirmative	N/A
6	Exelon	Dave Carlson		Affirmative	N/A
6	FirstEnergy - FirstEnergy Solutions	Ann Ivanc		Affirmative	N/A
6	Florida Municipal Power Agency	Richard Montgomery	Chris Gowder	Affirmative	N/A
6	Florida Municipal Power Pool	Tom Reedy		Affirmative	N/A
6	Great Plains Energy - Kansas City Power and Light Co.	Chris Bridges	Douglas Webb	Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
6	Great River Energy	Donna Stephenson	Michael Brytowski	Affirmative	N/A
6	Lincoln Electric System	Eric Ruskamp		Abstain	N/A
6	Lower Colorado River Authority	Michael Shaw		None	N/A
6	Luminant - Luminant Energy	Brenda Hampton		Affirmative	N/A
6	Manitoba Hydro	Blair Mukanik		Affirmative	N/A
6	Muscatine Power and Water	Ryan Streck		Affirmative	N/A
6	New York Power Authority	Shivaz Chopra		Affirmative	N/A
6	NextEra Energy - Florida Power and Light Co.	Silvia Mitchell		Affirmative	N/A
6	NiSource - Northern Indiana Public Service Co.	Joe O'Brien		Affirmative	N/A
6	OGE Energy - Oklahoma Gas and Electric Co.	Jerry Nottnagel		None	N/A
6	Omaha Public Power District	Mark Trumble		Affirmative	N/A
6	Platte River Power Authority	Carol Ballantine		Affirmative	N/A
6	Portland General Electric Co.	Shawn Davis		Affirmative	N/A
6	PPL - Louisville Gas and Electric Co.	Linn Oelker		Affirmative	N/A
6	PSEG - PSEG Energy Resources and Trade LLC	Karla Jara		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
6	Sacramento Municipal Utility District	Diane Clark	Joe Tarantino	Affirmative	N/A
6	Salt River Project	William Abraham		Affirmative	N/A
6	Santee Cooper	Michael Brown		Affirmative	N/A
6	Seattle City Light	Charles Freeman		Affirmative	N/A
6	Seminole Electric Cooperative, Inc.	Trudy Novak		Affirmative	N/A
6	Snohomish County PUD No. 1	Kenn Backholm		Affirmative	N/A
6	Southern Company - Southern Company Generation and Energy Marketing	John J. Ciza		Negative	No Comment Submitted
6	Tacoma Public Utilities (Tacoma, WA)	Rick Applegate		Affirmative	N/A
6	Talen Energy Marketing, LLC	Elizabeth Davis		None	N/A
6	Tennessee Valley Authority	Marjorie Parsons		Abstain	N/A
6	WEC Energy Group, Inc.	David Hathaway		Affirmative	N/A
6	Westar Energy	Megan Wagner		None	N/A
6	Xcel Energy, Inc.	Peter Colussy		Affirmative	N/A
8	David Kiguel	David Kiguel		Affirmative	N/A
8	Massachusetts Attorney General	Frederick Plett		Affirmative	N/A
9	City of Vero Beach	Ginny Beigel		Affirmative	N/A
9	Commonwealth of Massachusetts Department of Public Utilities	Donald Nelson		None	N/A
10	Midwest Reliability Organization	Russel Mountjoy		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
10	Northeast Power Coordinating Council	Guy V. Zito		Affirmative	N/A
10	ReliabilityFirst	Anthony Jablonski		Affirmative	N/A
10	SERC Reliability Corporation	David Greene		Affirmative	N/A
10	Southwest Power Pool Regional Entity	Bob Reynolds		Affirmative	N/A
10	Texas Reliability Entity, Inc.	Rachel Coyne		Affirmative	N/A

Showing 1 to 281 of 281 entries

Previous 1 Next

Survey Report

Survey Details

Name 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls | BAL-004-0

Description

Start Date 9/24/2015

End Date 11/12/2015

Associated Ballots

2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls BAL-004-0 IN 1 ST

Survey Questions

1. Based on comments received from the SAR posting and the BAL-004-0 Survey posting, the SDT is recommending that BAL-004-0 be retired and WEQ Manual Time Error Correction Business Practice Standard – WEQ-006, should also be retired contemporaneously with BAL-004-0. Do you agree that the BAL-004-0 – Time Error Correction standard should be retired? If not, please explain.

Yes

No

Responses By Question

1. Based on comments received from the SAR posting and the BAL-004-0 Survey posting, the SDT is recommending that BAL-004-0 be retired and WEQ Manual Time Error Correction Business Practice Standard – WEQ-006, should also be retired contemporaneously with BAL-004-0. Do you agree that the BAL-004-0 – Time Error Correction standard should be retired? If not, please explain.

John Fontenot - Bryan Texas Utilities - 1 -

Selected Answer: Yes

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Thomas Lyons - Owensboro Municipal Utilities - 3 -

Selected Answer: Yes

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Nick Vtyurin - Manitoba Hydro - 1,3,5,6 - MRO

Selected Answer: Yes

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Ginette Lacasse - Seattle City Light - 1,3,4,5,6 - WECC

Group Information

Group Name: Seattle City Light Ballot Body

Group Member Name	Entity	Region	Segments
Pawel Krupa	Seattle City Light	WECC	1
Dana Wheelock	Seattle City Light	WECC	3
Hao Li	Seattle City Light	WECC	4
Bud (Charles) Freeman	Seattle City Light	WECC	6
Mike haynes	Seattle City Light	WECC	5
Michael Watkins	Seattle City Light	WECC	1,3,4
Faz Kasraie	Seattle City Light	WECC	5
John Clark	Seattle City Light	WECC	6

Voter Information

Voter

Ginette Lacasse

Segment

1,3,4,5,6

Entity

Seattle City Light

Region(s)

WECC

Selected Answer: Yes

Answer Comment:

That said, Seattle City Light would like to reiterate that we still feel Standard BAL-004-WECC-02, Automatic Time Error Correction,is a good standard to have. This standard is very effective in automatically correcting time errors, supporting system frequency and reducing primary and secondary inadvertent accumulations. It is our opinion, automatic time error correction programs similar to WECC could help in reliable operations of other Interconnections.

Document Name:

Likes: 0

Dislikes: 0

Scott McGough - Georgia System Operations Corporation - 3 -

Selected Answer: Yes

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Scott McGough - Georgia System Operations Corporation - 3 -

Selected Answer: Yes

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Jennifer Losacco - NextEra Energy - Florida Power and Light Co. - 1 - FRCC

Selected Answer: Yes

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Anthony Jablonski - ReliabilityFirst - 10 -

Selected Answer: Yes

Answer Comment:

ReliabilityFirst agrees that the practice of using manual TEC to place the Interconnection closer to the settings for automatic underfrequency load shedding does not support or enhance reliability. Therefore, RF believes the BAL-004-0 should be retired as long as sufficient advance notice of retiring the standard and adoption of specific business practices by applicable entities is adopted which will help eliminate any potential adverse unintended consequences.

Document Name:

Likes: 0

Dislikes: 0

Terry BIlke - Midcontinent ISO, Inc. - 2 -

Selected Answer: No

Answer Comment:

While we agree that TECs are primarily a commercial service and that the process should be converted to a procedure in the NERC Operating Manual or a NAESB business practice, we should not stop the implementation of TECs. NIST has demonstrated that there are equipment and processes that use grid frequency as a time reference.

While the reliability impact of TECs is miniscule, there are simple things that can be done to reduce the magnitude and impact of TECs. Europe uses clock-day TECs with a 0.01Hz offset and a 30 second window. NERC used to have a unilateral payback process that not only helped manage Inadvertent Interchange, it also reduced the magnitude of Time Error.

NERC could keep a simple requirement that sets the maximum offset for TECs and the process could be managed in a procedure similar to the Time Monitoring Procedure in the NERC Operating Manual.

See the attached slides for additional information.

Document Name: Summary of past Time Error Discussions and Recommendations.pptx

Likes: 0

Dislikes: 0

Terry BIlke - Midcontinent ISO, Inc. - 2 -

Selected Answer: No

Answer Comment:

While we agree that TECs are primarily a commercial service and that the process should be converted to a procedure in the NERC Operating Manual or a NAESB business practice, we should not stop the implementation of TECs. NIST has demonstrated that there are equipment and processes that use grid frequency as a time reference.

While the reliability impact of TECs is miniscule, there are simple things that can be done to reduce the magnitude and impact of TECs. Europe uses clock-day TECs with a 0.01Hz offset and a 30 second window. NERC used to have a unilateral payback process that not only helped manage Inadvertent Interchange, it also reduced the magnitude of Time Error.

NERC could keep a simple requirement that sets the maximum offset for TECs and the process could be managed in a procedure similar to the Time Monitoring Procedure in the NERC Operating Manual.

See the attachment for past NERC and NAESB discussions on TECs.

Document Name: Summary of past Time Error Discussions and Recommendations.pptx

Likes: 0

Dislikes: 0

Emily Rousseau - MRO - 1,2,3,4,5,6 - MRO

Group Information

Group Name: MRO-NERC Standards Review Forum (NSRF)

Group Member Name	Entity	Region	Segments
Joe Depoorter	Madison Gas & Electric	MRO	3,4,5,6
Chuck Lawrence	American Transmission Company	MRO	1
Chuck Wicklund	Otter Tail Power Company	MRO	1,3,5
Theresa Allard	Minnkota Power Cooperative, Inc	MRO	1,3,5,6
Dave Rudolph	Basin Electric Power Cooperative	MRO	1,3,5,6
Kayleigh Wilkerson	Lincoln Electric System	MRO	1,3,5,6
Jodi Jenson	Western Area Power Administration	MRO	1,6
Larry Heckert	Alliant Energy	MRO	4
Mahmood Safi	Omaha Public Utility District	MRO	1,3,5,6
Shannon Weaver	Midwest ISO Inc.	MRO	2
Mike Brytowski	Great River Energy	MRO	1,3,5,6
Brad Perrett	Minnesota Power	MRO	1,5
Scott Nickels	Rochester Public Utilities	MRO	4
Terry Harbour	MidAmerican Energy Company	MRO	1,3,5,6
Tom Breene	Wisconsin Public Service Corporation	MRO	3,4,5,6
Tony Eddleman	Nebraska Public Power District	MRO	1,3,5

Voter Information

Voter

Emily Rousseau

Segment

1,2,3,4,5,6

Entity

MRO

Region(s)

MRO

Selected Answer: No

Answer Comment:

While, fundamentally, we agree that TECs do not rise to the level of Reliability Standard, it doesn’t appear that the SDT has done any coordination with NAESB to retire BAL-004 at the same time as the NAESB companion business practice, as outlined in the implementation plan. It is our belief that TECs should be relegated to a procedure in the NERC Operating Manual. We are also concerned that the SDT offers no reversion plan, should time drift excessively and NERC is asked to take action. We would be in favor of the SDT presenting an alternative to a Standard for TEC, and, until such alternatives are presented, will be voting no.

Document Name:

Likes: 0

Dislikes: 0

Colby Bellville - Duke Energy - 1,3,5,6 - FRCC,SERC,RFC

Group Information

Group Name: Duke Energy

Group Member Name	Entity	Region	Segments
Doug Hils	Duke Energy	RFC	1
Lee Schuster	Duke Energy	FRCC	3
Dale Goodwine	Duke Energy	SERC	5
Greg Cecil	Duke Energy	RFC	6

Voter Information

Voter

Colby Bellville

Segment

1,3,5,6

Entity

Duke Energy

Region(s)

FRCC,SERC,RFC

Selected Answer: Yes

Answer Comment:

Duke Energy is in agreement with the retirement of the Time Error Correction standard, BAL-004-0.

Document Name:

Likes: 0

Dislikes: 0

Jared Shakespeare - Peak Reliability - 1 -

Selected Answer: Yes

Answer Comment:

Document Name:

Likes: 0

Dislikes: 0

Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC

Selected Answer: Yes

Answer Comment:

While BPA supports the retirement of BAL-004-0, BPA recommends that industry retains the ability for Manual Time Error Corrections to be made outside of a Reliability Standard. Thank you.

Document Name:

Likes: 0

Dislikes: 0

Shannon Mickens - Southwest Power Pool, Inc. (RTO) - 2 - SPP

Group Information

Group Name: SPP Standards Review Group

Group Member Name	Entity	Region	Segments
Shannon Mickens	Southwest Power Pool Inc.	SPP	2
Jason Smith	Southwest Power Pool Inc	SPP	2
Ron Gunderson	Nebraska Public Power District	MRO	1,3,5

Voter Information

Voter	Segment
Shannon Mickens	2
Entity	**Region(s)**
Southwest Power Pool, Inc. (RTO)	SPP

Selected Answer: Yes

Answer Comment:

We agree that BAL-004-0 should be retired and the retirement of this particular standard has no reliability impact on the BES.

