ERCOT Board Action

Proposed Protocol Language Revision

{ERCOT Comments 021604, PRS, and TAC revisions}

(The following shall be added to Section 5 of the Protocols)

5.8 Frequency Response Requirements and ~~Compliance~~ Monitoring

5.8.1 Generation Resource~~or~~ and QSE Participation~~Requirements~~

5.8.1.1 Governor in Service

At all times a Generation Resource ~~generating unit~~ is on line, its turbine governor shall remain in service and be allowed to respond to all changes in system frequency. Generation ~~Resources~~ Entities shall not reduce governor response on individual ~~units~~ Resources during abnormal conditions without ERCOT's ~~the~~ consent ~~of ERCOT~~ (conveyed by way of ~~their~~ Generation Entity's QSE) unless equipment damage is imminent.

5.8.1.2 Reporting

Generation ~~Resources~~Entities shall conduct applicable generating governor speed regulation tests on Resources as specified in the Operating Guides. Test results and/or other relevant information shall be reported to ERCOT, and ERCOT shall forward results to the appropriate TSPs.

~~Unit~~Resource governor modeling information required in the ERCOT Planning Criteria shall be determined from actual ~~unit~~ Resource testing described in the Operating Guides. Within thirty (30) days of ERCOT's request, the results of the latest test performed shall be supplied to ERCOT and the connected TSP.

When the governor of a ~~generationg unit~~Generation Resource is blocked while the ~~unit~~ Resource is operating, the QSE shall promptly inform ERCOT. The QSE shall also supply governor status logs to ERCOT upon request.

Any short-term inability of a ~~generating unit~~ Generation Resource to supply governor response shall be immediately reported to ERCOT.

If a Ggeneration Resource ~~unit The~~ tripsping ~~o~~Off -line ~~of a generating unit~~ due to governor response problems, the Generation Entity shall immediately report the change in the status of the ~~unit~~ Resource ~~should be immediately communicated~~ to ERCOT and the QSE.

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5.8.2 ~~QSE Portfolio Performance~~Primary Frequency Control Measurements

~~5.8.2.1 Definitions~~

~~A Point:~~ For the purposes of this section, tThe A Point is the last stable frequency value prior to a frequency disturbance. For a decreasing frequency event with the last stable frequency value of 60.000 Hz or below, the actual frequency is used. For a decreasing frequency event with the last stable frequency value between 60.000 and 60.036 Hz, 60.000 Hz will be used. For a decreasing frequency event with the last stable frequency value above 60.036 Hz, actual frequency will be used. For an increasing frequency event with the last stable frequency value of 60.000 or above, the actual frequency is used. For an increasing frequency event with the last stable frequency between 59.964 and 60.000 Hz, 60.000 Hz will be used. For an increasing frequency event with the last stable frequency value of 59.964 or below, the actual frequency is used. ERCOT shall determine the A Point frequency for each event.

~~C Point:~~ For the purposes of this section, tThe C Point is the lowest frequency value during the first five ~~few~~ [Delete "few" ~~because number of seconds is too difficult to quantify~~] seconds of the event ~~as determined by ERCOT.~~.

~~B Point:~~ For the purposes of this section, tThe B Point is the "recovery" frequency value after the C Point. The B Point should occur after full governor response of the turbines has occurred, usually between ten (10) and thirty (30) seconds after the A Point, but not greater than sixty (60) seconds after the A Point. ERCOT shall determine the B Point for each event.

B Point Plus Thirty Seconds: At thirty seconds following the B Point, an analysis will be ~~p~~performed [by ERCOT with the assistance of the appropriate ERCOT subcommittee~~Market Participant group~~] to determine if primary frequency control response is sustained.

For the purposes of this section, a "Measurable Event": is the ~~S~~sudden changes in ~~i~~interconnection ~~F~~frequency that will be evaluated for performance compliance will have i) a frequency B Point between 59.700 Hz and 59.900 Hz or between 60.100 Hz and 60.300 Hz, and ii) a difference between the B Point and the A Point greater than or equal to +/- 0.100 Hz.

5.8.2.21 ERCOT Required Primary Frequency Control Response~~Performance~~

The combined response of all ~~generators~~Generation Resources interconnected in ERCOT to a Measurable Event shall be at least 420 MW / 0.1 Hz. This value should be reviewed on an annual basis by ERCOT and the appropriate ~~stakeholderMarket Participant group~~ ERCOT subcommittee ~~PDCWG~~ for system interconnect reliability needs.

~~This 420 MW / 0.1 Hz totalcombined primary frequency control response requirement will be proportionally assigned to all generation portfoliosQSEsQSEs with generation,, by ratio shareproportionally, based on of each generation portfolioQSE's actual On-lineQSE's Scheduled gGeneration as compared to the sum of all actual oOn-line QSEs Scheduled Ggeneration during the interval including the time of the A Point of the event. Any Load that trips during an event that is included in a generations portfolioQSE'sQSE's response will be~~

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~~subtracted from the generations portfolioQSE'sQSE's total response. This measurementstandard applies to turbine response only.~~

ERCOT will evaluate, with the assistance of the appropriate ~~stakeholderMarket Participant group~~ERCOT subcommittee~~Performance Disturbance Compliance Working Group (PDCWG), QSE generation portfolioQSE proportional participation erformance toduring sudden changes in Interconnection~~ primary ~~F~~frequency control response during Measurable Events. The actual Generation Resource response ~~of each generation portfolioQSEQSE~~ will be compiled to determine if adequate primary frequency control participation was available~~ared to the ratio share of the 420 MW / 0.1 Hz combined response requirement assigned to that QSE~~.

