

## **Balance Resources and Demand Standard Proof-of-Concept Field Trial**

### **Overview**

The Proof-of-Concept Field Trial (“Field Trial”) of the Balance Resources and Demand Standard will require participating Balancing Authorities to operate and report compliance under the provisions stated in the draft Standard and this document.

The Field Trial will be executed in three phases:

- A. Alliant Energy, Cinergy, East Kentucky Power Cooperative, Entergy, Manitoba Hydro and Northern Indiana Public Service Company, representing a summer peak load of approximately 50,000 MW, will begin operating to the proposed Standard on July 6, 2005. Upon review of operations under Phase A, and endorsement of the RCWG, the SDT will determine whether to move to Phase B.
- B. If approved, PJM, representing a summer peak load of approximately 118,000 MW, will begin operating to the proposed Standard on August 1, 2005 or as soon as practical. Upon review of operations under Phase B, and endorsement of the RCWG, the SDT will determine whether to move to Phase C.
- C. If approved, additional Balancing Authorities, representing a summer peak load of approximately 90,000 MW, will begin operating to the proposed Standard on September 1, 2005 or as soon as practical. (The team is awaiting positive confirmation from each Balancing Authority of their readiness to participate in the Field Trial as of the writing of this document)

Attachment C contains the procedure that will be followed by the SDT to review operations under the Field Trial with participating Balancing Authorities and Reliability Coordinators prior to moving to Phase B, prior to moving to Phase C, and throughout the Field Trial. Attachment D outlines the dates applicable to the participating Balancing Authorities under the Field Trial.

### **Field Trial Requirements**

For the duration of the Field Trial, the participating Balancing Authorities shall continue to be responsible for compliance under the NERC Standards including:

BAL-001-0 - Real Power Balancing Control Performance (with the exception of CPS2)

BAL-002-0 - Disturbance Control Performance

Participating Balancing Authorities shall be waived of compliance to CPS2 while operating under the Field Trial except under the conditions stated below. Attachment E contains Dave Hilt’s notification of CPS2 waiver to the Standards Authorization Committee.

All Balancing Authorities participating in the Field Trial shall immediately cease operating under the proposed Standard if so directed by their Reliability Coordinator or Raymond Vice, chair of the Balance Resources and Demand Standard Drafting Team.

## **Balance Resources and Demand Standard Proof-of-Concept Field Trial**

Any requests for the Balancing Authority to take corrective action or cease operating under the Field Trial from the Reliability Coordinator shall be documented by the Balancing Authority including the duration of the Reliability Coordinator request, and provided to the Balancing Resources and Demand Standard Drafting Team within 24 hours of such event. Upon receipt of notification from the Balancing Authority, a conference call will be set up between the SDT, the Balancing Authority, and its Reliability Coordinator to determine if any changes to the Field Trial procedure are necessary. For the duration of the time a Balancing Authority is directed not to operate under this Field Trial, it will be responsible for all compliance to the current Standards including CPS2.

Participating Balancing Authorities shall be fully responsible for operating and reporting compliance to the draft Balancing Resources and Demand Standard. Each Balancing Authority shall provide its clock-minute data for the first two weeks' operations under the Field Trial in the CSV format provided in Attachment A for analysis and review by the SDT (for further information see Attachment C - Execution of the Field Trial and Procedure to be Followed by the Standard Drafting Team). For each calendar month of the Field Trial, each Balancing Authority will provide its clock-minute data for the prior month's operations to the SDT by the 10<sup>th</sup> working day of following month in the CSV format provided in Attachment A.

### **Responsibility to Follow Reliability Coordinator Directives**

The Reliability Coordinator over each participating Balancing Authority will have unquestioned authority to direct the participating Balancing Authority to cease operation under the Field Trial, no matter of the Interconnection frequency, if any Reliability Coordinator experiences a problem on its system that it believes may be attributed to operations under the Field Trial. Options available to the Reliability Coordinator include:

**BAAL Exceeded:** If any Reliability Coordinator experiences a problem on its system attributed to the real-time ACE of a participating Balancing Authority, where that Balancing Authority's ACE has exceeded the BAAL, the Reliability Coordinator over the participating Balancing Authority shall direct the Balancing Authority to restore its ACE within BAAL compliance limits immediately. At its discretion or at the request of a Reliability Coordinator experiencing a problem on its system, the Reliability Coordinator over the participating Balancing Authority may also direct the participating Balancing Authority to cease operation under the Field Trial and restore ACE within safe limits until the system problem is addressed. The Reliability Coordinator will notify the Balancing Authority when it can restore operations again to the Field Trial.