Document Name:

Likes: 0

Dislikes: 0

Brian Van Gheem - ACES Power Marketing - 6 - NA - Not Applicable

Group Information

Group Name: ACES Standards Collaborators

Group Member Name	Entity	Region	Segments
Bob Solomon	Hoosier Energy Rural Electric Cooperative, Inc.	RFC	1
Ginger Mercier	Prairie Power, Inc.	SERC	1,3
Ellen Watkins	Sunflower Electric Power Corporation	SPP	1
Michael Brytowski	Great River Energy	MRO	1,3,5,6
John Shaver	Arizona Electric Power Cooperative, Inc.	WECC	4,5
John Shaver	Southwest Transmission Cooperative, Inc.	WECC	1

Voter Information

Voter	Segment
Brian Van Gheem	6
Entity	**Region(s)**
ACES Power Marketing	NA - Not Applicable

Selected Answer: Yes

Answer Comment:

1) We would like to commend the drafting team in its efforts to strengthen its case for the retirement of the Time Error Correction standard. The addition of two new appendices to its white paper provides essential background on time error corrections and alternative methods that registered entities can use to achieve similar results.

2) While we continue to support the retirement of this standard, as we feel it puts an undue risk on the reliability of the BES, we have concerns regarding the direction taken by the SDT as part of this process. The implementation plan states the retirement of this standard is dependent on the retirement of NAESB standard WEQ-006. While we agree this is necessary, the limited coordination with NAESB we have observed will only delay these efforts. We believe a letter

of support from NAESB should be included in the white paper to demonstrate joint collaboration from all aspects of industry and strengthen your conclusions.

3) We also feel the SDT should identify, within the implementation plan, revising the NERC Operating Manual as a listed prerequisite for the retirement of this standard. We feel specific initiation and monitoring criteria listed within the retired standards should be moved to the time error correction section within the Manual. We also recommend the addition of the alternative methods provided within the white paper to complement this revision.

Document Name:

Likes: 0

Dislikes: 0

Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7 - NPCC

Group Information

Group Name: RSC

Group Member Name	Entity	Region	Segments
Paul Malozewski	Hydro One.	NPCC	1
Guy Zito	Northeast Power Coordinating Council	NPCC	NA - Not Applicable
Michael Forte	Con Edison	NPCC	1
Brian Shanahan	National Grid	NPCC	1
Rob Vance	New Brunswick Power	NPCC	1
Robert J. Pellegrini	United Illuminating	NPCC	1
Sylvain Clermont	Hydro Quebec	NPCC	1
Edward Bedder	Orange and Rockland Utilities	NPCC	1
Mark J. Kenny	Eversource Energy	NPCC	1
Gregory A. Campoli	NY-ISO	NPCC	2
Si Truc Phan	Hydro Quebec	NPCC	2
Randy MacDonald	New Brunswick Power	NPCC	2
Kelly Dash	Con Edison	NPCC	3
Michael Jones	National Grid	NPCC	3
David Burke	Orange and Rockland Utilities	NPCC	3
Peter Yost	Con Edison	NPCC	4
Wayne Sipperly	New York Power Authority	NPCC	4
Connie Lowe	Dominion Resources Services	NPCC	4
David Ramkalawan	Ontario Power Generation	NPCC	4
Glen Smith	Entergy Services	NPCC	4
Brian O'Boyle	Con Edison	NPCC	5
Brian Robinson	Utility Services	NPCC	5
Bruce Metruck	New York Power Authority	NPCC	6
Alan Adamson	New York State Reliability Council	NPCC	7
Kathleen M. Goodman	ISO-New England	NPCC	2

Helen Lainis	Independent Electricity System Operator	NPCC	2
Silvia Parada Mitchell	NextEra Energy	NPCC	4

Voter Information

Voter

Ruida Shu

Segment

1,2,3,4,5,6,7

Entity

Northeast Power Coordinating Council

Region(s)

NPCC

Selected Answer: Yes

Answer Comment:

We support the SDT's recommendation to retire BAL-004-0 Time Error Correction standard.

Document Name:

Likes: 0

Dislikes: 0

Manual Time Error Correction Discussion

Terry Bilke, MISO

Background

The following slides are extracts from past work within the NERC Resources Subcommittee (RS) and the NAESB Time and Inadvertent Management Task Force (TIMTF) while attempting to address FERC's 693 concerns on Time Error Corrections and Inadvertent Interchange balances

Order No. 693 Concerns

- Address number and efficiency of TECs
- Concerned with large Inadvertent Interchange balances
- Asks NERC to investigate alternatives to present TEC practices

Reasons for Fast Time*

- Tariffs that treat under-generation more severely than over-generation
- Operator perception that negative Inadvertent Interchange balances are “worse” than positive balances
- Changes to Inadvertent Interchange Payback processes
- Unaccounted for Inadvertent Interchange

*Anecdotal

TEC Risk Misperception

- Frequency
  - 0.02 Hz offset occurs infrequently and only takes 4% of frequency margin to the prevailing first step of UFLS
  - Takes about 100 MW from 10,000 MW margin to UFLS in the East
  - Likelihood of a 9900 MW contingency during a TEC (whereby the TEC would contribute to a ULFS event) is next to nil
- Flow impact of an improper TEC is on the order of metering error (small fraction of a MW per tie line)

Other Observations

- NIST has found that there are indeed equipment and processes that rely on grid frequency as their time reference
- RCs effectively manage the Time Monitoring function using the procedure in the NERC Operating Manual, BAs would no doubt do the same

Suggested Approach

- A simple NERC requirement that sets the maximum offset for TECs and the obligation to halt a TEC if directed by an RC
- A procedural solution (either in the NERC Operating Manual or a NAESB Business Practice) based on what works or has worked in the past to address FERC's concerns
  - Wider window (+/- 30 seconds)
  - Smaller clock-day offset (+/- 0.01Hz similar to Europe)
  - Reinstate a payback process similar to what was followed under NERC's A1/A2 criteria (allow unilateral payback of 5MW or 10% of bias when Inadvertent balance is "in phase" with Time Error)
  - NERC RS to monitor TEC efficiency and Inadvertent balances

Consideration of Comments

Project Name: 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls | BAL-004-0

Comment Period Start Date: 9/24/2015

Comment Period End Date: 11/12/2015

Associated Ballot: 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls BAL-004-0 IN 1 ST

There were 17 responses, including comments from approximately 77 different people from approximately 53 different companies representing 8 of the 10 Industry Segments as shown on the following pages.

All comments submitted can be reviewed in their original format on the project page.

If you feel that your comment has been overlooked, please let us know immediately. Our 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 Director of Standards, Howard Gugel (via email) or at (404) 446-9693.

Questions

1. **Based on comments received from the SAR posting and the BAL-004-0 Survey posting, the SDT is recommending that BAL-004-0 be retired and WEQ Manual Time Error Correction Business Practice Standard – WEQ-006, should also be retired contemporaneously with BAL-004-0. Do you agree that the BAL-004-0 – Time Error Correction standard should be retired? If not, please explain.**

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

1. Based on comments received from the SAR posting and the BAL-004-0 Survey posting, the SDT is recommending that BAL-004-0 be retired and WEQ Manual Time Error Correction Business Practice Standard – WEQ-006, should also be retired contemporaneously with BAL-004-0. Do you agree that the BAL-004-0 – Time Error Correction standard should be retired? If not, please explain.

John Fontenot - Bryan Texas Utilities - 1 -	
Selected Answer:	Yes
Thomas Lyons - Owensboro Municipal Utilities - 3 -	
Selected Answer:	Yes
Nick Vtyurin - Manitoba Hydro - 1,3,5,6 - MRO	
Selected Answer:	Yes

Ginette Lacasse - Seattle City Light - 1,3,4,5,6 - WECC

Group Name: Seattle City Light Ballot Body

Group Member Name	Entity	Region	Segments
Pawel Krupa	Seattle City Light	WECC	1
Dana Wheelock	Seattle City Light	WECC	3
Hao Li	Seattle City Light	WECC	4
Bud (Charles) Freeman	Seattle City Light	WECC	6
Mike haynes	Seattle City Light	WECC	5
Michael Watkins	Seattle City Light	WECC	1,3,4
Faz Kasraie	Seattle City Light	WECC	5
John Clark	Seattle City Light	WECC	6

Selected Answer: Yes

Answer Comment: That said, Seattle City Light would like to reiterate that we still feel Standard BAL-004-WECC-02, Automatic Time Error Correction,is a good standard to have. This standard is very effective in automatically correcting time errors, supporting system frequency and reducing primary and secondary inadvertent accumulations. It is our opinion, automatic time error correction programs similar to WECC could help in reliable operations of other Interconnections. Thank you for your affirmative response. This NERC effort for retirement of BAL-004-0 does not change the status of the BAL-004-WECC-02 standard.

Response:

Scott McGough - Georgia System Operations Corporation - 3 -

Selected Answer: Yes

Jennifer Losacco - NextEra Energy - Florida Power and Light Co. - 1 - FRCC

Selected Answer:	Yes

Anthony Jablonski - ReliabilityFirst - 10 -

Selected Answer:	Yes
Answer Comment:	**ReliabilityFirst agrees that the practice of using manual TEC to place the Interconnection closer to the settings for automatic underfrequency load shedding does not support or enhance reliability. Therefore, RF believes the BAL-004-0 should be retired as long as sufficient advance notice of retiring the standard and adoption of specific business practices by applicable entities is adopted which will help eliminate any potential adverse unintended consequences.** Thank you for your affirmative response. The Interconnections are continuously monitored by the RCs to assure reliability is maintained at all times. The SDT will recommend that the RCs report to NERC any unintended consequences associated with the retirement of this Standard, allowing for such conditions to be addressed.
Response:	

Terry BIlke - Midcontinent ISO, Inc. - 2 -

Selected Answer:	No
Answer Comment:	While we agree that TECs are primarily a commercial service and that the process should be converted to a procedure in the NERC Operating Manual or a NAESB business practice, we should not stop the implementation of TECs. NIST has demonstrated that there are equipment and processes that use grid frequency as a time reference. While the reliability impact of TECs is miniscule, there are simple things that can be done to reduce the magnitude and impact of TECs. Europe uses clock-day TECs with a 0.01Hz offset and a 30 second window. NERC used to have a unilateral payback process that not only helped manage Inadvertent Interchange, it also reduced the magnitude of Time Error. NERC could keep a simple requirement that sets the maximum offset for TECs and the process could be managed in a procedure similar to the Time Monitoring Procedure in the NERC Operating Manual. See the attached slides for additional information.

Thank you for your comment. The SDT has reviewed your presentation and believes that the White Paper developed by the SDT addresses your issues. The Interconnections are continuously monitored by the RCs to assure reliability is maintained at all times. The SDT will recommend that the RCs report to NERC any unintended consequences associated with the retirement of this Standard, allowing for such conditions to be addressed.

Response:

Emily Rousseau - MRO - 1,2,3,4,5,6 - MRO

Group Name: MRO-NERC Standards Review Forum (NSRF)

Group Member Name	Entity	Region	Segments
Joe Depoorter	Madison Gas & Electric	MRO	3,4,5,6
Chuck Lawrence	American Transmission Company	MRO	1
Chuck Wicklund	Otter Tail Power Company	MRO	1,3,5
Theresa Allard	Minnkota Power Cooperative, Inc	MRO	1,3,5,6

Dave Rudolph	Basin Electric Power Cooperative	MRO	1,3,5,6
Kayleigh Wilkerson	Lincoln Electric System	MRO	1,3,5,6
Jodi Jenson	Western Area Power Administration	MRO	1,6
Larry Heckert	Alliant Energy	MRO	4
Mahmood Safi	Omaha Public Utility District	MRO	1,3,5,6
Shannon Weaver	Midwest ISO Inc.	MRO	2
Mike Brytowski	Great River Energy	MRO	1,3,5,6
Brad Perrett	Minnesota Power	MRO	1,5
Scott Nickels	Rochester Public Utilities	MRO	4
Terry Harbour	MidAmerican Energy Company	MRO	1,3,5,6
Tom Breene	Wisconsin Public Service Corporation	MRO	3,4,5,6
Tony Eddleman	Nebraska Public Power District	MRO	1,3,5

Selected Answer: No

Answer Comment: *While, fundamentally, we agree that TECs do not rise to the level of Reliability Standard, it doesn't appear that the SDT has done any coordination with NAESB to retire BAL-004 at the same time as the NAESB companion business* *practice, as outlined in the implementation plan. It is our belief that TECs should be relegated to a procedure in the NERC Operating Manual. We are also concerned that the SDT offers no reversion plan, should time drift excessively and NERC is asked to take action. We would be in favor of the SDT presenting an alternative to a Standard for TEC, and, until such alternatives are presented, will be voting no.*

Thank you for your comment. The SDT has been in discussions with NAESB concerning their standard. The SDT will be submitting a request to NAESB to retire their WEQ-006 standard.

The Interconnections are continuously monitored by the RCs to assure reliability is maintained at all times. The SDT will recommend that the RCs report to NERC any unintended consequences associated with the retirement of this Standard, allowing for such conditions to be addressed.

Response:

Colby Bellville - Duke Energy - 1,3,5,6 - FRCC,SERC,RFC

Group Name: Duke Energy

Group Member Name	Entity	Region	Segments

Doug Hils	Duke Energy	RFC	1
Lee Schuster	Duke Energy	FRCC	3
Dale Goodwine	Duke Energy	SERC	5
Greg Cecil	Duke Energy	RFC	6

Selected Answer: Yes

Answer Comment: Duke Energy is in agreement with the retirement of the Time Error Correction standard, BAL-004-0.

Thank you for your affirmative response and clarifying comment.