ERCOT and the ~~PDCWG~~appropriate ~~Market Participant stakeholder group~~ ERCOT subcommittee will review each Measurable Event, verifying the reasonableness of data~~, and tabulating generation portfolioQSE participationQSE performance~~. Data that is in question may be requested from the QSE ~~representing the generation portfolioQSE~~ for comparison and/or individual Resource data may be retrieved from ERCOT's database.

~~A Ggeneration portfolio'sQSEQSE's participationerformance~~ERCOT's performance will be averaged using the most recent six (6) Measurable Events to determine ~~their~~its rolling average contribution~~performance~~.

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~~5.8.2.32 Frequency Response Obligation Transfers~~

~~A QSE, for the purpose to this Section, may enter into an agreement with a second QSE that provides that the second QSE shall be responsible for a portion of the required response during a Measurable Event. ERCOT and the PDCWG shall use the provisions of any such agreement when analyzing QSE performance during a Measurable Event, if the following conditions are all met:~~

~~The agreement is in effect during the Measurable Event;~~

~~All parties to the agreement have notified ERCOT, at least fifteen (15) days prior to the Measurable Event, of the term of the agreement; and.~~

~~(1) All parties certify to ERCOT the fixed amount of MW / 0.1 Hz response obligation that one QSE will assume on behalf of another QSE.~~

5.8.3 ERCOT Data Collection~~Requirements~~

5.8.3.1 Data Collection

ERCOT will collect all data necessary to analyze each Measurable Event. This will include the following real-time ~~two (2) second~~ data:

(1) Interconnection Frequency;

(2) ~~ERCOT~~ Regulation Service deployed;

(3) ~~ERCOT~~ Responsive Reserve Service deployed;

(4) QSE available ~~Physical~~ Responsive Reserve Service;

(5) QSE ~~T~~total Generation;

(6) QSE SCE;

(7) QSE Bias;

(8) QSE LaaR MW;

(9) LaaR ~~Response~~deployed;

(10) QSE Responsive ~~Spinning~~ Reserve Service; and,

(11) ERCOT Load and ~~I~~individual Resource(s) that contributed to the frequency deviation.

~~Compliance~~

~~ERCOT shall notify a QSE if that QSE's actual response during any Measurable Event is less than the ratio share of the 420 MW / 0.1 Hz combined response requirement assigned to that QSE.~~

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~~ERCOT may suggest to the QSE an appropriate frequency Bias setting for the QSE, if ERCOT believes the QSE bias setting in effect during the Measurable Event to be inappropriate.~~

~~In the event of the failure of any QSE to meet the requirements of this Section, when determined on the basis of a rolling average performance using the most recent six (6) Measurable Events, ERCOT shall notify The Market Oversight Division of the PUCT. The ERCOT Compliance Office shall use its Compliance Procedures to address such confirmed non-compliant performance. The term Compliance Procedures shall include all penalties, sanctions, or fines that may be adopted in the future regarding QSE portfolio frequency response.~~

PRR Evaluation	
Non-ERCOT Market Comparison	No Comparison conducted.
Comments Author	**Comments Summary**
Calpine	Agrees with 468PRR.
Oncor	Discusses conflicts between PRR and Operating Guides.
TXU	Agrees but has questions and feels it conflicts with existing Protocol language.
STEC/MEC	Has revisions.
ERCOT 1/21/04	Recommends revisions.
ERCOT 2/17/04	Recommends revisions for clarification and conformance to the Protocols.

Sponsor's Revision Description	Adds Section 5.8, establishing requirements for QSE portfolio generator governor response, and establishing performance monitoring criteria.
Sponsor's Reason for Revision	To ensure that the expected state of the system will be secure in the face of unexpected events, generator governor response, proportional to the frequency error, applied dynamically in seconds without Dispatch Instruction from ERCOT, is essential. Although mentioned in the ERCOT Operating Guides, existing Protocols are silent as to the obligation to maintain governors in service, and to respond to frequency excursions. This PRR is needed to ensure such response continues to be available to the system, limiting frequency error, and maintaining reliability.

ERCOT Protocols Revision Request

PRR Number	468PRR	PRR Title	Frequency Response Requirements and Monitoring
Status		Posted	
Protocol Section Requiring Revision		Section 5.8, Frequency Response Requirements and Compliance Monitoring	
Requested Resolution		Normal	
Revision Description		Adds Section 5.8, establishing requirements for QSE portfolio generator governor response, and establishing performance monitoring criteria.	
Reason for Revision		To ensure that the expected state of the system will be secure in the face of unexpected events, generator governor response, proportional to the frequency error, applied dynamically in seconds without Dispatch Instruction from ERCOT, is essential. Although mentioned in the ERCOT Operating Guides, existing Protocols are silent as to the obligation to maintain governors in service, and to respond to frequency excursions. This PRR is needed to ensure such response continues to be available to the system, limiting frequency error, and maintaining reliability.	

Timeline	
Date Received	9/22/03
Date Posted	9/22/03
Comments Due	10/13/03
PRS Review Date	10/23/03

ERCOT Protocols Revision Request

Proposed Protocol Language Revision

(The following shall be added to Section 5 of the Protocols)

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5.8 Frequency Response Requirements and Compliance Monitoring

5.8.1 Generator and QSE Requirements

5.8.1.1 Governor in Service

At all times a generating unit is on line, its turbine governor shall remain in service and allowed to respond to all changes in system frequency. Generation Resources shall not reduce governor response on individual units during abnormal conditions without the consent of ERCOT (conveyed by way of their QSE) unless equipment damage is imminent.

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5.8.1.2 Reporting

Generation Resources shall conduct applicable generating governor speed regulation tests as specified in the Operating Guides. Test results and/or other relevant information shall be reported to ERCOT, and ERCOT shall forward results to the appropriate TSPs.

Unit governor modeling information required in the ERCOT Planning Criteria shall be determined from actual unit testing described in the Operating Guides. Within thirty (30) days of ERCOT's request, the results of the latest test performed shall be supplied to ERCOT and the connected TSP.