**BAAL Not Exceeded:** If any Reliability Coordinator experiences a problem on its system attributed to the real-time ACE of a participating Balancing Authority where that Balancing Authority's ACE has not exceeded the BAAL but is outside its associated CPS2 L10 bound, the Reliability Coordinator over the participating

## **Balance Resources and Demand Standard Proof-of-Concept Field Trial**

Balancing Authority, at its discretion or at the request of the Reliability Coordinator experiencing a problem on its system, may direct the Balancing Authority to cease operation under the Field Trial and restore ACE to within safe limits until the system problem is addressed. The Reliability Coordinator will notify the Balancing Authority when it can restore operations again to the Field Trial.

In addition to the information provided above, Attachment B proposes actions to be taken by the Reliability Coordinator in consideration of abnormal Interconnection frequency.

### **Data Confidentiality**

The BALRESSDT will assign a unique identifier to each Balancing Authority participating in the Field Trial. All one-minute data submitted under the Field Trial will reflect the identifier and not the acronym of the Balancing Authority. Compliance to the draft Standard under the Field Trial will be reported to each Balancing Authority's Region with the Balancing Authority identified. Compliance reports to the draft Standard will be posted on the NERC Resources Subcommittee web site along with the compliance reports for the Control Performance and Disturbance Control Standards.

# Balance Resources and Demand Standard Proof-of-Concept Field Trial

## ATTACHMENT A Field Trial Data Submittal Format

One-minute data will be provided in monthly files under the following CSV format:

BA, Date, Time, TimeZone, ACE, FreqError, FreqBias, ActFreq, SchedFreq, AQC, FQC,  
BAAL\_Low, MinCtLow, BAAL\_High, MinCtHigh <EOL>

<u>Field Name</u>	<u>Description/Type</u>
BA	5-character BA Identifier provided by BALRESSDT
Date	Date format (MM/DD/YYYY),
Time	24-hour time format (hh:mm),
TimeZone	3-character time-zone abbreviation (EST, EDT, CST, CDT, etc)
ACE (REAL)	Clock-minute average Area Control Error (MW) (minimum of 1 digit to right of decimal point)
FreqError (REAL)	Clock-minute average Frequency Error (Hz), (minimum of three digits to right of decimal point)
FreqBias (REAL)	Clock-minute average Frequency Bias (MW/0.1 Hz)
ActFreq (REAL)	Clock-minute average Actual Frequency (Hz) (minimum of three digits to right of decimal point)
SchedFreq (REAL)	Clock-minute average Scheduled Frequency (Hz) (minimum of two digits to right of decimal point)
AQC* (INTEGER)	ACE Quality Code (0=valid data, 1=bad data)
FQC* (INTEGER)	Frequency Quality Code (0=valid data, 1=bad data)
BAAL_Low** (REAL)	BAAL <sub>Low</sub> (MW) (minimum of 1 digit to right of decimal point)
MinCtLow (INTEGER)	Count of the consecutive minutes of negative ACE < BAAL <sub>Low</sub> when Frequency Error is negative.
BAAL_High** (REAL)	BAAL <sub>High</sub> (MW) (minimum of 1 digit to right of decimal point)
MinCtHigh (INTEGER)	Count of the consecutive minutes of positive ACE > BAAL <sub>High</sub> when Frequency Error is positive.

## Balance Resources and Demand Standard Proof-of-Concept Field Trial

\*If no quality code is available, then write 0 for all records. Ideally, the user should have the capability to update the quality code for the ACE and Frequency with each sample to flag whether that sample represents good or bad data. If over 50% of the samples of ACE for a given period have bad data, then AQC for that period should be flagged as "bad" for the ACE represented. If less than 50% of the samples represent bad data, then AQC for the period should be flagged as "good" using only the good samples of ACE for that period. Likewise, if over 50% of the samples of frequency for a given period have bad data, then FQC for that period should be flagged as "bad" for the frequency represented. If less than 50% of the samples represent bad data, then FQC for that period should be flagged as "good" using only the good samples of frequency for that period.