Response:

Jared Shakespeare - Peak Reliability - 1 -

Selected Answer: Yes

Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC

Selected Answer:	Yes
Answer Comment:	While BPA supports the retirement of BAL-004-0, BPA recommends that industry retains the ability for Manual Time Error Corrections to be made outside of a Reliability Standard. Thank you. Thank you for your affirmative response and clarifying comment. The Interconnections are continuously monitored by the RCs to assure reliability is maintained at all times. The SDT will recommend that the RCs report to NERC any unintended consequences associated with the retirement of this Standard, allowing for such conditions to be addressed.
Response:	

Shannon Mickens - Southwest Power Pool, Inc. (RTO) - 2 - SPP

Group Name: SPP Standards Review Group

Group Member Name	Entity	Region	Segments
Shannon Mickens	Southwest Power Pool Inc.	SPP	2
Jason Smith	Southwest Power Pool Inc	SPP	2
Ron Gunderson	Nebraska Public Power District	MRO	1,3,5

Selected Answer: Yes

Answer Comment: We agree that BAL-004-0 should be retired and the retirement of this particular standard has no reliability impact on the BES.
Thank you for your affirmative response and clarifying comment.

Response:

Brian Van Gheem - ACES Power Marketing - 6 - NA - Not Applicable

Group Name: ACES Standards Collaborators

Group Member Name	Entity	Region	Segments
Bob Solomon	Hoosier Energy Rural Electric Cooperative, Inc.	RFC	1
Ginger Mercier	Prairie Power, Inc.	SERC	1,3
Ellen Watkins	Sunflower Electric Power Corporation	SPP	1
Michael Brytowski	Great River Energy	MRO	1,3,5,6
John Shaver	Arizona Electric Power Cooperative, Inc.	WECC	4,5
John Shaver	Southwest Transmission Cooperative, Inc.	WECC	1

Selected Answer: Yes

Answer Comment: 1) We would like to commend the drafting team in its efforts to strengthen its case for the retirement of the Time Error Correction standard. The addition of two new appendices to its white paper provides essential background on time error corrections and alternative methods that registered entities can use to achieve similar results.

	Thank you for your comment. 2) While we continue to support the retirement of this standard, as we feel it puts an undue risk on the reliability of the BES, we have concerns regarding the direction taken by the SDT as part of this process. The implementation plan states the retirement of this standard is dependent on the retirement of NAESB standard WEQ-006. While we agree this is necessary, the limited coordination with NAESB we have observed will only delay these efforts. We believe a letter of support from NAESB should be included in the white paper to demonstrate joint collaboration from all aspects of industry and strengthen your conclusions. Due to processes used by NERC and NAESB, the SDT did not request NAESB to participate in the development of the White Paper. The SDT has contacted NAESB during development and will now submit to NAESB a request to retire the NAESB WEQ-006 business practice. NERC's filing at FERC will highlight that BAL-004-0 retirement is contingent on retirement of NAESB WEQ-006. 3) We also feel the SDT should identify, within the implementation plan, revising the NERC Operating Manual as a listed prerequisite for the retirement of this standard. We feel specific initiation and monitoring criteria listed within the retired standards should be moved to the time error correction section within the Manual. We also recommend the addition of the alternative methods provided within the white paper to complement this revision. The SDT does not believe that it is within our purview to modify the NERC Operating Manual. The SDT will recommend to the NERC OC that they review the time monitoring reference section of the Operating Manual to determine if any modifications are necessary.

Response:

Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7 - NPCC

Group Name: RSC

Group Member Name	Entity	Region	Segments
Paul Malozewski	Hydro One.	NPCC	1
Guy Zito	Northeast Power Coordinating Council	NPCC	NA - Not Applicable
Michael Forte	Con Edison	NPCC	1
Brian Shanahan	National Grid	NPCC	1
Rob Vance	New Brunswick Power	NPCC	1
Robert J. Pellegrini	United Illuminating	NPCC	1
Sylvain Clermont	Hydro Quebec	NPCC	1
Edward Bedder	Orange and Rockland Utilities	NPCC	1
Mark J. Kenny	Eversource Energy	NPCC	1

Gregory A. Campoli	NY-ISO	NPCC	2
Si Truc Phan	Hydro Quebec	NPCC	2
Randy MacDonald	New Brunswick Power	NPCC	2
Kelly Dash	Con Edison	NPCC	3
Michael Jones	National Grid	NPCC	3
David Burke	Orange and Rockland Utilities	NPCC	3
Peter Yost	Con Edison	NPCC	4
Wayne Sipperly	New York Power Authority	NPCC	4
Connie Lowe	Dominion Resources Services	NPCC	4
David Ramkalawan	Ontario Power Generation	NPCC	4
Glen Smith	Entergy Services	NPCC	4
Brian O'Boyle	Con Edison	NPCC	5
Brian Robinson	Utility Services	NPCC	5
Bruce Metruck	New York Power Authority	NPCC	6
Alan Adamson	New York State Reliability Council	NPCC	7
Kathleen M. Goodman	ISO-New England	NPCC	2
Helen Lainis	Independent Electricity System Operator	NPCC	2

Silvia Parada Mitchell	NextEra Energy	NPCC	4

Selected Answer: Yes

Answer Comment: We support the SDT's recommendation to retire BAL-004-0 Time Error Correction standard.

Thank you for your affirmative response and clarifying comment.

Response:

End of report

Time Error Correction and Reliability White Paper

Recommendation of the Balancing Authority Reliability-based Controls 2.2 Standard Drafting Team to Retire BAL-004-0 – Time Error Correction

The Balancing Authority Reliability-based Controls 2 Periodic Review Team (BARC 2 PRT) was tasked with reviewing certain Reliability Standards and developing recommendations that each Reliability Standard be (1) reaffirmed as is (i.e., no changes needed); (2) revised (which may include revising or retiring one or more requirements); or (3) retired. After an extensive review, the BARC 2 PRT recommended that Reliability Standard BAL-004-0 be retired and that manual Time Error Correction (TEC) be eliminated as a continent-wide NERC standard. The Balancing Authority Reliability-based Controls 2.2 Standard Drafting Team (BARC 2.2 SDT) reviewed the findings of the BARC 2 PRT and issued a survey to the industry to gain a better perspective as to any concerns the industry may have if the practice of manual TEC was eliminated. The survey response indicated support for retirement of manual TEC as a standard. Upon review, as detailed below, the BARC 2.2 SDT determined that manual TEC would not support the reliability of the BPS. Conducting manual TEC in any form directly contradicts NERC Reliability Principle 2: “The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.” The practice of using manual TEC to place the Interconnection closer to the settings for automatic underfrequency load shedding does not support or enhance reliability. Therefore, BAL-004-0 should be retired.

The survey also indicated that the accompanying North American Energy Standard Board (NAESB) business practice standard, WEQ Manual Time Error Correction Business Practice Standard – WEQ-006, should be retired contemporaneously with BAL-004-0. The BARC 2.2 SDT’s recommendation for retirement of BAL-004-0 is contingent on simultaneous retirement of NAESB WEQ-006 to ensure clarity and to avoid inadvertent, uncoordinated, manual TEC. The BARC 2.2 SDT has been coordinating with NAESB on this issue. As discussed below, upon retirement of BAL-004-0 and NAESB WEQ-006, currently or soon to be effective Reliability Standards BAL-003-1 and BAL-001-2 will insent continued adherence to a frequency approximating 60 Hz over long-term averages.

This white paper reviews the history of manual TEC and BAL-004-0, outlines the key considerations of the BARC 2.2 SDT in developing its recommendation, and assesses whether the use of manual TEC supports the reliability of the Bulk Power System (BPS).

I. History of Time Error Correction and Reduced Reliance On Manual TEC Today

A. Invention of the Synchronous Motor Clock and Market Penetration

In 1916, Henry E. Warren invented the self-starting synchronous motor and three years later the motor was used for the production of the Telechron Clock. The Telechron Clock was a synchronous electric clock, which used alternating current electricity to measure time. Its accuracy depended on the frequency of the power grid. To incentivize electric system operators to regulate frequency in a way that kept the clocks running accurately, the Warren Clock Company, which was manufacturing the Telechron Clock at the time, gave electric clocks to electric system operators. The idea worked and system operators began regulating the frequency as desired by the Warren Clock Company.

During the 1920s, other companies developed synchronous motor clocks and used the same marketing strategy, giving electric clocks to system operators. As the penetration of the synchronous electric clock increased, the incremental electric revenue to utilities from the additional electric clock motors justified the relatively small cost to utilities to regulate system time by modifying system frequency. This additional revenue helped ensure that manual TEC would be an ongoing service provided by the electric utility industry.

B. Time Error Correction Practice and Improvements in Clock Accuracy

As the electric system became more interconnected, the service of providing manual TEC was incorporated into the industry's general operating practice. The current form of manual TEC is a legacy commercial practice that originated in the 1920s as a commercial service and was not related to the reliability of the electric grid. While documentation is available from as late as 1976 that synchronous electric clocks were still being used for important applications, by 1969, alternative methods of keeping accurate time penetrated the market and gradually displaced the electric clock. For example, the introduction of the first mass-produced quartz watch provided a more reliable and less expensive method to keep accurate time. Additionally, 15 years later, the United States made available for free the Global Positioning System, which is a space-based satellite navigation system that provides location and time information.

As discussed below in Section III.e., current Reliability Standards BAL-003-1 and BAL-001-2also ensure adherence to 60 Hz.

II. History of BAL-004-0

Reliability Standard BAL-004-0 – Time Error Correction became mandatory and enforceable on June 18, 2007. It contains four requirements:

- **R1** Only a Reliability Coordinator shall be eligible to act as an Interconnection Time Monitor. A single Reliability Coordinator in each Interconnection shall be designated by the NERC Operating Committee to serve as Interconnection Time Monitor.
- **R2** The Interconnection Time Monitor shall monitor Time Error and shall initiate or terminate corrective action orders in accordance with the NAESB Time Error Correction Procedure.
- **R3** Each Balancing Authority, when requested, shall participate in a Time Error Correction by one of the following methods:
    - **R3.1** The Balancing Authority shall offset its frequency schedule by 0.02 Hertz, leaving the Frequency Bias Setting normal; or
    - **R3.2** The Balancing Authority shall offset its Net Interchange Schedule (MW) by an amount equal to the computed bias contribution during a 0.02 Hertz Frequency Deviation (i.e. 20% of the Frequency Bias Setting).
- **R4** Any Reliability Coordinator in an Interconnection shall have the authority to request the Interconnection Time Monitor to terminate a Time Error Correction in progress, or a scheduled Time Error Correction that has not begun, for reliability considerations.
    - **R4.1** Balancing Authorities that have reliability concerns with the execution of a Time Error Correction shall notify their Reliability Coordinator and request the termination of a Time Error Correction in progress.

On July 11, 2007, a Standard Authorization Request (SAR) was submitted to NERC, proposing to revise BAL-004-0 to:

- Remove inappropriate compliance requirements on Reliability Coordinators who voluntarily agree to serve as Interconnection Time Monitors.
- Remove inappropriate compliance requirements on the NERC Operating Committee (OC), which is not a user, owner, or operator of the BPS.
- Remove inappropriate requirements to follow NAESB business practices.

The revised BAL-004-1 received 94.10% weighted segment approval on December 4, 2007, and was adopted by NERC's Board of Trustees on March 26, 2008. NERC filed a petition with the Federal Energy Regulatory Commission (FERC) on April 7, 2009, requesting approval for the revised BAL-004-1. In response, FERC issued a Notice of Proposed Rulemaking (NOPR) proposing to remand BAL-004-1 for further consideration. The NOPR requested that NERC:

- Change R2 to indicate that the Interconnection Time Monitor, designated according to a process described in a FERC approved document, is responsible for initiating or terminating a TEC in a reliable manner.
- Explain the circumstances under which the Time Monitor should start or end a TEC.

Between 2010 and 2012, NERC filed a series of petitions to defer action on the BAL-004-1 NOPR as it worked with the NERC Operating Committee (OC) to explore the possibility of eliminating manual TEC, using a field trial. In May and June of 2011, NERC held a webinar and issued a press release laying out a schedule to do a field trial in which manual TEC would have been stopped for a period of time. NERC's intention was to begin a phased elimination of TEC in ERCOT in August 2011.

After the webinar and issuance of the press release, and in part because NERC received feedback from private citizens, industry, and government entities expressing concern about the field trial, the trial was not conducted. Discussion of the data affecting these issues is included in Apendix I – Discussion of Correspondence attached.

On August 16, 2012, the NERC Board of Trustees withdrew its adoption of BAL-004-1, stating that:

- No Interconnection Time Monitor has ever incurred a violation.
- The NERC OC is not a registered entity, and therefore compliance actions are not a concern. Thus, it is acceptable to keep the OC reference in the Reliability Standard.
- There are no significant issues with the reference to NAESB in R2.

BAL-004-0 remains mandatory and enforceable. Since that time, BAL-004-0 has continued being examined, and the BARC 2.2 SDT has determined that under the current environment and rubric of Reliability Standards (discussed above), BAL-004-0 and NAESB WEQ-006 should be retired.