When the governor of a generating unit is blocked while the unit is operating, the QSE shall promptly inform ERCOT. The QSE shall also supply governor status logs to ERCOT upon request.

Any short-term inability of a generating unit to supply governor response shall be immediately reported to ERCOT.

The tripping off line of a generating unit due to governor response problems should be immediately communicated to ERCOT and the QSE.

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5.8.2 QSE Portfolio Performance

5.8.2.1 Definitions

A Point: The A Point is the last stable frequency value prior to a frequency disturbance. For a decreasing frequency event with the last stable frequency value of 60.000 Hz or below, the actual frequency is used. For a decreasing frequency event with the last stable frequency value between 60.000 and 60.036 Hz, 60.000 Hz will be

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used. For a decreasing frequency event with the last stable frequency value above 60.036 Hz, actual frequency will be used. For an increasing frequency event with the last stable frequency value of 60.000 or above, the actual frequency is used. For an increasing frequency event with the last stable frequency between 59.964 and 60.000 Hz, 60.000 Hz will be used. For an increasing frequency event with the last stable frequency value of 59.964 or below, the actual frequency is used. ERCOT shall determine the A Point frequency for each event.

C Point: The C Point is the lowest frequency value during the first few seconds of the event.

B Point: The B Point is the "recovery" frequency value after the C Point. The B Point should occur after full governor response of the turbines has occurred, usually between 10 and 30 seconds after the A Point, but not greater than 60 seconds after the A Point. ERCOT shall determine the B Point for each event.

Measurable Event: Sudden changes in Interconnection Frequency that will be evaluated for performance compliance will have i) a frequency B Point between 59.700 Hz and 59.900 Hz or between 60.100 Hz and 60.300 Hz, and ii) a difference between the B Point and the A Point greater than or equal to +/- 0.100 Hz.

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5.8.2.2 Required Performance

The combined response of all generators interconnected in ERCOT to a Measurable Event shall be at least 420 MW / 0.1 Hz.

This 420 MW / 0.1 Hz combined response requirement will be proportionally assigned to all QSEs, by ratio share of each QSE's Scheduled Generation as compared to the sum of all QSEs Scheduled Generation during the interval including the time of the A Point of the event. Any Load that trips during an event that is included in a QSE's response will be subtracted from the QSE's total response. This standard applies to turbine response only.

ERCOT will evaluate, with the assistance of the Performance Disturbance Compliance Working Group (PDCWG), QSE portfolio performance to sudden changes in Interconnection Frequency during Measurable Events. The actual response of each QSE will be compared to the ratio share of the 420 MW / 0.1 Hz combined response requirement assigned to that QSE.

ERCOT and the PDCWG will review each Measurable Event, verifying the reasonableness of data, and tabulating QSE performance. Data that is in question may be requested from the QSE for comparison and/or individual Resource data may be retrieved from ERCOT's database.

QSE performance will be averaged using the most recent six (6) Measurable Events to determine their rolling average performance.

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5.8.2.3 Frequency Response Obligation Transfers

A QSE, for the purpose to this Section, may enter into an agreement with a second QSE that provides that the second QSE shall be responsible for a portion of the required response during a Measurable Event. ERCOT and the PDCWG shall use the provisions of any such agreement when analyzing QSE performance during a Measurable Event, if the following conditions are all met:

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(1) The agreement is in effect during the Measurable Event;

(2) All parties to the agreement have notified ERCOT, at least fifteen (15) days prior to the Measurable Event, of the term of the agreement; and,

(3) All parties certify to ERCOT the fixed amount of MW / 0.1 Hz response obligation that one QSE will assume on behalf of another QSE.

5.8.3 ERCOT Requirements

5.8.3.1 Data Collection

ERCOT will collect all data necessary to analyze each Measurable Event. This will include the following two (2) second data:

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(1) Interconnection Frequency;

(2) ERCOT Regulation deployed;

(3) ERCOT Responsive deployed;

(4) QSE Physical Responsive Reserve;

(5) QSE Total Generation;

(6) QSE SCE;

(7) QSE Bias;

(8) QSE LaaR MW;

(9) LaaR Response;

(10) QSE Spinning Reserve; and,

(11) ERCOT Load and Individual Resource(s) that contributed to the frequency deviation.

5.8.3.2 Compliance

ERCOT shall notify a QSE if that QSE's actual response during any Measurable Event is less than the ratio share of the 420 MW / 0.1 Hz combined response requirement assigned to that QSE.

ERCOT may suggest to the QSE an appropriate frequency Bias setting for the QSE, if ERCOT believes the QSE bias setting in effect during the Measurable Event to be inappropriate.

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In the event of the failure of any QSE to meet the requirements of this Section, when determined on the basis of a rolling average performance using the most recent six (6) Measurable Events, ERCOT shall notify The Market Oversight Division of the PUCT. The ERCOT Compliance Office shall use its Compliance Procedures to address such confirmed non-compliant performance. The term Compliance Procedures shall include all penalties, sanctions, or fines that may be adopted in the future regarding QSE portfolio frequency response.

(End of Revision)

Sponsor	
Name	Fred Sherman (on behalf of the Reliability and Operations Subcommittee)
E-mail Address	fsherman@ci.garland.tx.us
Company	Garland Power & Light
Company Address	
Phone Number	
Fax Number	

Note 1: Statements from Policies and related appendices that have been moved to Version 0 Standards have been highlighted and the new Version 0 location has been identified as: 1.0 moved to Version 0 Standard 001, Requirement 1, (Simplified as 1.0 to 001, R1). Un-highlighted statements have not been included in Version 0 Standards.

Note 2: In the Version 0 standards, policy statements have been changed to "active voice" wording, and entity titles have been changed to reflect the Functional Model. Other wording changes are intended to be clarification of meaning only.