**\*\*BAAL should be calculated from the clock-minute averages of the data as follows:**


If  $\text{FreqError} \leq 0$ , then  $\text{BAAL}_{\text{Low}} = (-10 * \text{Frequency Bias} * (\text{FTL}_{\text{Low}} - 60 \text{ Hz})^2) / (\text{Frequency Error} + 0.00000001)$ , else  $\text{BAAL}_{\text{Low}} = 0.0$

If  $\text{FreqError} > 0$ , then  $\text{BAAL}_{\text{High}} = (-10 * \text{Frequency Bias} * (\text{FTL}_{\text{High}} - 60 \text{ Hz})^2) / (\text{Frequency Error} + 0.00000001)$ , else  $\text{BAAL}_{\text{High}} = 0.0$

For the Field Trial,  $\text{FTL}_{\text{Low}} = 59.95 \text{ Hz}$ . and  $\text{FTL}_{\text{High}} = 60.05 \text{ Hz}$ .

### Example CSV records:

```
BA-01,11/21/2004,10:00,EST,-10.2,-0.008,-90.0,59.992,60.00,0,0,-281.3,0,0.0,0
BA-01,11/21/2004,10:01,EST,-2.5,-0.010,-85.0,59.990,60.00,0,0,-212.5,0,0.0,0
BA-01,11/21/2004,10:02,EST,1.6,-0.007,-80.0,59.993,60.00,0,0,-285.7,0,0.0,0
BA-01,11/21/2004,10:03,EST,-309.0,-0.037,-80.0,59.963,60.00,0,0,-54.1,1,0.0,0
BA-01,11/21/2004,10:04,EST,-310.4,-0.042,-80.0,59.958,60.00,0,0,-47.6,2,0.0,0
BA-01,11/21/2004,10:05,EST,-312.5,-0.054,-80.0,59.946,60.00,0,0,-37.0,3,0.0,0
```



Note that the fourth row of data represents the first one-minute record where the ACE of -309.0 MW was less than the  $\text{BAAL}_{\text{Low}}$  boundary of -54.1 MW. As ACE remained outside the calculated BAAL boundary for the next two minutes, "MinCtLow" was incremented for each record.

Note that column headings are not to be provided in the monthly CSV files.

### Monthly File Naming Convention

YYYYMM\_BA-NN.CSV

For example, August 2005 data for BA-06 should be written to the file named "200508\_BA-06.CSV"

# Balance Resources and Demand Standard Proof-of-Concept Field Trial

## ATTACHMENT B

### Proposed Frequency Monitoring and Response Process for the Eastern Interconnection

#### Introduction

This document outlines a proposed frequency monitoring and response process for the Eastern Interconnection.

#### Short-Term Triggers (Reliability Coordinators (RC))

NOTE: If the frequency exceeds the FRL (Frequency Reliability Limit) or FAL (Frequency Abnormal Limit) High or Low then immediate action is required. The Frequency Trigger Limit (FTL) represents the initial frequency where the Reliability Coordinators should be directing corrective action if necessary.

Frequency	What	Actions
60.5	FRL High	1,4
60.2	FAL High	1,3
60.05 (if >10 minutes)	FTL High	1,2
60.05 (if >5 minutes)	FTL High	1,
59.95 (if >5 minutes)	FTL Low	1,
59.95 (if >10 minutes)	FTL Low	1,2
59.91	FAL Low	1,3
59.82	FRL Low	1,4

#### Actions

1. Look for BAs (Balancing Authorities) within your area beyond BAAL (Balancing Authority Abnormal Limit). Direct correction and log in RCIS (Reliability Coordinator Information System) under Frequency section.
2. Direct BAs beyond BAAL to correct ACE (Area Control Error). Call Other RCs, communicate problem if known. Ask for cause if none reported. Log in RCIS under Frequency section. Notify Time Monitor of event and problem (if known). Time Monitor logs event and problem.
3. Direct all BAs with ACE hurting frequency to correct. Call other RCs, communicate problem if known. Ask for cause if none is reported. Log in RCIS under Frequency section. Notify Time Monitor of event and problem (if known). Time monitor logs event and problem.
4. Evaluate whether still interconnected. Direct emergency action. Call other RCs, communicate problem if known. Ask for cause if none is reported. Log in RCIS under Frequency section. Notify Time Monitor of event and problem (if known). Time monitor logs event and problem.

RCs should also log any other unusual frequency events and report to the Time Monitor.