III. Key Considerations for BAL-004-0 Retirement

A. Manual TEC does not support the reliability of the BPS.

The frequency of an Interconnection is a contributor to the reliability of that Interconnection is. In North America, the system is designed to operate within a specified range, with 60 Hz as the center point of that range. Under and over frequency limits have been established to protect the equipment of both the providers and the users on the Interconnection from failure. As described above, Reliability Standards BAL-003-1 and BAL-001-2 support this by helping to ensure that frequency approximates 60 Hz in addition to modifications made to other standards, such as Interchange and Emergency Operations standards, increasing focus on data accuracy and frequency. As manual TEC is not required for reliability, a Reliability Standard focused on manual TEC is only necessary for ensuring that any manual TEC is implemented consistently across an Interconnection. The BARC 2.2 SDT maintains that elimination of manual TEC will allow each Interconnection to be operated closer to the design frequency of 60 Hz more often, by avoiding the over-corrections that arise in manual TEC accomplished under BAL-004-0 and NAESB WEQ-006.

Industry experts on the OC have stated that the practice of manual TEC does not support reliability, and is instead a strictly commercial service that does require a mandatory and enforceable Reliability Standard. [1] For instance, in an industry survey performed by the Balancing Authority Reliability-based Controls 1 Standard Drafting Team between September 12 and October 13, 2008, approximately 77% of respondents supported the discontinuation of manual TEC. Further, when revisions to BAL-004-0 were developed in the proposed BAL-004-1, "the underlying driver was that it was commonly understood that manual TECs were a commercial task."[2]

Because there is no additional benefit to reliability from the implementation of manual TEC, the BARC 2.2 SDT recommends the retirement of BAL-004-0.

B. *Manual TEC is occurring less frequently.*

Over the past ten years there has been a drastic decrease of the number of TEC called across all interconnections. There are a number of reasons for these decreases across the interconnections and these include but not limited to the following (see RS Meeting Presentations - January 28-29, 2015 (Coral Gables, FL), slides 50-53; http://www.nerc.com/comm/OC/Resources%20Subcommittee%20RS%202013/RS%20Meeting%20Presentations_January_28-29_2015.pdf):

- Economy (Recession)
- 2005 Energy Policy Act, creation of ERO as reliability enforcer
- The current suite of NERC Reliability Standards
- BAAL field trial participation
- Reduction in number of control areas in the Eastern and Western Interconnections
- Incremental steps in the expansion of PJM and MISO
- Development of Eastern largest Reserve Sharing Group
- Tools that better indicate current performance, such as the Intelligent Alarms from NERC-CERTS Resource Adequacy Application

[1] Minutes from the March 6-7, 2012 meeting of the Operating Committee. Posted at: http://www.nerc.com/comm/OC/Agendas%20Highlights%20and%20Minutes%20DL/Agendas,%20Highlights,%20and%20Minutes%20-%202012/Operating_Committee_Meeting_Minutes_Mar_6-7_2011_R1.pdf

[2] Minutes from the March 6-7, 2012 meeting of the Operating Committee.

- Inadvertent Interchange Tool, which gives BA's a heads up that their control may require some investigation

There exists no way of determining which of these factors may be the main factor in the decrease of manual TEC, but there has been a marked decrease since the factors listed above have taken place. This indicates that BAL-004-0 (and the NAESB corollary WEQ-006) are not materially assisting entities to maintain frequency at 60 Hz.

C. *The elimination of manual TEC is not expected to impact Inadvertent Interchange accumulations.*

In a FERC Order 693 directive related to BAL-004-0, FERC directed NERC "to perform whatever research it and the industry believe is necessary to provide a sound technical basis for either continuing with the present practice [of TEC] or identifying an alternative practice that is more effective and helps reduce inadvertent interchange." It should be noted that Time Error and Inadvertent Interchange are not necessarily linked, and therefore, eliminating manual TEC will not have negative imapcts on Inadvertent Interchange.

Time Error relates to the accumulated frequency drift of an Interconnection; whereas Inadvertent Interchange is an imbalance of scheduled and actual energy at a Balancing Authority's boundary in an Interconnection with other Balancing Authorities. Frequency drift is related to an imbalance between load and generation, which may be influenced by factors that include metering error, scheduling error, and the inability to instantaneously match load and generation.

Given the dynamics of load, generation, and Interconnection frequency, it is highly unlikely for any Balancing Authority to have an Area Control Error (ACE) of zero except by chance, so Inadvertent Interchange, positive and negative, is a fact of operation. In addition, the difference between the reliability requirement to ramp Interchange schedules and the business practice to account for Interchange schedules after the fact as "block schedules" (ramp not included) will also result in some amount of Inadvertent Interchange being accumulated each hour, even if the Balancing Authority could perfectly match load and generation throughout an hour. Like frequency drift, Inadvertent Interchange is influenced by the multiple factors that cause an imbalance between load and generation. Eliminating manual TEC will not impact Inadvertent Interchange accumulations.

D. Comments from non-electric power industry parties reflect misunderstanding regarding manual TEC.

When NERC and the NERC OC began exploring the possibility of conducting a field trial to eliminate manual TEC, they received feedback from private citizens, industry, and government representatives expressing concern about the impact of eliminating manual TEC. Some of these individuals expressed concern that eliminating manual TEC could affect billing meters or traffic lights that could rely on grid frequency.

However, for the reasons described in Section A of Part III above, such as Reliability Standards BAL-003-1 and BAL-001-2 , eliminating manual TEC will not adversely affect frequency. On average, frequency will approximate 60 Hz under these Reliability Standards, and eliminating BAL-004-0 and NAESB WEQ-006 will eliminate the over-corrections that are likely to cause deviation from 60 Hz in today's environment. [Further comments to address the types of concerns raised by non-electric power industry parties are included at Appendix I.]

Moreover, grid frequency is not the appropriate source for alignment to official time; there are other more appropriate sources available for that service. The National Institute of Standards and Technology and the U.S. Naval Observatory, for instance, maintain a website (www.time.gov) that could be used to correct time periodically, including after power outages. Manual TEC should not be required for the purpose of providing accurate time for synchronous electric clocks. Similarly, commercial or industrial processes dependent upon an exact duration of time could not rely on synchronous electric clocks, as any duration of time determined by such clocks can never be exact, and are negatively affected by each instance of manual TEC.

E. Other NERC Reliability Standards already require operation within a reliable frequency range.

NERC's suite of BAL Reliability Standards is designed to assure safe and reliable Interconnection operation within a defined frequency range, apart from any obligations associated with manual TEC in BAL-004-0. Reliability Standard BAL-003-1 – *Frequency Response and Frequency Bias Setting*, which became enforceable on April 1, 2015, requires sufficient Frequency Response from the Balancing Authority to maintain Interconnection Frequency within predefined bounds by arresting frequency deviations and supporting frequency until the frequency is restored to its scheduled value. This Reliability Standard ensures that each Interconnectionhas sufficient Frequency Response[3] to guard against underfrequency load shedding due to a credible event in that Interconnection. It ensures that Balancing Authorities provide the Frequency Response necessary to ensure that frequency does not reach the point where coordinated underfrequency load shedding relays curtail load. BAL-003-1 provides a reliability back stop for N-1-1 contigencies in that the standard requires the Balancing Authority to maintain frequency response to arrest frequency excursions following disturbance on the interconnection. The arresting of frequency allows the interconnection to stabilize and to make adjustments to be ready for the next disturbance.

In addition, the stated purpose of BAL-001-2 – Real Power Balancing Control Performance, which will become effective on July 1, 2016, is to control Interconnection frequency within defined limits. BAL-001

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[3] Frequency Response is a measure of an Interconnection's ability to stabilize frequency immediately following the sudden loss of generation or load. Power system operators manage or control frequency primarily through adjustments to the output of generators with the goal of restoring balance between generation and load. Failure to maintain frequency can disrupt the operation of equipment and initiate disconnection of power plant equipment to prevent them from being damaged, which could lead to wide-spread blackouts.

Requirement R1 (CPS1) is the longer term measure of a Balancing Authorities control of frequency in the interconnection. Requirement R1 requires Balancing Authority to consistently over time adjust generation to improve frequency of the interconnection. BAL-001-2 Requirement R2, "Each Balancing Authority shall operate such that its clock-minute average of Reporting ACE does not exceed its clock-minute Balancing Authority ACE Limit (BAAL) for more than 30 consecutive clock-minutes", is the short term real-time feedback to the system operator of frequency control of the interconnection. Requirement R2 combines frequency versus ACE information to give the operator the immediate feedback to make corrections to move frequency back to within Frequency Trigger Limits.

F. Revising BAL-004-0 would not enhance the reliability of the BPS.

In minutes from its March 6-7, 2012 meeting, the NERC OC states that "there is a general consensus that the conduct of manual TECs is a commercial service and does not rise to the level of a reliability standard, with the exception of setting bounds on the magnitude of frequency offset."[4] But, recognizing that there are other ways to lessen the impact of manual TECs, the NERC OC did not pass a motion to move forward with a field trial to test the impact of eliminating Manual TECs. Further, some have suggested alternative methods of achieving TEC without a TEC Standard. These are discussed in Appendix II – Alternative TEC Methods Suggested.

When considering possible recommendations for BAL-004-0, the BARC 2.2 SDT discussed the option of revising BAL-004-0 to reduce the offset to allow for manual TEC to be implemented for a full load cycle over a consistent time period and lessen the burden on Interconnection Time Monitors. However, the BARC 2.2 SDT determined that would not support the reliability of the BPS. Conducting manual TEC in any form directly contradicts NERC Reliability Principle 2: "The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand." The practice of using manual TEC to place the Interconnection closer to the settings for automatic underfrequency load shedding does not support or enhance reliability. Therefore, in line with NERC's efforts to eliminate standards that do not promote reliability, BAL-004-0 should be retired.

IV. Summary

Manual TEC is a commercial service that does not support reliability, and accurate time can be obtained from alternative sources. As noted above, other Reliability Standards insent frequency to remain within defined limits. Accordingly, BAL-004-0 – Time Error Correction and the associated NAESB WEQ Manual Time Error Correction Business Practice Standard – WEQ-006 should be retired.

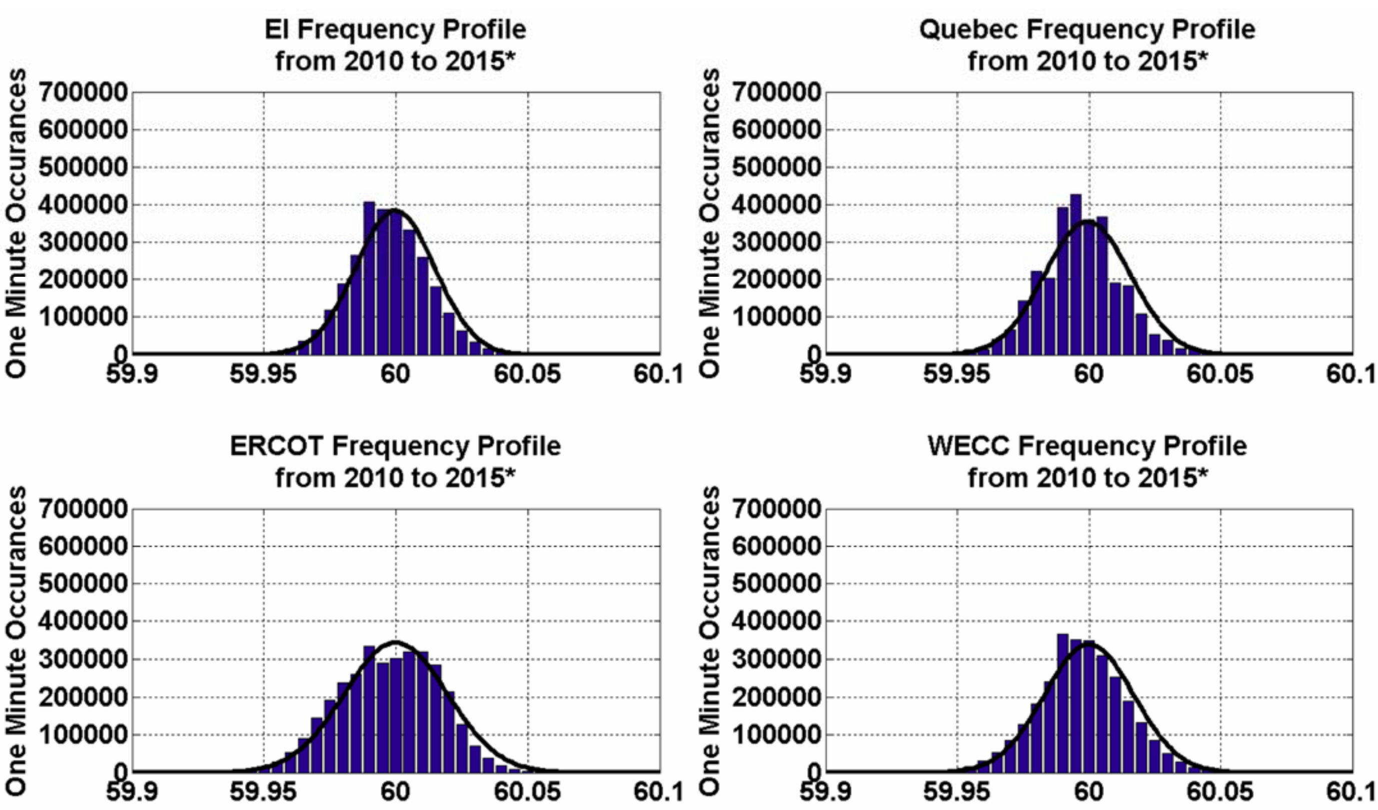
[4] Minutes from the March 6-7, 2012 meeting of the Operating Committee.