Policy 1 – Generation Control and Performance

Version 2

Policy Subsections

A. **Control Performance Standard**
B. **Disturbance Control Standard**
C. **Frequency Response and Bias**
D. **Time Control Standard**
E. **Automatic Generation Control Standard**
F. **Inadvertent Interchange Standard**
G. **Surveys Standard**

Introduction

Each CONTROL AREA shall have access to and/or operate resources to provide for a level of OPERATING RESERVE sufficient to account for frequency support, errors in load forecasting, generation loss, transmission unavailability, and regulating requirements. Sufficient OPERATING RESERVES is defined as the capacity required to meet the Control Performance Standard (Section A), Disturbance Control Standard (Section B), and Frequency Response Standard (Section C) of this Policy.

A. Control Performance Standard

[Appendix 1A, "Area Control Error (ACE) Equation"]
["Performance Standard Reference Document"]

Introduction

The CONTROL AREA balance between demand and supply (generation plus INTERCHANGE) is measured by its AREA CONTROL ERROR (ACE). Because supply and demand change unpredictably, there will often be a mismatch between them, resulting in non-zero ACE.

The Control Performance Standard (CPS) establishes the statistical boundaries for ACE magnitudes, ensuring that steady-state frequency is statistically bounded around its scheduled value. Each CONTROL AREA must achieve at least the minimum performance required by the CPS. CPS1 defines the permissible distribution of all CONTROL AREAS' ACEs in an INTERCONNECTION and is based on expected frequency performance within that individual INTERCONNECTION. CPS2 limits the magnitude of the impact that a CONTROL AREA places on its respective INTERCONNECTION. Values controlling the effects of CPS are set by the Resources Subcommittee.

1. **Monitoring.** Each CONTROL AREA shall monitor its control performance against two Standards: CPS1 and CPS2.

   (Section 1.1 and included formulae were moved to Version 0 Standard 001 Requirement 1)

Policy 1 – Generation Control and Performance

A. Control Performance Standard

Note: for simplicity, identification of new location will be: (1.1 and formulae to 001, R1)

1.1. **Control Performance Standard (CPS1).** On a rolling 12-month basis, the average of the clock-minute averages of a CONTROL AREA'S ACE divided by 10B (B is the clock-minute average of the CONTROL AREA'S frequency bias) times the corresponding clock-minute averages of the INTERCONNECTION'S FREQUENCY ERROR shall be less than a

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

specific limit. This limit ϵ_1^2 is a constant derived from a targeted frequency bound (separately calculated for each INTERCONNECTION) reviewed and set as necessary by the NERC Resources Subcommittee. [See the **"Performance Standard Reference Document"** for application for variable frequency bias.]

(1.2 and formulae moved to 001, R2)

1.2. **Control Performance Standard (CPS2).** The average ACE for at least 90% of clock-ten-minute periods (6 non-overlapping periods per hour) during a calendar month must be within a specific limit, referred to as L_{10}. [See the **"Performance Standard Reference Document,"** for the methods for calculating L_{10}.]

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

where:

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

ϵ_{10} is a constant derived from the targeted frequency bound. It is the targeted RMS of ten-minute average frequency error from schedule based on frequency performance over a given year. The bound, ϵ_{10}, is the same for every control area within an interconnection.

(2. CPS1 section to 001, Measure M1)

2. **Control Performance Standard (CPS) Compliance.** (CPS1 section to 001, Measure 1) Each CONTROL AREA shall achieve, as a minimum, CPS1 compliance of 100% and (CPS2 section to 001, Measure 2) CPS2 compliance of 90% [See the **"Performance Standard Reference Document," Section C**].

2.1. **CONTROL AREAS Participating in SUPPLEMENTAL REGULATION SERVICE.** A CONTROL AREA providing or receiving SUPPLEMENTAL REGULATION SERVICE through DYNAMIC TRANSFER shall continue to be evaluated on the characteristics of its own ACE with the SUPPLEMENTAL REGULATION SERVICE included.

(2.2 to 001, R3)

2.2. **CONTROL AREAS Providing OVERLAP REGULATION SERVICE.** A CONTROL AREA providing OVERLAP REGULATION SERVICE shall evaluate CPS1 and CPS2 using the characteristics of the combined CONTROL AREAS' ACE and combined FREQUENCY BIAS SETTINGS.

(2.3 to 001, R4)

2.3. **CONTROL AREAS Receiving OVERLAP REGULATION SERVICE.** A CONTROL AREA receiving OVERLAP REGULATION SERVICE shall not have its control performance

evaluated (i.e. from a control performance perspective, the CONTROL AREA has shifted all control requirements to the CONTROL AREA providing overlap regulation).

B. Disturbance Control Standard

[Appendix 1A – Area Control Error Equation]
[Performance Standard Reference Document]

Introduction

The CONTROL AREA demand-supply balance will quickly change following the sudden loss of load or generation failure. This results in a sudden change in the CONTROL AREA'S ACE, and also a change in INTERCONNECTION frequency. The Disturbance Control Standard measures the CONTROL AREA'S ability to utilize its CONTINGENCY RESERVES following a REPORTABLE DISTURBANCE. Because generator failures are far more common than significant losses of load and because CONTINGENCY RESERVE activation does not typically apply to the loss of load, the application of the Disturbance Control Standard is limited to the loss of supply and does not apply to the loss of load.

Each CONTROL AREA shall have access to and/or operate resources to provide for a level of CONTINGENCY RESERVE sufficient to meet the DCS performance standards.

(Introductory statement concerning Reserve Sharing Groups has been moved to 001, R1)

RESERVE SHARING GROUPS shall have the same responsibilities and meet the same obligations as individual CONTROL AREAS with regards to monitoring and meeting the Disturbance Control Standard.