## Balance Resources and Demand Standard Proof-of-Concept Field Trial

The Time Monitor will notify the Resources Subcommittee for all events logged by Time Monitor.

Metric	What	Actions
+/- 0.031Hz	Hourly Average	Call Other RCs, communicate problem if known. Ask for cause if none reported. Log in RCIS under Frequency section. Notify Time Monitor of event and problem (if known). Time Monitor logs event and problem.
28 mHz	Changes in one-minute average frequency deviation	Call Other RCs, communicate problem if known. Ask for cause if none reported. Log in RCIS under Frequency section. Notify Time Monitor of event and problem (if known). Time Monitor logs event and problem.
28 mHz	Change over 10 seconds (future-in CERTS)	Scan for corresponding ACE changes to capture unit trips for frequency response benchmarking. Call Other RCs, communicate problem if known. Ask for cause if none reported. Log in RCIS under Frequency section. Notify Time Monitor of event and problem (if known). Time Monitor logs event and problem.

## Balance Resources and Demand Standard Proof-of-Concept Field Trial

### Longer-Term Triggers and Benchmarks (Resources Subcommittee)

Metric	What	Actions
+/- 0.031Hz	Hourly Average	AIE Survey if no problem known. If problem known, survey entities involved to determine any lessons. Maintain record
20 mHz	Daily RMS1	Evaluate Day and determine need for survey. Maintain Record
16.8 mHz	Weekly RMS1	Evaluate Week and determine underlying cause. Maintain Record
28 mHz	Changes in one-minute average frequency deviation	If problem is known, maintain for excursion benchmarking. If problem is not known, ACE survey to determine problem.
28 mHz	Change over 10 seconds (future-in CERTS)	Scan for corresponding ACE changes to capture unit trips for frequency response benchmarking. If problem is not known, ACE survey to determine problem.

# **Balance Resources and Demand Standard Proof-of-Concept Field Trial**

## **ATTACHMENT C**

### **Execution of the Field Trial and Procedure to be Followed by the Standard Drafting Team**

#### **OVERVIEW**

The Field Trial will be executed in three phases:

- A. Alliant Energy, Cinergy, East Kentucky Power Cooperative, Entergy, Manitoba Hydro and Northern Indiana Public Service Company, representing a summer peak load of approximately 50,000 MW, will begin operating to the proposed Standard on July 6, 2005. Upon review of operations under Phase A, the SDT will determine whether to move to Phase B.
- B. If approved, PJM, representing a summer peak load of approximately 118,000 MW, will begin operating to the proposed Standard on August 1, 2005 or as soon as practical. Upon review of operations under Phase B, the SDT will determine whether to move to Phase C.
- C. If approved, additional Balancing Authorities, representing a summer peak load of approximately 90,000 MW, will begin operating to the proposed Standard on September 1, 2005 or as soon as practical. (The team is awaiting positive confirmation from each Balancing Authority of their readiness to participate in the Field Trial as of the writing of this document)

A complete timeline of events is provided in Attachment D.

#### **PROCEDURE**

The Field Trial will be executed and reviewed as follows:

##### **Phase A:**

- 1) Alliant Energy, Cinergy, East Kentucky Power Cooperative, Entergy, Manitoba Hydro and Northern Indiana Public Service Company, representing a summer peak load of approximately 50,000 MW, will begin operating to the proposed Standard on July 6, 2005.
- 2) Two weeks after the start of the Field Trial, the Balancing Authorities will provide the Balance Resources and Demand Standard Drafting Team (SDT) with their respective clock-minute data for the first two weeks of operations in the format described in Attachment A.
- 3) The SDT will evaluate the performance under the proposed Balancing Standard and will hold a conference call with the Resources Subcommittee (RS), the Reliability Coordinator Working Group (RCWG), and the participating Balancing Authorities to present the results of the SDT's analysis.
- 4) During the conference call, the SDT will ask for feedback from the Balancing Authorities and the Reliability Coordinators on the prior two week's operations, including suggestions on how the Field Trial can be improved.

## **Balance Resources and Demand Standard Proof-of-Concept Field Trial**

- 5) Based on the data and feedback provided back to the SDT, the SDT will determine if it should
  - a) Stop the Field Trial to make revisions to the procedures followed,
  - b) Continue the Field Trial without the PJM Balancing Authority, or
  - c) Bring the PJM Balancing Authority into the Field Trial contingent upon the approval of the PJM Reliability Coordinator.