Appendix I – Discussion of Correspondence

Considerable correspondence was received by NERC in response to the announcement of the beginning of a trial to eliminate TEC. In most cases, those commenting on the trial admitted their lack of knowledge of interconnection frequency and its relation to Time Error and TEC. This appendix contains significant information to aid in the understanding of the issues related to time error correction.

Time Error Correction:

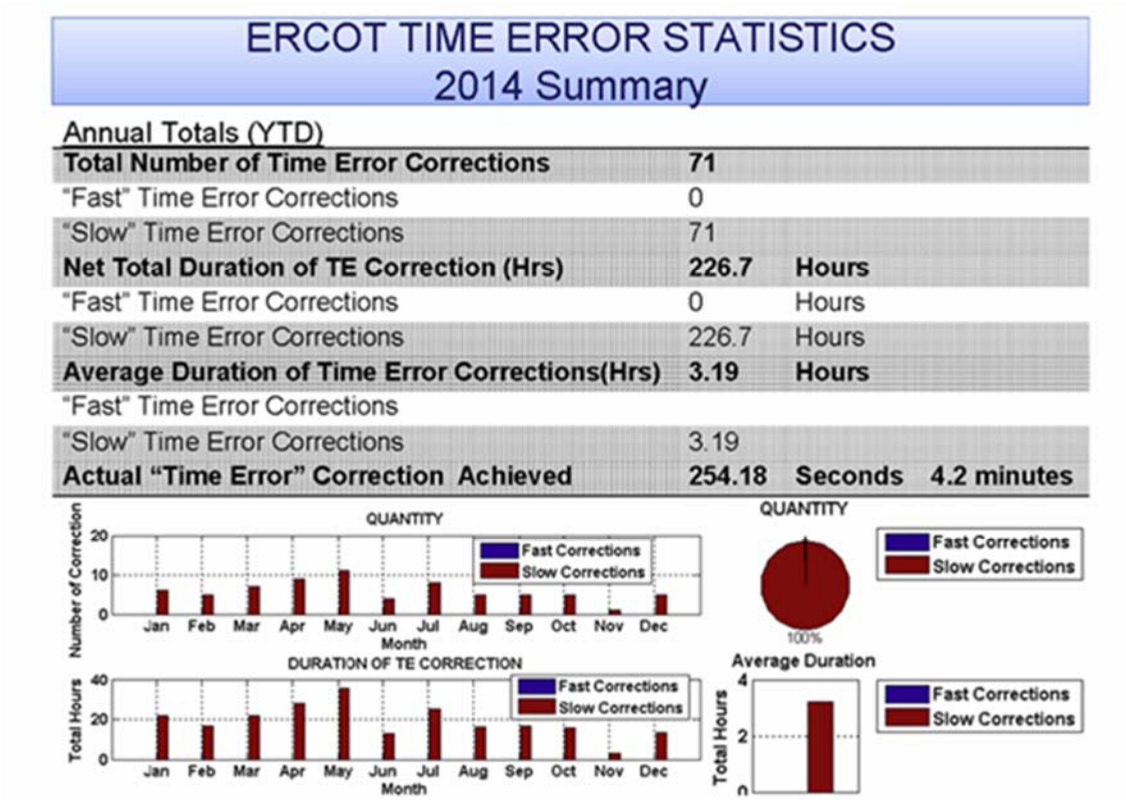
The North American Interconnections normally operate with a scheduled frequency of 60 Hz. As load and generation vary, actual frequency of the interconnection varies around this scheduled value. This variation is shown for one-minute average frequencies for the period from the beginning of 2010 through June 2015. This data shows that the one-minute frequency varies from a value of about 59.95 Hz to 60.05 Hz for the great majority of the time, over 99 % of the one-minute intervals. It also shows that the frequency error from 60 Hz is close to a Normal (Gaussian) Distribution.



These normal errors can be put into perspective by looking at the percentage the a 0.05 Hz error represents. This is obtained by dividing the 0.05 Hz error by the scheduled frequency of 60 Hz and

converting that number to a percentage. This gives an error of 0.083 %. The frequency error that the interconnections experience is less than one tenth of one percent. The elimination of TEC will have no significant effect on these error distributions, although it will move them slightly right or left so that the average error is slightly above or below 60 Hz.

Time error correction has historically been implemented by offsetting the scheduled frequency by 0.02 Hz above or below the normal frequency of 60 Hz. This scheduled offset moves the distribution closer to the relay limits for the interconnection, thus having a detrimental effect on reliability. The history of time error correction has been retained by the interconnections. This history for recent time error corrections is shown below for the Texas, Western, and Eastern Interconnections. This history shows that the total time error accumulated during the year 2014 was 4.2 minutes for the Texas Interconnection, 7.7 minutes for the Western Interconection, and 2.4 minutes for the Eastern Interconnection. An 8 minute annual error is an error of 0.0015%. When one considers that in most regions of the country, clocks are changed twice per year for Daylight Savings Time, these accumulated time errors are not significant. Although there are no guarantees that this experience will continue, it is expected to do so.


ERCOT TIME ERROR STATISTICS
2014 Summary

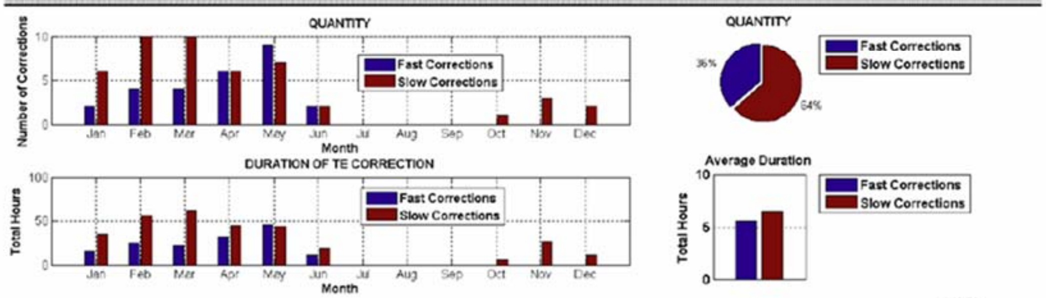
Annual Totals (YTD)

Total Number of Time Error Corrections	**71**		
"Fast" Time Error Corrections	0		
"Slow" Time Error Corrections	71		
Net Total Duration of TE Correction (Hrs)	**226.7**	**Hours**	
"Fast" Time Error Corrections	0	Hours	
"Slow" Time Error Corrections	226.7	Hours	
Average Duration of Time Error Corrections(Hrs)	**3.19**	**Hours**	
"Fast" Time Error Corrections			
"Slow" Time Error Corrections	3.19		
Actual "Time Error" Correction Achieved	**254.18**	**Seconds**	**4.2 minutes**

WECC TIME ERROR STATISTICS
2014 Summary

Annual Totals (YTD)

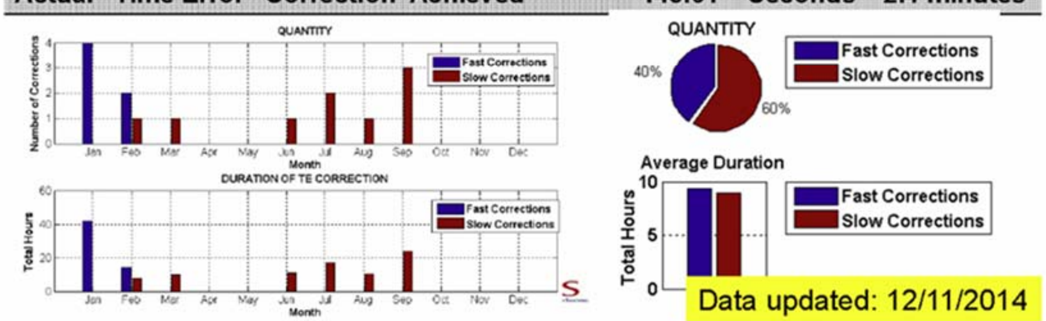
Total Number of Time Error Corrections	**74**		
"Fast" Time Error Corrections	27		
"Slow" Time Error Corrections	47		
Net Total Duration of TE Correction (Hrs)	**454.82**	**Hours**	
"Fast" Time Error Corrections	150.2	Hours	
"Slow" Time Error Corrections	304.6	Hours	
Average Duration of Time Error Corrections(Hrs)	**6.15**	**Hours**	
"Fast" Time Error Corrections	5.56		
"Slow" Time Error Corrections	6.48		
Actual "Time Error" Correction Achieved	**459.22**	**Seconds**	**7.7 minutes**



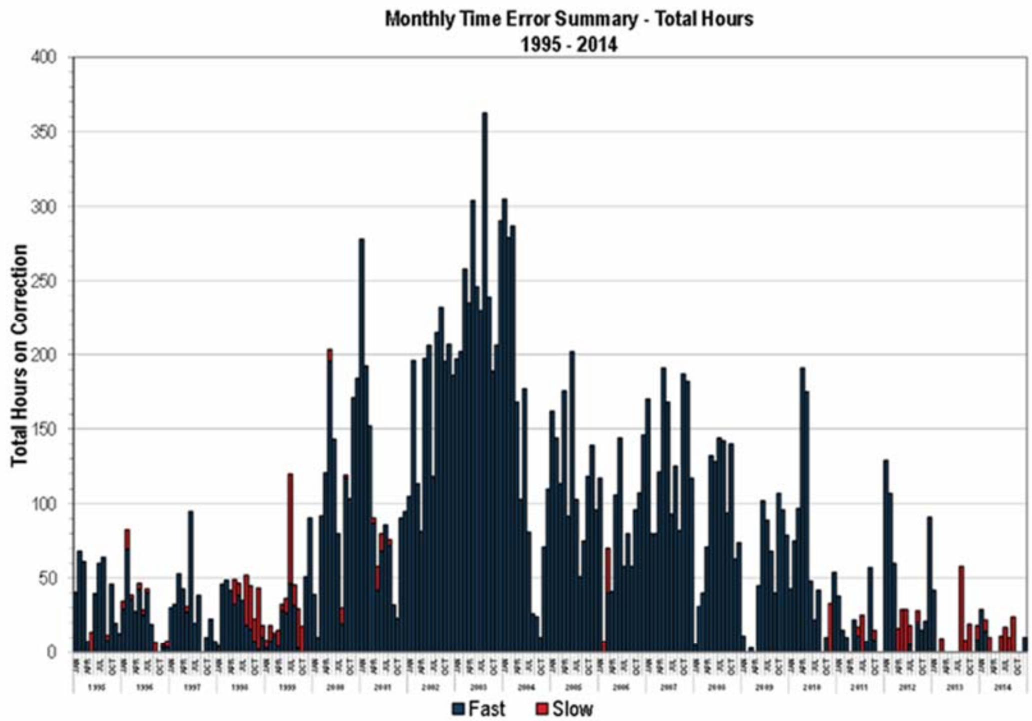
EI TIME ERROR STATISTICS
2014 Summary

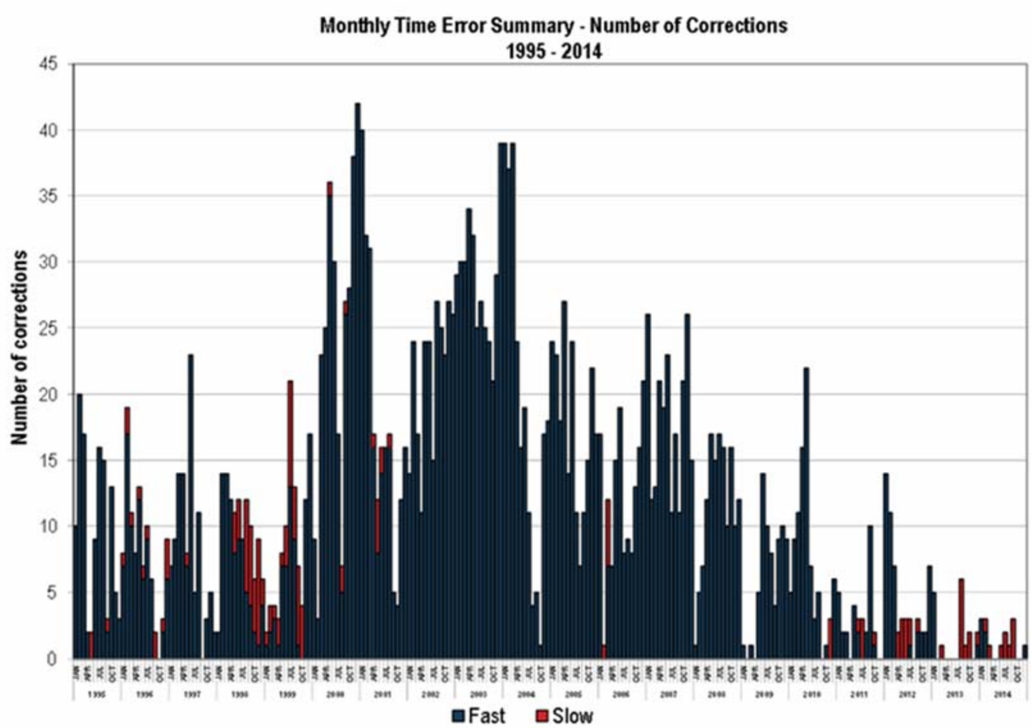
Annual Totals (YTD)

Total Number of Time Error Corrections	**15**		
"Fast" Time Error Corrections	6		
"Slow" Time Error Corrections	9		
Net Total Duration of TE Correction (Hrs)	**135.98**	**Hours**	
"Fast" Time Error Corrections	56.0	Hours	
"Slow" Time Error Corrections	80.0	Hours	
Average Duration of Time Error Corrections(Hrs)	**9.07**	**Hours**	
"Fast" Time Error Corrections	9.33		
"Slow" Time Error Corrections	8.89		
Actual "Time Error" Correction Achieved	**145.61**	**Seconds**	**2.4 minutes**



Data updated: 12/11/2014


Monthly Time Error Summary - Total Hours
1995 - 2014
Total Hours on Correction
Fast
Slow


Monthly Time Error Summary - Number of Corrections
1995 - 2014
Number of corrections
Fast
Slow

These last two graphs show the history of TEC over the last twenty years. They show that, since NERC was named the Electric Reliability Organization in 2007, TECs have significantly declined to todays levels. Many feel that this reduction in TEC is a result of improvements in the operation of the North American interconnections resulting from improvements in the NERC Reliability Standards and improvements in best practices as described in the NERC Reliability Guidelines.