Standards

(1. to 002, R1)

1. **CONTINGENCY RESERVES.** Each CONTROL AREA shall have access to and/or operate CONTINGENCY RESERVES to respond to DISTURBANCES. This CONTINGENCY RESERVE is that part of the OPERATING RESERVES that is available, following loss of resources by the CONTROL AREA, to meet the Disturbance Control Standard (DCS). CONTINGENCY RESERVE may be supplied from generation, controllable load resources, or coordinated adjustments to INTERCHANGE SCHEDULES.

(1.1 to 002, R2)

1.1. **CONTINGENCY RESERVE Accounting.** The same portion of RESOURCE CAPACITY shall not be counted by more than one entity (e.g. reserves from jointly owned generation) as part of its CONTINGENCY RESERVES.

(1.2 to 002, R2)

1.2. **REGIONAL CONTINGENCY RESERVE Policies.** Each Region, subregion or RESERVE SHARING GROUP shall specify its CONTINGENCY RESERVE policies, including the minimum reserve requirement for the group, its allocation among members, the permissible mix of OPERATING RESERVE – SPINNING and OPERATING RESERVE – SUPPLEMENTAL that may be included in CONTINGENCY RESERVE, and the procedure for applying CONTINGENCY RESERVE in practice, and the limitations, if any, upon the amount of interruptible load that may be included.

(2. to 002, R3)

2. **CONTINGENCY RESERVE to meet Disturbance Control Standard.** Each CONTROL AREA or RESERVE SHARING GROUP shall activate sufficient CONTINGENCY RESERVE to comply with the

NERC Disturbance Control Standard. As a minimum the CONTROL AREA, or RESERVE SHARING GROUP, shall carry at least enough CONTINGENCY RESERVES to cover the MOST SEVERE SINGLE CONTINGENCY.

(2.1 to 002, R3

2.1. Contingency review. All RESERVE SHARING GROUPS and CONTROL AREAS shall at least annually review their probable contingencies to determine their prospective MOST SEVERE SINGLE CONTINGENCIES.

(2.2 to 002, R4)

2.2. Disturbance Control Standard Compliance. When a CONTROL AREA or RESERVE SHARING GROUP experiences a REPORTABLE DISTURBANCE (SEE 2.4), it is compliant with the Disturbance Control Standard when the DISTURBANCE RECOVERY CRITERION is met within the DISTURBANCE RECOVERY PERIOD. Each CONTROL AREA or RESERVE SHARING GROUP shall meet the Disturbance Control Standard (DCS) 100% of the time for REPORTABLE DISTURBANCES.

(2.2 1 to 002, R4)

2.2.1. DISTURBANCE RECOVERY CRITERION. The CONTROL AREA shall return its ACE to zero if its ACE just prior to the DISTURBANCE was positive or equal to zero. For negative initial ACE values just prior to the DISTURBANCE, the ACE must return to its pre-disturbance value. The default performance criterion described above may be adjusted to better suit the needs of an INTERCONNECTION based on analysis approved by the NERC Resources Subcommittee and the NERC Operating Committee.

(2.2.2 to 002, R4)

2.2.2. DISTURBANCE RECOVERY PERIOD. The default DISTURBANCE RECOVERY PERIOD is 15 minutes after the start of a REPORTABLE DISTURBANCE. This period may be adjusted to better suit the needs of an INTERCONNECTION based on analysis approved by the NERC Resources Subcommittee and the NERC Operating Committee.

(2.3 to 002, R5)

2.3. RESERVE SHARING GROUP. Each RESERVE SHARING GROUP shall comply with the Disturbance Control Standard. A RESERVE SHARING GROUP shall be considered in a DISTURBANCE condition whenever a group member has experienced a REPORTABLE DISTURBANCE and calls for the activation of CONTINGENCY RESERVES from one or more other group members. (If a group member has experienced a REPORTABLE DISTURBANCE condition but does not call for reserve activation from other members of the RESERVE SHARING GROUP, then that member shall report as a single CONTROL AREA.) Compliance may be demonstrated by either of the following two methods:

(2.3.1 to 002, R5)

2.3.1. Group compliance to Disturbance Control Standard. The RESERVE SHARING GROUP reviews group ACE (or equivalent) and demonstrates compliance to the DCS. To be in compliance, the group ACE (or its equivalent) must meet the DISTURBANCE RECOVERY CRITERION after the schedule change(s) related to reserve sharing have been fully implemented, and within the DISTURBANCE RECOVERY PERIOD.

(2.3.2 to 002, R5)

2.3.2. Group member compliance to Disturbance Control Standard. The RESERVE SHARING GROUP reviews each member's ACE in response to the activation of reserves. To be in compliance, a member's ACE (or its equivalent) must meet the DISTURBANCE RECOVERY CRITERION after the schedule change(s) related to reserve sharing have been fully implemented, and within the DISTURBANCE RECOVERY PERIOD. [See Requirement 2.2.2 above.]

(2.4 through 2.5.3 have been moved to 002, Supporting Notes)

2.4. Reportable Disturbances. REPORTABLE DISTURBANCES are contingencies that are greater than or equal to 80% of the MOST SEVERE SINGLE CONTINGENCY loss. Regions may optionally reduce the 80% threshold, provided that normal operating characteristics are not being considered or misrepresented as contingencies. Normal operating characteristics are excluded because DCS only measures the recovery from sudden, unanticipated losses of supply-side resources.

2.5. Treatment of Multiple Contingencies.

2.5.1. Simultaneous Contingencies. Multiple contingencies occurring within one minute or less of each other shall be treated as a single contingency. If the combined magnitude of the multiple contingencies exceeds the MOST SEVERE SINGLE CONTINGENCY, the loss shall be reported, but excluded from compliance evaluation.