If a) is chosen, the participating Balancing Authorities under Phase A will be directed to immediately cease operations under the Field Trial. The SDT will revise the procedures to be followed and then hold another conference call following steps 3, 4, & 5 above.

If b) or c) is chosen, the participating Balancing Authorities under Phase A will provide, on a monthly basis, the one-minute data for the prior month's operations to the SDT by the 10<sup>th</sup> working day of following month in the CSV format provided in Attachment A.

### **Phase B:**

- 6) If approved by the SDT and endorsed by the RCWG, the PJM Balancing Authority, representing a summer peak load of approximately 118,000 MW, will begin operating to the proposed Standard on August 1, 2005 or as soon as practical.
- 7) After two weeks of operations under the Field Trial, the PJM Balancing Authority will provide the Standard Drafting Team (SDT) with its respective clock-minute data for the first two weeks of operations in the format described in Attachment A.
- 8) The SDT will evaluate the performance under the proposed Balancing Standard for participants under Phase A and B, and will hold a conference call with the Resources Subcommittee, the RCWG, and the participating Balancing Authorities, to present the results of the SDT's analysis.
- 9) During the conference call, the SDT will ask for feedback from the Balancing Authorities and the Reliability Coordinators on operations, including suggestions on how the Field Trial can be improved.
- 10) Based on the data and feedback provided back to the SDT, the SDT will determine if it should
  - a) Stop the Field Trial to make revisions to the procedures followed
  - b) Continue the Field Trial without the Phase C group
  - c) Bring the Phase C group into the Field Trial contingent upon the approval of the Reliability Coordinators over the Phase C participants.

If a) is chosen, the participating Balancing Authorities will be directed to immediately cease operations under the Field Trial. The SDT will revise the procedures to be followed and then hold another conference call following steps 8, 9, & 10 above.

If b) or c) is chosen, the participating Balancing Authorities under Phase A and B will provide, on a monthly basis, the one-minute data for the prior month's operations to the SDT by the 10<sup>th</sup> working day of following month in the CSV format provided in Attachment A.

## **Balance Resources and Demand Standard Proof-of-Concept Field Trial**

### **Phase C:**

- 11) If approved by the SDT and endorsed by the RCWG, additional Balancing Authorities, representing a summer peak load of approximately 90,000 MW, will begin operating to the proposed Standard on September 1, 2005 or as soon as practical following the Phase B review. (The team is awaiting positive confirmation from each Balancing Authority of their readiness to participate in the Field Trial as of the writing of this document)
- 12) After two weeks of operations under the Field Trial, the Phase C Balancing Authorities will provide the Standard Drafting Team (SDT) with their respective clock-minute data for the first two weeks of operations in the format described in Attachment A.
- 13) The SDT will evaluate the performance under the proposed Balancing Standard for participating Balancing Authorities, and will hold a conference call with the Resources Subcommittee, the RCWG, and the participating Balancing Authorities to present the results of the SDT's analysis.
- 14) During the conference call, the SDT will ask for feedback from the Balancing Authorities and the Reliability Coordinators on operations, including suggestions on how the Field Trial can be improved.
- 15) Based on the data and feedback provided back to the SDT, the SDT will determine if it should
  - a) Stop the Field Trial to make revisions to the procedures followed
  - b) Continue the Field Trial with monthly review of operations.

If a) is chosen, the participating Balancing Authorities will be directed to immediately cease operations under the Field Trial. The SDT will revise the procedures to be followed and then hold another conference call following steps 13, 14, and 15 above.

If b) is chosen, the participating Balancing Authorities will continue to provide, on a monthly basis, the one-minute data for the prior month's operations to the SDT by the 10<sup>th</sup> working day of following month in the CSV format provided in Attachment A. Operations under the Field Trial will be reviewed from that time forward on a monthly basis following steps 13, 14, and 15 above.