Appendix II – Alternative TEC Methods Suggested

Each time the elimination of TEC has been recommended, some in the industry have suggested that alternative methods can be used to achieve TEC without having a reliability standard. Some of the methods suggested are discussed in this appendix.

Allow Uncoordinated Frequency Offset for TEC:

The NERC definition of Reporting ACE requires, "The use of a common Scheduled Frequency (F_S) for all areas at all times." The industry must investigate the effect of not following this part of the definition. When a BA uses a Scheduled Frequency different from the Scheduled Frequency in use by the remainder of the interconnection BAs, the use of this Scheduled Frequency affects the value of ACE. For example, if a BA offsets it Scheduled Frequency by +0.02 Hz when the remainder of the interconnection is using a Scheduled Frequency of 60 Hz, that BAs Reporting ACE will be reduced by an amount equal to its Frequency Bias times 0.02 Hz. This is relatively small effect, but there is an additional effect that most fail to consider.

When CPS1 and BAAL are calculated the value of Reporting ACE is multiplied by the value of the Frequency Error. The Frequency Error value also depends on the Scheduled Frequency. As a result, simply using a different Scheduled Frequency from the remainder of the interconnection will not only cause a small MW offset to Reporting ACE, but it may also cause a large change in CPS1 and BAAL measured performance. These large changes in performance measurement are the concern. causing its CPS1 and BAAL measure to change by more than just the change in the value of ACE. An example of this effect is provided as follows:

Example 1: Effect of Uncoordinated Frequency Offset
Assume that Time Error is fast indicating that a lower Scheduled Frequency will help to correct Time Error. Assume that Actual Frequency of the interconnection is 59.990 Hz and Scheduled Frequency is 60 Hz. Assume that a BA with a Frequency Bias Setting of 100 MW/0.1 Hz has a Tie Error of -290 MW. Using the Scheduled Frequency of 60 Hz, this BA will have the following performance measurements:

ACE = Tie Error (10B)(F_A – F_S) = -290 -10 x -100 x (59.990 – 60.000) = -300 MW
CPS1 = (2 – ((-300 /-10(-100)) x -0.010) / ε_1^2) x 100% = 2-(0.003 / 0.000324) x 100% = -725%
$BAAL_{Low}$ = -10 (-100) x (FTL_{Low} – F_S)^2 / (F_A – F_S) = 1000 x (3 x ε_1)^2 / (-0.01) = 1000 x 9 x ε_1^2 / (-0.01) = -291.6

If an uncoordinated frequency offset is allowed, then this BA could offset its Scheduled Frequency -.02 Hz. Using this new scheduled frequency in the above measures will yield the following performance measurements:

ACE = Tie Error – 10(B)(F_A – F_S) = -290 -10 x -100 x (59.990 – 59.980) = -280 MW
CPS1 = (2 – ((-280 /-10(-100)) x 0.010) / ε_1^2) x 100% = 2-(-0.0028 / 0.000324) x 100% = 964%
$BAAL_{Low}$ = -10 (-100) x (FTL_{Low} – F_S)^2 / (F_A – F_S) = 1000 x (3 x ε_1)^2 / (-0.01) = 1000 x 9 x ε_1^2 / (-0.01) = -291.6

By making this simple change in Scheduled Frequency, the BA reduces its ACE by 20 MW, the BA improves its CPS1 performance by 1,689 %, and it improves its BAAL performance enough to avoid a BAAL non-compliance. Although on first look, it would appear that allowing uncoordinated frequency offsets to enable TEC is beneficial, allowing this practice would make all of the current performance measurements that rely on ACE unreliable.

Allow Unilateral Inadvertent Payback for TEC:

Another suggestion that has been made is that unilateral inadvertent payback be included in Reporting ACE allowing up to 5 MW or 10% of the Frequency Bias Setting in the direction to correct time error. This practice is also addressed in the Reporting ACE definition, "The algebraic sum of all area Net Interchange Schedules and all Net Interchange actual values is equal to zero at all times." It has further been suggested that enabling a unilateral inadvertent payback of this magnitude would have little effect on the current performance measures. As with the previous analysis for uncoordinated frequency offset, the effect of including a unilateral inadvertent payback term in Reporting ACE is evaluated in the following Example 2:

Example 2: Effect of Unilateral Inadvertent Payback
Assume that Time Error is fast indicating that a lower Scheduled Frequency will help to correct Time Error.
Assume that Actual Frequency of the interconnection is 59.990 Hz and Scheduled Frequency is 60 Hz.
Assume that a BA with a Frequency Bias Setting of 100 MW/0.1 Hz has a Tie Error of -290 MW.
Using the Scheduled Frequency of 60 Hz, this BA will have the following performance measurements:

ACE = Tie Error – 10(B)(F_A – F_S) = -290 -10 x -100 x (59.990 – 60.000) = -300 MW
CPS1 = (2 – ((-300 /-10(-100)) x -0.010) / ε_1^2) x 100% = 2-(0.003 / 0.000324) x 100% = -725%
$BAAL_{Low}$ = -10 (-100) x (FTL_{Low} – F_S)^2 / (F_A – F_S) = 1000 x (3 x ε_1)^2 / (-0.01) = 1000 x 9 x ε_1^2 / (-0.01) = -291.6

If a unilateral inadvertent payback term is allowed, then this BA could modify its Reporting ACE by 10 MW in the above calculation of performance measures. The performance calculations would change as follows:

ACE = Tie Error – 10(B)(F_A – F_S) = -290 -10 x -100 x (59.990 – 60.000) + 10 = -290 MW
CPS1 = (2 – ((-290 /-10(-100)) x 0.010) / ε_1^2) x 100% = 2-(0.0029 / 0.000324) x 100% = -695%
$BAAL_{Low}$ = -10 (-100) x (FTL_{Low} – F_S)^2 / (F_A – F_S) = 1000 x (3 x ε_1)^2 / (-0.01) = 1000 x 9 x ε_1^2 / (-0.01) = -291.6

By making this simple change by adding 10 MW of unilateral inadvertent payback, the BA reduces its ACE by 10 MW, the BA improves its CPS1 performance by 30 %, and it improves its BAAL performance enough to avoid a BAAL non-compliance. Although on first look, it would appear that allowing unilateral inadvertent payback to enable TEC causes only small changes in performance, and it therefore, should be enabled to address TEC. This position has been supported by a study that implemented unilateral inadvertent payback on a continuous basis at 10% of the Frequency Bias Setting would cause a change of less than 1% in CPS1 performance.

The problem with the above analysis is that unilateral inadvertent payback would only need to be implemented a small percentage of the time. Under these conditions, it is important to consider the factors that could influence when to implement a unilateral payback schedule. One factor is the Actual Frequency at the time the unilateral inadvertent payback schedule is implemented.

Example 3: Effect of Unilateral Inadvertent Payback
Assume that Time Error is fast indicating that a lower Scheduled Frequency will help to correct Time Error. Assume that Actual Frequency of the interconnection is 59.940 Hz and Scheduled Frequency is 60 Hz. Assume that a BA with a Frequency Bias Setting of 100 MW/0.1 Hz has a Tie Error of 10 MW.
Using the Scheduled Frequency of 60 Hz, this BA will have the following performance measurements:

ACE = Tie Error – 10(B)(F_A – F_S) = 10 -10 x -100 x (59.940 – 60.000) = -50 MW
CPS1 = (2 – ((-50 /-10(-100)) x -0.060) / $\varepsilon_1{}^2$) x 100% = 2-(0.003 / 0.000324) x 100% = -726%
$BAAL_{Low}$ = -10 (-100) x (FTL_{Low} – F_S)^2 / (F_A – F_S) = 1000 x (3 x ε_1)^2 / (-0.01) = 1000 x 9 x $\varepsilon_1{}^2$ / (-0.06) = -48.6

If a unilateral inadvertent payback term is allowed, then this BA could modify its Reporting ACE by 10 MW in the above calculation of performance measures. The performance calculations would change as follows:

ACE = Tie Error – 10(B)(F_A – F_S) = 10 -10 x -100 x (59.940 – 60.000) + 10 = -40 MW
CPS1 = (2 – ((-40 /-10(-100)) x 0.060) / $\varepsilon_1{}^2$) x 100% = 2-(0.0024 / 0.000324) x 100% = -541%
$BAAL_{Low}$ = -10 (-100) x (FTL_{Low} – F_S)^2 / (F_A – F_S) = 1000 x (3 x ε_1)^2 / (-0.01) = 1000 x 9 x $\varepsilon_1{}^2$ / (-0.06) = -48.6

By making this simple change of adding 10 MW of unilateral inadvertent payback, the BA reduces its ACE by 10 MW, the BA improves its CPS1 performance by 185 %, and easily meets its BAAL limit. Since the suggested change when implemented across all time has very little effect on CPS1 and BAAL, it would make sense to require unilateral inadvertent payback to be excluded from Reporting ACE to encourage that unilateral inadvertent payback to be implemented at times when it will have little to no effect on the CPS1 and BAAL performance measures. In other words, unilateral inadvertent payback should only be implemented when it will benefit the interconnection by moving Actual Frequency toward 60 Hz or when Actual Frequency is near 60 Hz and it will not contribute to reliability problems. Under these conditions, unilateral inadvertent payback will be able to be implemented almost 50% of the time.

Standards Announcement

Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls
Recommended Retirement of BAL-004-0

Final Ballot Open through December 17, 2015

Now Available

A final ballot for the recommended retirement of **BAL-004-0 – Time Error Correction** is open through **8 p.m. Eastern, Thursday, December 17, 2015**.

The Balancing Authority Reliability-based Controls 2.2 Standard Drafting Team (BARC 2.2 SDT) reviewed the findings of the BARC 2 Primary Review Team. A survey was posted for comment August 12-25, 2015 to gain a better perspective as to any concerns the industry may have if the practice of manual Time Error Correction (TEC) was eliminated. The survey responses indicated support for retirement of manual TEC as a standard. Upon further review the BARC 2.2 SDT determined that manual TEC would not support the reliability of the BPS. Conducting manual TEC in any form directly contradicts NERC Reliability Principle 2: “The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.” The practice of using manual TEC to place the Interconnection closer to the settings for automatic underfrequency load shedding does not support or enhance reliability. Therefore, BAL-004-0 should be retired.

The survey responses also indicated that the accompanying North American Energy Standard Board (NAESB) WEQ Manual Time Error Correction Business Practice Standard – WEQ-006, should be retired contemporaneously with BAL-004-0. The BARC 2.2 SDT’s recommendation for retirement of BAL-004-0 is contingent on simultaneous retirement of NAESB WEQ-006 to ensure clarity and to avoid inadvertent, uncoordinated, manual TEC. The BARC 2.2 SDT has been coordinating with NAESB on this issue. Upon retirement of BAL-004-0 and NAESB WEQ-006, currently or soon to be effective Reliability Standards BAL-003-1 and BAL-001-2 will incent continued adherence to a frequency approximating 60 Hz over long-term averages.

Balloting

In the final ballot, votes are counted by exception. Only members of the ballot pool may cast a vote. All ballot pool members may change their previously cast vote. A ballot pool member who failed to vote during the previous ballot period may vote in the final ballot period. If a ballot pool member does not participate in the final ballot, the member’s vote from the previous ballot will be carried over as their vote in the final ballot.

Members of the ballot pool associated with this project may log in and submit their vote by clicking here.

If you are having difficulty accessing the SBS due to a forgotten password, incorrect credential error messages, or system lock-out, contact NERC IT support directly at https://support.nerc.net/ (Monday – Friday, 8 a.m. - 8 p.m. Eastern).

Next Steps

The voting results will be posted and announced after the ballot closes. If approved, the standard will be submitted to the Board of Trustees for adoption and then filed with the appropriate regulatory authorities.

For more information on the Standards Development Process, refer to the Standard Processes Manual.

For more information or assistance, contact Senior Standards Developer, Darrel Richardson (via email), or at (609) 613-1848.