2.5.2. Multiple Contingencies within the REPORTABLE DISTURBANCE period. Additional contingencies that occur after one minute of the start of a Reportable Disturbance but before the end of the DISTURBANCE RECOVERY PERIOD can be excluded from evaluation. The CONTROL AREA or RESERVE SHARING GROUP shall determine the DCS compliance of the initial REPORTABLE DISTURBANCE by performing a reasonable estimation of the response that would have occurred had the second and subsequent contingencies not occurred.

2.5.3. Multiple Contingencies within the CONTINGENCY RESERVE RESTORATION PERIOD. Additional Reportable Disturbances that occur after the end of the DISTURBANCE RECOVERY PERIOD but before the end of the CONTINGENCY RESERVE RESTORATION Period shall be reported and included in the compliance evaluation. However, the CONTROL AREA or RESERVE SHARING GROUP can request a waiver from the Resources Subcommittee for the event if the contingency reserves were rendered inadequate by prior contingencies and a good faith effort to replace contingency reserve can be shown.

(3. to 002, R6)

3. Restoration of Reserves. Each Control Area must fully restore its CONTINGENCY RESERVES within the CONTINGENCY RESERVE RESTORATION PERIOD for its INTERCONNECTION.

(3.1 to 002, R6)

3.1. Start of CONTINGENCY RESERVE RESTORATION PERIOD. The CONTINGENCY RESERVE RESTORATION PERIOD begins at the end of the DISTURBANCE RECOVERY PERIOD.

(3.2 TO 002, R6)

3.2. CONTINGENCY RESERVE RESTORATION PERIOD. The CONTROL AREA or RESERVE SHARING GROUP shall restore its CONTINGENCY RESERVES within 90 minutes. This

period may be adjusted to better suit the reliability targets of the INTERCONNECTION based on analysis approved by the NERC Resources Subcommittee.

(4. to 002, Levels of non compliance)

4. **Disturbance Control Performance Adjustment.** Each CONTROL AREA or RESERVE SHARING GROUP *not meeting the Disturbance Control Standard* during a given calendar quarter shall increase its CONTINGENCY RESERVE obligation for the calendar quarter (offset by one month) following the evaluation by the Region and/or the NERC Resources Subcommittee. [e.g. For the first calendar quarter of the year, the penalty is applied for May, June, and July.] The increase shall be directly proportional to the non-compliance with the Disturbance Control Standard in the preceding quarter. This adjustment is not compounded across quarters, and is an additional percentage of reserve needed beyond the MOST SEVERE SINGLE CONTINGENCY. A RESERVE SHARING GROUP may choose an allocation method for increasing its CONTINGENCY RESERVE for the RESERVE SHARING GROUP provided that this increase is fully allocated. [See the "**Performance Standard Reference Document**," Section C.]

(5. to 002, Levels of non compliance)

5. **Reserve Policy Compliance Documentation.** A representative from each CONTROL AREA or RESERVE SHARING GROUP that was non-compliant in the calendar quarter most recently completed shall provide written documentation verifying that the CONTROL AREA or RESERVE SHARING GROUP will apply the appropriate Disturbance Control Performance Adjustment beginning the first day of the succeeding month, and will continue to apply it for three months. The written documentation shall accompany the quarterly Disturbance Control Standard Report when a CONTROL AREA or RESERVE SHARING GROUP is non-compliant.

1-3 Please identify and produce all documents, tangible things, reports, models and data compilations provided to, reviewed by, or prepared by or for testifying experts concerning the issues set forth in the NOV or Jaussaud memorandum in anticipation of the expert's testimony.

Response

No testifying expert has been designated in this case. If a testifying expert is designated, Staff will file supplemental responses in accordance with the Agreed Modifications to Discovery Procedures.

Documents produced in response to other requests for information may be responsive, in part, to this request.

Response prepared by Shelah Cisneros.

Staff's 7th Supplemental Response to IPA Parties' RFI 1-3

On June 4, 2008, Staff designated Danielle Jaussaud as an expert witness in this case.

Please see the Direct Testimony of Danielle Jaussaud, filed June 4, 2008 (including attachments) and responses to discovery requests filed in this docket for a general explanation of the documents, tangible things, reports, models and data compilations provided to, reviewed by, or prepared by me in anticipation of testimony. Documents produced in response to other requests for information, including Staff's responses to IPA Parties' First RFI to Staff, Question No. 1-4, are responsive to this request.

Documents will be made available subject to the General Conditions of Response. Responsive documents (both confidential and nonconfidential) are voluminous and will be made available for review or copying at a mutually convenient time at the voluminous document room designated by Staff at 1701 North Congress Avenue, Austin, Texas 78711. Confidential documents will be made available subject to a protective order.

The first section of the responsive voluminous nonconfidential documents is marked "Documents Previously Marked as Privileged" and references 192 documents that Staff had previously marked as privileged, but for which Staff is no longer asserting privilege. The nonconfidential voluminous response begins with a list of the documents, followed by each document in order. Confidential documents are located in the confidential voluminous response and will be made available subject to a protective order. The documents previously withheld are each numbered (in handwriting in the bottom right corner of the first page) and are responsive to IPA Parties' First RFIs to Staff, question numbers: RFI 1-1 (items nos. 1 through 24), RFI 1-2 (item nos. 25 through 97), RFI 1-4 (item nos. 98 through 154), RFI 1-5 (item nos. 155 through 156), RFI 1-6 (item nos. 157 through 191); and RFI 1-8 (item no. 192). In releasing these documents, Staff does not waive any claims of privilege to other documents withheld in accordance with Staff's objections filed in this docket.

The second section of the voluminous confidential and nonconfidential documents are marked by divider sheets titled "Other Voluminous Documents" and contain other responsive documents.

The voluminous confidential material includes four disks of data responsive to this request and will be made available subject to a protective order. A description of the disks follows.