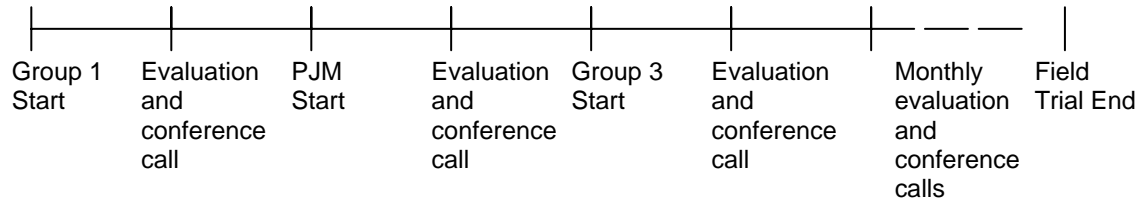
# Balance Resources and Demand Standard Proof-of-Concept Field Trial

## ATTACHMENT D

### Applicable Dates for the Balancing Authorities under the Field Trial

SDT= Standard Drafting Team; RS = Resources Subcommittee;

RCWG = Reliability Coordinator Working Group



**July 6, 2005 - Field Trial begins for Group 1** (ALTE, ALTW, CIN, EKPC, Entergy, MHEB, NIPS)

July 22, 2005 - Data for first 2 weeks of operations (July 6-19) provided to the SDT

July 27, 2005 - Conference call to review operations with SDT, RS and RCWG

**August 1, 2005 - Field Trial begins for PJM**

August 12, 2005 - Data for July 2005 provided by Group 1 (ten business days)

August 17, 2005 - Data for first 2 weeks of operations (Aug 1-14) provided by PJM

August 24, 2005 - Conference call to review operations with SDT, RS and RCWG

**September 1, 2005 - Field Trial begins for Group 3**

September 15, 2005 - Data for August 2005 provided by Group 1 and PJM (ten business days)

September 19, 2005 - Data for first 2 weeks of operations (Sept 1-14) provided by Group 3

September 29, 2005 - Conference call to review operations with SDT, RS and RCWG

October 14, 2005 - Data for September 2005 provided (conference call review TBD)

November 14, 2005 - Data for October 2005 provided (conference call review TBD)

December 14, 2005 - Data for November 2005 provided (conference call review TBD)

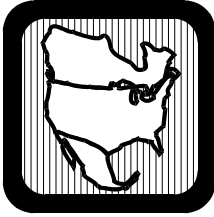
January 13, 2006 - Data for December 2005 provided (conference call review TBD)

February 14, 2006 - Data for January 2006 provided (conference call review TBD)

March 14, 2006 - Data for February 2006 provided (conference call review TBD)

March 31, 2006 – Participating Balancing Authorities cease operating under the Field Trial

April 14, 2006 - Data for March 2006 provided



## NORTH AMERICAN ELECTRIC RELIABILITY COUNCIL

Princeton Forrestal Village, 116-390 Village Boulevard, Princeton, New Jersey 08540-5731

June 20, 2005

Linda Campbell  
Chair of the Standards Authorization Committee

Dear Ms. Campbell,

### **BALANCE RESOURCES AND DEMAND DRAFT STANDARD PHASE II FIELD TEST WAIVER OF CPS2 COMPLIANCE**

Several months ago the Compliance and Certification Managers Committee reviewed the Balance Resources and Demand Standard Drafting Team's request for approval of its proof-of-concept field test. The Compliance and Certification Managers Committee agreed to waive compliance to CPS-2 measures for entities who participate in the proof-of-concept field test for the duration of the field test with concurrence of the NERC Operating Committee. The proof-of-concept field test is being phased in, with entities beginning participation on different dates.

The following entities have volunteered and have been approved for participation in the Balance Resources and Demand proof-of-concept field test. For the duration of their participation in the field test, these entities will not be held accountable for compliance with CPS-2, found in Standard BAL-001, Real Power Balancing Control Performance.

- Alliant Energy
- Cinergy
- East Kentucky Power Cooperative
- Entergy
- Manitoba Hydro
- Northern Indiana Public Service Company
- PJM
- Central and Southwest
- FirstEnergy
- Michigan Electric Coordinated Systems
- Nebraska Public Power District
- Tennessee Valley Authority ESO
- Wisconsin Energy Corporation

The Chair of the Balance Resources and Demand Standard Drafting Team, Raymond Vice, will provide us with prompt notification of the initiation and termination of the field test as well as any changes to this list of approved participating Balancing Authorities. Mr. Vice will send notice of these changes to the applicable Regional Managers for use in their Compliance Enforcement Programs.

Sincerely,  
Dave Hilt  
NERC VP – Compliance

Copy to: Regional Managers

A New Jersey Nonprofit Corporation

Phone 609-452-8060 ■ Fax 609-452-9550 ■ URL [www.nerc.com](http://www.nerc.com)