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Standards Announcement

Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls
BAL-004-0

Final Ballot Results

Now Available

A final ballot for the recommended retirement of **BAL-004-0 – Time Error Correction** concluded **8 p.m. Eastern, Thursday, December 17, 2015.**

The ballot received sufficient affirmative votes for approval. Voting statistics are listed below, and the Ballot Results page provides the detailed results.

Ballot
Quorum / Approval
88.65% / 98.26%

Next Steps
The standard will be submitted to the Board of Trustees for adoption and then filed with the appropriate regulatory authorities.

Standards Development Process
For more information on the Standards Development Process, refer to the Standard Processes Manual.

For more information or assistance, contact Senior Standards Developer, Darrel Richardson (via email) or at (609) 613-1848.

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BALLOT RESULTS

Ballot Name: 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls BAL-004-0 FN 2 ST
Voting Start Date: 12/8/2015 12:01:00 AM
Voting End Date: 12/17/2015 8:00:00 PM
Ballot Type: ST
Ballot Activity: FN
Ballot Series: 2
Total # Votes: 250
Total Ballot Pool: 281
Quorum: 88.97
Weighted Segment Value: 98.27

Segment	Ballot Pool	Segment Weight	Affirmative Votes	Affirmative Fraction	Negative Votes w/ Comment	Negative Fraction w/ Comment	Negative Votes w/o Comment	Abstain	No Vote
Segment: 1	70	1	56	0.982	1	0.018	0	4	9
Segment: 2	10	0.9	8	0.8	1	0.1	0	0	1
Segment: 3	63	1	52	1	0	0	0	4	7
Segment: 4	20	1	19	1	0	0	0	0	1
Segment: 5	61	1	48	1	0	0	0	4	9
Segment: 6	47	1	42	1	0	0	0	2	3
Segment: 7	0	0	0	0	0	0	0	0	0
Segment: 8	2	0.2	2	0.2	0	0	0	0	0
Segment: 9	2	0.1	1	0.1	0	0	0	0	1

Segment	Ballot Pool	Segment Weight	Affirmative Votes	Affirmative Fraction	Negative Votes w/ Comment	Negative Fraction w/ Comment	Negative Votes w/o Comment	Abstain	No Vote
Segment: 10	6	0.6	6	0.6	0	0	0	0	0
Totals:	281	6.8	234	6.682	2	0.118	0	14	31