- Data attachments related to the documents Staff had previously marked as privileged, but for which Staff is no longer asserting privilege are on a disk marked "Data for 192 documents."
- Final penalty calculations on a disk marked "Revised Penalty Calculation."
- Data reviewed relating to the January 2006 Frequency Events and IPA's Governor Response during these events are provided on a disk marked "January 2006 Frequency Events."
- Data reviewed but not used in testimony are provided on a disk marked "IPA data not used in testimony."

In accordance with Staff's Statement of Compliance with Paragraph 8 of the Agreed Modifications to Discovery Procedures, filed June 4, 2008, a printed listing of articles authored by Danielle Jaussaud is provided in the nonconfidential voluminous response, as an attachment to the June 10, 2008 email from Danielle Jaussaud to Paul Curtis. The title of the attachment is "Papers and Presentations of Danielle Jaussaud."

Sponsoring Witness: Danielle Jaussaud

Supplemental Response Preparers: Carrie R. Tournillon and Paul Curtis

P-32128 – Investigation into ANP's failure to provide governor response.
April 18, 2005

Phone discussion with Mark Henry, ERCOT Compliance

BACKGROUND:
In its response to ERCOT, ANP stated that the governors on its units had been turned off at the time the plants went into commercial operations in 2000-2002. ANP recognized that this was a violation of the Protocols ("it was incorrectly assumed that the units did not have an obligation to participate in the provision of frequency response") and offered a plan to get into compliance in the next 4 months. A number of things have to be done with the units shut down in order to get the units into compliance with the Protocol requirements regarding governor response: evaluation of operations, testing, work program with the manufacturer, etc. All these things should have been done at the time of commissioning.

GENERAL DISCUSSION OF GOVERNOR RESPONSE.
ANP indicated that it had not been providing a bias signal to ERCOT, and volunteered to remedy this situation by asking its QSE to start providing the proper signal (10 units, 2 plants located at Midlothian and Hays.) The bias setting on a machine indicates to ERCOT how the governor of that machine responds to a frequency disturbance. ERCOT uses that information to make adjustment to a QSE's SCE calculation, to take into account the governor response in the SCE calculation.

Every machine in ERCOT is expected to provide some governor response. If there is room for the unit to move, the governor will adjust the output of the machine in response to a change in frequency. Thus, with a 5% droop, (which is standard,) the generator will increase/decrease production by 10% of its total output capability in response to a 0.3 Hz change in frequency. For each generator, a deadband of 0.36 Hz is set, (also a NERC standard,) meaning that when a frequency change is within 0.36 Hz, the generator does not respond.

ERCOT can see when a company's bias signal indicates no change in generation in response to a frequency disturbance. This can also sometimes be checked during an audit. ERCOT is planning to audit ANP in a few months and may bring that date forward given the circumstances.

Currently, ERCOT does not have its own employees checking on governor response. The Performance Disturbance Compliance Working Group (PDCWG), a group of stakeholder reliability experts, reviews governor response after a frequency disturbance and informs ERCOT of the deficiencies they find. Two ERCOT employees attend the group's meetings. ERCOT is planning to do this work internally some time in the future, but does not have the resources to do it now.

ANP CASE

ANP stated: "most of the people who were involved in the plant construction and commissioning have now left..." "...As far as I can establish, frequency sensitive operation was "turned off" in the control system at this time (i.e. at the time of plant commissioning.)

Mark Henry believes that, according to the data he has been looking at, some governor response was there, but the units were just not moving as expected and the response was not sustained. MH will require ANP to explain why they think the governor was turned off, he thinks it was not. He explained that ERCOT will post ANP for failure to provide its bias setting to ERCOT, which he stated is a clear violation of the Protocols. As far as failure to provide governor response, or to provide adequate governor response, ERCOT at this time does not think it would be on firm ground saying that it is a violation. MH explained that the Protocols are not clear in this regard, there is a "gap" regarding what is required of individual machines, there is no clear expectation. When ERCOT detects that there is no governor response from the QSE, it asks the QSE to explain. It could be that the unit was at its high (low) operating limit and could not move in the desired direction. It could be that the data provided by the QSE was not good: inaccurate HOL or LOL that made it look like the unit should have responded when it could not. It could be some other complicated issue related to a control situation. Only the QSE can explain, and ERCOT can't check their response because it does not have a QSE measurement to monitor governor capability. Hence ERCOT's reluctance to charge ANP (or anyone) with a violation related to a failure to provide adequate governor response.

MH's last word was that the PDCWG is working on that.

I am not happy about ERCOT's hesitations to charge ANP with failure to provide expected governor response and failure to keep its units' governors in service. Add to that the failure to inform ERCOT that its governor was not in service, another clear Protocol requirement. ANP has a plan to get into compliance, that will require a number of activities, including testing, evaluation of operations under different system conditions, consultations with the manufacturer, all of which should have been done at the time of the plant commissioning in order to place the governors in service. I will attend the PDCWG meeting tomorrow morning and meet again with ERCOT compliance to look at the data MH has mentioned, and understand their position better.

From: Henry, Mark [mailto:mhenry@ercot.com]
Sent: Monday, May 01, 2006 4:46 PM
To: Jaussaud, Danielle
Subject: RE: confidential - questions on governor response

1) ANP is providing a bias, which appears to be a fixed value that appears once frequency crosses a deadband. It began to show up in our PI records on April 27th.

2) Here's what I would say, although your statements are valid considering the way ERCOT analyzes performance:

"without a frequency bias signal from each QSE, ERCOT systems do not properly evaluate the impact of QSE portfolio governor action on SCE or spinning reserves during frequency deviations. Furthermore, lack of a bias complicates analysis of the primary response from generators' governors for ERCOT as a whole and for a particular QSE."