BALLOT POOL MEMBERS

Show All entries Search: Search

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	AEP - AEP Service Corporation	paul johnson		None	N/A
1	Ameren - Ameren Services	Eric Scott		Affirmative	N/A
1	APS - Arizona Public Service Co.	Michelle Amarantos		Affirmative	N/A
1	Arizona Electric Power Cooperative, Inc.	John Shaver		Affirmative	N/A
1	Associated Electric Cooperative, Inc.	Mark Riley		Affirmative	N/A
1	Austin Energy	Thomas Standifur		None	N/A
1	Avista - Avista Corporation	Bryan Cox	Rich Hydzik	Affirmative	N/A
1	Balancing Authority of Northern California	Kevin Smith	Joe Tarantino	Affirmative	N/A
1	BC Hydro and Power Authority	Patricia Robertson		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Beaches Energy Services	Don Cuevas		Affirmative	N/A
1	Berkshire Hathaway Energy - MidAmerican Energy Co.	Terry Harbour		Affirmative	N/A
1	Black Hills Corporation	Wes Wingen		Abstain	N/A
1	Bonneville Power Administration	Donald Watkins		Affirmative	N/A
1	Bryan Texas Utilities	John Fontenot		Affirmative	N/A
1	Cleco Corporation	John Lindsey	Louis Guidry	Affirmative	N/A
1	Colorado Springs Utilities	Shawna Speer		Affirmative	N/A
1	Con Ed - Consolidated Edison Co. of New York	Kelly Silver		Affirmative	N/A
1	Dairyland Power Cooperative	Robert Roddy		Negative	N/A
1	Dominion - Dominion Virginia Power	Larry Nash		Affirmative	N/A
1	Duke Energy	Doug Hils		None	N/A
1	Edison International - Southern California Edison Company	Steven Mavis		Affirmative	N/A
1	Entergy - Entergy Services, Inc.	Oliver Burke		Affirmative	N/A
1	Exelon	Chris Scanlon		Affirmative	N/A
1	FirstEnergy - FirstEnergy Corporation	William Smith		Affirmative	N/A
1	Great Plains Energy - Kansas City Power and Light Co.	James McBee	Douglas Webb	Affirmative	N/A
1	Hydro One Networks, Inc.	Payam Farahbakhsh		Abstain	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Hydro-Qu?bec TransEnergie	Nicolas Turcotte		Affirmative	N/A
1	IDACORP - Idaho Power Company	Johnny Anderson		None	N/A
1	International Transmission Company Holdings Corporation	Michael Moltane	Meghan Ferguson	Abstain	N/A
1	KAMO Electric Cooperative	Walter Kenyon		Affirmative	N/A
1	Lakeland Electric	Larry Watt		None	N/A
1	Long Island Power Authority	Robert Ganley		Affirmative	N/A
1	Los Angeles Department of Water and Power	faranak sarbaz		Affirmative	N/A
1	Lower Colorado River Authority	Teresa Cantwell		None	N/A
1	Manitoba Hydro	Mike Smith		Affirmative	N/A
1	MEAG Power	David Weekley	Scott Miller	Affirmative	N/A
1	Muscatine Power and Water	Andy Kurriger		Affirmative	N/A
1	N.W. Electric Power Cooperative, Inc.	Mark Ramsey		Affirmative	N/A
1	National Grid USA	Michael Jones		Affirmative	N/A
1	NB Power Corporation	Alan MacNaughton		Affirmative	N/A
1	Nebraska Public Power District	Jamison Cawley		Affirmative	N/A
1	New York Power Authority	Salvatore Spagnolo		Affirmative	N/A
1	NextEra Energy - Florida Power and Light Co.	Mike ONeil		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	NiSource - Northern Indiana Public Service Co.	Justin Wilderness		Affirmative	N/A
1	Northeast Missouri Electric Power Cooperative	Kevin White		Affirmative	N/A
1	OGE Energy - Oklahoma Gas and Electric Co.	Terri Pyle		Affirmative	N/A
1	OTP - Otter Tail Power Company	Charles Wicklund		Affirmative	N/A
1	Peak Reliability	Jared Shakespeare		Affirmative	N/A
1	PHI - Potomac Electric Power Co.	David Thorne		Affirmative	N/A
1	Platte River Power Authority	Matt Thompson		Affirmative	N/A
1	PNM Resources - Public Service Company of New Mexico	Laurie Williams		Affirmative	N/A
1	Portland General Electric Co.	John Walker		Affirmative	N/A
1	PPL Electric Utilities Corporation	Brenda Truhe		Affirmative	N/A
1	PSEG - Public Service Electric and Gas Co.	Joseph Smith		Affirmative	N/A
1	Public Utility District No. 1 of Snohomish County	Long Duong		Affirmative	N/A
1	Public Utility District No. 2 of Grant County, Washington	Michiko Sell		None	N/A
1	Puget Sound Energy, Inc.	Theresa Rakowsky		Affirmative	N/A
1	Sacramento Municipal Utility District	Tim Kelley	Joe Tarantino	Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Salt River Project	Steven Cobb		Affirmative	N/A
1	Santee Cooper	Shawn Abrams		Affirmative	N/A
1	SCANA - South Carolina Electric and Gas Co.	Tom Hanzlik		Affirmative	N/A
1	Seattle City Light	Pawel Krupa		Affirmative	N/A
1	Southern Company - Southern Company Services, Inc.	Robert A. Schaffeld		Affirmative	N/A
1	Tacoma Public Utilities (Tacoma, WA)	John Merrell		Affirmative	N/A
1	Tallahassee Electric (City of Tallahassee, FL)	Scott Langston		Affirmative	N/A
1	Tennessee Valley Authority	Howell Scott		None	N/A
1	Tri-State G and T Association, Inc.	Tracy Sliman		Abstain	N/A
1	U.S. Bureau of Reclamation	Richard Jackson		None	N/A
1	United Illuminating Co.	Jonathan Appelbaum		Affirmative	N/A
1	Xcel Energy, Inc.	Dean Schiro		Affirmative	N/A
2	BC Hydro and Power Authority	Venkataramakrishnan Vinnakota		Affirmative	N/A
2	California ISO	Richard Vine		Affirmative	N/A
2	Electric Reliability Council of Texas, Inc.	Elizabeth Axson		Affirmative	N/A
2	Herb Schrayshuen	Herb Schrayshuen		Affirmative	N/A
2	Independent Electricity System Operator	Leonard Kula		Affirmative	N/A
2	ISO New England, Inc.	Michael Puscas	Kathleen Goodman	Affirmative	N/A
2	Midcontinent ISO, Inc.	Terry Blike		Negative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
2	New York Independent System Operator	Gregory Campoli		None	N/A
2	PJM Interconnection, L.L.C.	Mark Holman	William Temple	Affirmative	N/A
2	Southwest Power Pool, Inc. (RTO)	Charles Yeung		Affirmative	N/A
3	Ameren - Ameren Services	David Jendras		Affirmative	N/A
3	APS - Arizona Public Service Co.	Jeri Freimuth		Affirmative	N/A
3	Associated Electric Cooperative, Inc.	Todd Bennett		Affirmative	N/A
3	Austin Energy	W. Dwayne Preston		Affirmative	N/A
3	Avista - Avista Corporation	Scott Kinney		Affirmative	N/A
3	BC Hydro and Power Authority	Faramarz Amjadi		Abstain	N/A
3	Beaches Energy Services	Steven Lancaster		Affirmative	N/A
3	Berkshire Hathaway Energy - MidAmerican Energy Co.	Thomas Mielnik	Darnez Gresham	Affirmative	N/A
3	Bonneville Power Administration	Rebecca Berdahl		Affirmative	N/A
3	Central Electric Power Cooperative (Missouri)	Adam Weber		Affirmative	N/A
3	City of Green Cove Springs	Mark Schultz		Affirmative	N/A
3	City of Leesburg	Chris Adkins		Affirmative	N/A
3	City of Redding	Elizabeth Hadley	Bill Hughes	Affirmative	N/A
3	Clark Public Utilities	Jack Stamper		Affirmative	N/A
3	Cleco Corporation	Michelle Corley	Louis Guidry	Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	Colorado Springs Utilities	Hillary Dobson		Affirmative	N/A
3	Con Ed - Consolidated Edison Co. of New York	Peter Yost		Affirmative	N/A
3	Dominion - Dominion Resources, Inc.	Connie Lowe		Affirmative	N/A
3	DTE Energy - Detroit Edison Company	Kent Kujala		Affirmative	N/A
3	Duke Energy	Lee Schuster		Affirmative	N/A
3	Edison International - Southern California Edison Company	Romel Aquino		None	N/A
3	Exelon	John Bee		Affirmative	N/A
3	FirstEnergy - FirstEnergy Corporation	Theresa Ciancio		Affirmative	N/A
3	Florida Municipal Power Agency	Joe McKinney	Chris Gowder	Affirmative	N/A
3	Georgia System Operations Corporation	Scott McGough		Affirmative	N/A
3	Great Plains Energy - Kansas City Power and Light Co.	Jessica Tucker	Douglas Webb	Affirmative	N/A
3	Great River Energy	Brian Glover		Affirmative	N/A
3	Hydro One Networks, Inc.	Paul Malozewski	Oshani Pathirane	Abstain	N/A
3	JEA	Garry Baker		None	N/A
3	Lakeland Electric	David Hadzima		None	N/A
3	Lincoln Electric System	Jason Fortik		Abstain	N/A
3	Los Angeles Department of Water and Power	Mike Anctil		Affirmative	N/A
3	M and A Electric Power Cooperative	Stephen Pogue		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	Manitoba Hydro	Karim Abdel-Hadi		Affirmative	N/A
3	MEAG Power	Roger Brand	Scott Miller	Affirmative	N/A
3	Muscatine Power and Water	Seth Shoemaker		Affirmative	N/A
3	National Grid USA	Brian Shanahan		Affirmative	N/A
3	Nebraska Public Power District	Tony Eddleman		Affirmative	N/A
3	New York Power Authority	David Rivera		Affirmative	N/A
3	NiSource - Northern Indiana Public Service Co.	Ramon Barany		Affirmative	N/A
3	Northeast Missouri Electric Power Cooperative	Skyler Wiegmann		Affirmative	N/A
3	NW Electric Power Cooperative, Inc.	John Stickley		Affirmative	N/A
3	Ocala Utility Services	Randy Hahn		None	N/A
3	OGE Energy - Oklahoma Gas and Electric Co.	Donald Hargrove		Affirmative	N/A
3	Owensboro Municipal Utilities	Thomas Lyons		Affirmative	N/A
3	PHI - Potomac Electric Power Co.	Mark Yerger		Affirmative	N/A
3	PNM Resources	Michael Mertz		None	N/A
3	Portland General Electric Co.	Thomas Ward		Affirmative	N/A
3	PPL - Louisville Gas and Electric Co.	Charles Freibert		Affirmative	N/A
3	PSEG - Public Service Electric and Gas Co.	Jeffrey Mueller		Affirmative	N/A
3	Puget Sound Energy, Inc.	Andrea Basinski		None	N/A
3	Sacramento Municipal Utility District	Rachel Moore	Joe Tarantino	Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	Santee Cooper	James Poston		Affirmative	N/A
3	Seattle City Light	Tuan Tran		Affirmative	N/A
3	Snohomish County PUD No. 1	Mark Oens		Affirmative	N/A
3	Southern Company - Alabama Power Company	R. Scott Moore		Affirmative	N/A
3	Tacoma Public Utilities (Tacoma, WA)	Marc Donaldson		Affirmative	N/A
3	Tallahassee Electric (City of Tallahassee, FL)	John Williams		Affirmative	N/A
3	Tennessee Valley Authority	Ian Grant		Affirmative	N/A
3	Tri-State G and T Association, Inc.	Janelle Marriott Gill		Abstain	N/A
3	Turlock Irrigation District	James Ramos		None	N/A
3	WEC Energy Group, Inc.	Thomas Breene		Affirmative	N/A
3	Xcel Energy, Inc.	Michael Ibold		Affirmative	N/A
4	Alliant Energy Corporation Services, Inc.	Kenneth Goldsmith		Affirmative	N/A
4	Austin Energy	Tina Garvey		Affirmative	N/A
4	Blue Ridge Power Agency	Duane Dahlquist		Affirmative	N/A
4	City of Clewiston	Lynne Mila		Affirmative	N/A
4	City of New Smyrna Beach Utilities Commission	Tim Beyrle		Affirmative	N/A
4	City of Redding	Nick Zettel	Bill Hughes	Affirmative	N/A
4	City Utilities of Springfield, Missouri	John Allen		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
4	DTE Energy - Detroit Edison Company	Daniel Herring		Affirmative	N/A
4	FirstEnergy - Ohio Edison Company	Doug Hohlbaugh		None	N/A
4	Florida Municipal Power Agency	Carol Chinn		Affirmative	N/A
4	Georgia System Operations Corporation	Guy Andrews		Affirmative	N/A
4	Keys Energy Services	Jeffrey Partington		Affirmative	N/A
4	MGE Energy - Madison Gas and Electric Co.	Joseph DePoorter		Affirmative	N/A
4	Public Utility District No. 1 of Snohomish County	John Martinsen		Affirmative	N/A
4	Sacramento Municipal Utility District	Michael Ramirez	Joe Tarantino	Affirmative	N/A
4	Seattle City Light	Hao Li		Affirmative	N/A
4	Seminole Electric Cooperative, Inc.	Michael Ward		Affirmative	N/A
4	Tacoma Public Utilities (Tacoma, WA)	Hien Ho		Affirmative	N/A
4	Utility Services, Inc.	Brian Evans-Mongeon		Affirmative	N/A
4	WEC Energy Group, Inc.	Anthony Jankowski		Affirmative	N/A
5	Ameren - Ameren Missouri	Sam Dwyer		Affirmative	N/A
5	APS - Arizona Public Service Co.	Stephanie Little		Affirmative	N/A
5	Associated Electric Cooperative, Inc.	Matthew Finn		None	N/A
5	Austin Energy	Jeanie Doty		Affirmative	N/A
5	Avista - Avista Corporation	Steve Wenke		Affirmative	N/A
5	BC Hydro and Power Authority	Helen Hamilton Harding		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Berkshire Hathaway - NV Energy	Eric Schwarzrock	Jeffrey Watkins	Affirmative	N/A
5	Bonneville Power Administration	Francis Halpin		Affirmative	N/A
5	Brazos Electric Power Cooperative, Inc.	Shari Heino		Affirmative	N/A
5	Choctaw Generation Limited Partnership, LLLP	Rob Watson		Affirmative	N/A
5	City of Independence, Power and Light Department	Jim Nail		Affirmative	N/A
5	Cleco Corporation	Stephanie Huffman	Louis Guidry	Affirmative	N/A
5	Colorado Springs Utilities	Jeff Icke		None	N/A
5	Con Ed - Consolidated Edison Co. of New York	Brian O'Boyle		Affirmative	N/A
5	Dominion - Dominion Resources, Inc.	Randi Heise		Affirmative	N/A
5	DTE Energy - Detroit Edison Company	Jeffrey DePriest		Affirmative	N/A
5	Duke Energy	Dale Goodwine		Affirmative	N/A
5	Dynegy Inc.	Dan Roethemeyer		Affirmative	N/A
5	Edison International - Southern California Edison Company	Thomas Rafferty		None	N/A
5	Entergy - Entergy Services, Inc.	Jaclyn Massey		Affirmative	N/A
5	Exelon	Ruth Miller		Affirmative	N/A
5	FirstEnergy - FirstEnergy Solutions	Robert Loy		Affirmative	N/A
5	Florida Municipal Power Agency	David Schumann	Chris Gowder	Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Great Plains Energy - Kansas City Power and Light Co.	Harold Wyble	Douglas Webb	Affirmative	N/A
5	Great River Energy	Preston Walsh		Affirmative	N/A
5	Hydro-Qu?bec Production	Roger Dufresne		Affirmative	N/A
5	JEA	John Babik		Affirmative	N/A
5	Kissimmee Utility Authority	Mike Blough		Affirmative	N/A
5	Lincoln Electric System	Kayleigh Wilkerson		Abstain	N/A
5	Los Angeles Department of Water and Power	Kenneth Silver		Affirmative	N/A
5	Lower Colorado River Authority	Wesley Maurer		Abstain	N/A
5	Manitoba Hydro	Yuguang Xiao		Affirmative	N/A
5	Massachusetts Municipal Wholesale Electric Company	David Gordon		Abstain	N/A
5	MEAG Power	Steven Grego	Scott Miller	Affirmative	N/A
5	Muscatine Power and Water	Mike Avesing		None	N/A
5	NB Power Corporation	Rob Vance		Affirmative	N/A
5	Nebraska Public Power District	Don Schmit		Affirmative	N/A
5	New York Power Authority	Wayne Sipperly		Affirmative	N/A
5	NextEra Energy	Allen Schriver		Affirmative	N/A
5	OGE Energy - Oklahoma Gas and Electric Co.	Leo Staples		Affirmative	N/A
5	Omaha Public Power District	Mahmood Safi		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	OTP - Otter Tail Power Company	Cathy Fogale		Affirmative	N/A
5	Pacific Gas and Electric Company	Alex Chua		None	N/A
5	Platte River Power Authority	Tyson Archie		Affirmative	N/A
5	PSEG - PSEG Fossil LLC	Tim Kucey		Affirmative	N/A
5	Public Utility District No. 1 of Snohomish County	Sam Nietfeld		Affirmative	N/A
5	Public Utility District No. 2 of Grant County, Washington	Alex Ybarra		Affirmative	N/A
5	Puget Sound Energy, Inc.	Lynda Kupfer		None	N/A
5	Sacramento Municipal Utility District	Susan Gill-Zobitz	Joe Tarantino	Affirmative	N/A
5	Salt River Project	Kevin Nielsen		Affirmative	N/A
5	Seattle City Light	Mike Haynes		Affirmative	N/A
5	Seminole Electric Cooperative, Inc.	Brenda Atkins		None	N/A
5	Southern Company - Southern Company Generation	William D. Shultz		Affirmative	N/A
5	Southern Indiana Gas and Electric Co.	Scotty Brown	Rob Collins	None	N/A
5	Tacoma Public Utilities (Tacoma, WA)	Chris Mattson		Affirmative	N/A
5	Talen Generation, LLC	Donald Lock		Affirmative	N/A
5	Tallahassee Electric (City of Tallahassee, FL)	Karen Webb		Affirmative	N/A
5	Tennessee Valley Authority	Brandy Spraker		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Tri-State G and T Association, Inc.	Mark Stein		Abstain	N/A
5	U.S. Bureau of Reclamation	Erika Doot		None	N/A
5	WEC Energy Group, Inc.	Linda Horn		Affirmative	N/A
6	AEP - AEP Marketing	Dan Ewing		None	N/A
6	Ameren - Ameren Services	Robert Quinlivan		Affirmative	N/A
6	APS - Arizona Public Service Co.	Bobbi Welch		Affirmative	N/A
6	Associated Electric Cooperative, Inc.	Brian Ackermann		Affirmative	N/A
6	Austin Energy	Andrew Gallo		Affirmative	N/A
6	Berkshire Hathaway - PacifiCorp	Sandra Shaffer		Affirmative	N/A
6	Bonneville Power Administration	Andrew Meyers		Affirmative	N/A
6	City of Redding	Marvin Briggs	Bill Hughes	Affirmative	N/A
6	Cleco Corporation	Robert Hirchak	Louis Guidry	Affirmative	N/A
6	Colorado Springs Utilities	Shannon Fair		Affirmative	N/A
6	Con Ed - Consolidated Edison Co. of New York	Robert Winston		Affirmative	N/A
6	Dominion - Dominion Resources, Inc.	Sean Bodkin		Affirmative	N/A
6	Duke Energy	Greg Cecil		Affirmative	N/A
6	Entergy	Julie Hall		Affirmative	N/A
6	Exelon	Maggy Powell		Affirmative	N/A
6	FirstEnergy - FirstEnergy Solutions	Ann Ivanc		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
6	Florida Municipal Power Agency	Richard Montgomery	Chris Gowder	Affirmative	N/A
6	Florida Municipal Power Pool	Tom Reedy		Affirmative	N/A
6	Great Plains Energy - Kansas City Power and Light Co.	Chris Bridges	Douglas Webb	Affirmative	N/A
6	Great River Energy	Donna Stephenson	Michael Brytowski	Affirmative	N/A
6	Lincoln Electric System	Eric Ruskamp		Abstain	N/A
6	Lower Colorado River Authority	Michael Shaw		None	N/A
6	Luminant - Luminant Energy	Brenda Hampton		Affirmative	N/A
6	Manitoba Hydro	Blair Mukanik		Affirmative	N/A
6	Muscatine Power and Water	Ryan Streck		Affirmative	N/A
6	New York Power Authority	Shivaz Chopra		Affirmative	N/A
6	NextEra Energy - Florida Power and Light Co.	Silvia Mitchell		Affirmative	N/A
6	NiSource - Northern Indiana Public Service Co.	Joe O'Brien		Affirmative	N/A
6	OGE Energy - Oklahoma Gas and Electric Co.	Jerry Nottnagel		Affirmative	N/A
6	Omaha Public Power District	Mark Trumble		Affirmative	N/A
6	Platte River Power Authority	Sabrina Martz		Affirmative	N/A
6	Portland General Electric Co.	Shawn Davis		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
6	PPL - Louisville Gas and Electric Co.	Linn Oelker		Affirmative	N/A
6	PSEG - PSEG Energy Resources and Trade LLC	Karla Jara		Affirmative	N/A
6	Sacramento Municipal Utility District	Diane Clark	Joe Tarantino	Affirmative	N/A
6	Salt River Project	Chris Janick		Affirmative	N/A
6	Santee Cooper	Michael Brown		Affirmative	N/A
6	Seattle City Light	Charles Freeman		Affirmative	N/A
6	Seminole Electric Cooperative, Inc.	Trudy Novak		Affirmative	N/A
6	Snohomish County PUD No. 1	Franklin Lu		Affirmative	N/A
6	Southern Company - Southern Company Generation and Energy Marketing	John J. Ciza		Affirmative	N/A
6	Tacoma Public Utilities (Tacoma, WA)	Rick Applegate		Affirmative	N/A
6	Talen Energy Marketing, LLC	Elizabeth Davis		None	N/A
6	Tennessee Valley Authority	Marjorie Parsons		Affirmative	N/A
6	WEC Energy Group, Inc.	Scott Hoggatt		Affirmative	N/A
6	Westar Energy	Megan Wagner		Abstain	N/A
6	Xcel Energy, Inc.	Carrie Dixon		Affirmative	N/A
8	David Kiguel	David Kiguel		Affirmative	N/A
8	Massachusetts Attorney General	Frederick Plett		Affirmative	N/A
9	City of Vero Beach	Ginny Beigel		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
9	Commonwealth of Massachusetts Department of Public Utilities	Donald Nelson		None	N/A
10	Midwest Reliability Organization	Russel Mountjoy		Affirmative	N/A
10	Northeast Power Coordinating Council	Guy V. Zito		Affirmative	N/A
10	ReliabilityFirst	Anthony Jablonski		Affirmative	N/A
10	SERC Reliability Corporation	David Greene		Affirmative	N/A
10	Southwest Power Pool Regional Entity	Bob Reynolds		Affirmative	N/A
10	Texas Reliability Entity, Inc.	Rachel Coyne		Affirmative	N/A

Previous 1 Next

Showing 1 to 281 of 281 entries

Exhibit E

Summary Drafting Team Roster

Standard Drafting Team Roster

Project 2010-14.2.2 Phase 2 of Balancing Authority Reliability-based Controls

	Participant	Entity
Members	Chad Burgess	Duke Energy
	Howard F. Illian	Energy Mark, Inc.
	David F. Lemmons	Xcel Energy, Inc.
	Jerry Rust	Northwest Power Pool
	Glenn Stephens	Santee Cooper
	Phil Hart	Associated Electric Cooperative, Inc.
	Robert Blohm	Keen Resources
NERC Staff	Darrel Richardson – Senior Standards Developer	North American Electric Reliability Corporation
	Candice Castaneda – Counsel	North American Electric Reliability Coportation