MRH

(512) 225-7021

From: Jaussaud, Danielle
Sent: Monday, May 01, 2006 11:07
To: Henry, Mark
Subject: confidential - questions on governor response

Mark:

It would greatly help me if you could answer some technical questions regarding ANP's governor response case.

1. ANP indicated that it would work with its QSE to provide ERCOT a real time frequency bias signal by the middle of April. Can you tell me if the ANP QSE is now providing frequency bias data in real time for its on-line resources? And if so, when did it start providing these data?
2. Is the following statement technically correct:
"without a frequency bias signal from each QSE, ERCOT cannot properly evaluate whether primary response from generators' governors is appropriate for ERCOT as a whole and for a particular QSE." And if not, how would you re-word this statement?

Thanks a lot.

Danielle Jaussaud

Memorandum

To: Paul Curtis

From: Danielle Jaussaud

Date: February 12, 2008

Subject: Reporting on a discussion I had with Texas Regional Entity staff regarding enforcement of the Governor in Service requirement in the ERCOT Protocols.

On February 5, 2008, I met with Larry Grimm, Susan xxx, and Jeff Whitmer of the Texas Regional Entity. The purpose of the meeting was to discuss NPRR 097, relating to Protocol compliance and performance metrics under Nodal. During the discussion, the issue of compliance with the Governor in Service requirement came up and after discussing the performance of two market participants I asked Larry Grimm why ERCOT Compliance had never issued a Notice of Protocol Violation to ANP (now IPA) following the July 19, 2005 frequency event when ERCOT Compliance sent a message to ANP requesting an explanation of why ANP did not provide a frequency response on that occasion, and requesting a mitigation plan. Larry Grimm and Jeff Whitmer responded that the Protocols did not give them the tools they needed to enforce the Protocol requirements relating to Frequency Response. I pointed out that ANP Vice President Tina Bennett had admitted in a letter to ERCOT dated January 31, 2006, and again on April 7, 2006, that the ANP units had their frequency response function turned off shortly after the beginning of commercial operations, and I asked them why they did not consider that sufficient evidence of Protocol violation. They maintained their position. I also reminded them that John Adams had specifically instructed ANP to confirm that the governor was in service and set to 5% droop, and had agreed to postpone testing until after the manufacturer devise a test procedure applicable to ANP's technology, which was never done. They responded that Adams should have given them a deadline and should have followed up. When I enquired why they cited ANP for failure to provide a frequency bias signal, they responded that in that case, the performance metrics provided in the Protocols to detect the presence of a frequency bias signal was sufficient for them to carry out enforcement. I then asked them if they were aware that the frequency bias signal ANP provided starting April 17, 2006 was from a plant other than an ANP plant, and whether there was any technical justification they could think of for doing that. They expressed surprise and responded that they could not think of any technical justification. The discussion of ANP ended at that point.

January 12, 16, 25, 29, and 30, 2006.[38] From IPA's admission, we know that these MW outputs or reductions were not due to Governor Response, and from the ERCOT data, we know that they did not reflect a 5% droop. From the data, we also know that they were not sustained for at least 30 seconds after the B point,[39] and therefore did not satisfy the requirements of the Protocols and Operating Guides relating to governor in service. From ERCOT Compliance's point of view, however, these partial responses should have been included in the Frequency Bias term of the SCE equation but were not. Mr. Henry wrote:

> ERCOT Compliance will post this finding unless ANP provides further written information within 10 calendar days indicating why this lack of frequency bias was not a violation of the above Protocols and Operating Guides requirements."

IPA did not provide such information, thereupon ERCOT cited IPA for failing to comply with the Protocols' Frequency Bias requirement of § 6.5.1.1(1)(e).

Q. How is it possible that the IPA units generated some output in response to frequency changes when their Frequency Response controls had been turned off?

A. I have learned that there are at least two methods for providing Frequency Response. One is through the Turbine Governor or Frequency Regulation controls with

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[37] Mr. Henry's letters dated May 17 and June 2, and Ms. Bennett's May 31 letter are provided in Attachment # 11, 12, and 13.

[38] See January 2006 data in spreadsheet provided in Attachment # 19. In particular, see the columns entitled: "MW Response at Point B", and "MW Response at Point B+30". Compare with columns entitled "Expected MW Response at Point B" and "Expected MW Response at Point B+30)". Note that on January 29, the response was actually sustained. On three other dates, the response at Point B+30 was zero.

[39] The B-point occurs approximately 15 to 20 seconds after the A point, which marks the beginning of the frequency excursion. Governor Response is measured at the B point and again at the B+30 second point.

2-23. Please list by date every Performance Disturbance Control Working Group meeting attended by any Commission Staff member, as well as witness who will testify on your behalf, between January 31, 2001 to December 31, 2006.

Response

This response is subject to the General Conditions of Response.

Prior to June 2006, Staff did not attend the meetings of the Performance Disturbance Compliance Working Group (PDCWG) regularly and no record of Staff attendance has been retained by Staff. During the period between June 2006 and August 2006, all the monthly PDCWG meetings were regularly attended by Danielle Jaussaud. Exact dates of the meetings during that specific period are not available. Ms. Jaussaud may have attended the whole meetings or only part of the meetings, depending upon her other obligations. From September 2006 to December 2006, Ms. Jaussaud attended PDCWG meetings on the following dates: 9/26, 9/27, 10/26, and 12/5.

Response prepared by Danielle Jaussaud.

5-2. Please list by date all PDCWG meetings Ms. Jaussaud has attended.

Response

Please refer to Staff's response to IPA RFI No. 2-23 for dates of meetings attended between June 2006 and December 2006. In 2007, Ms. Jaussaud attended PDCWG meetings on 2/20, 2/21, 3/13, 3/14, 4/10, 4/11, 5/22, 8/14, 8/15, 9/11, 9/12, and 10/9.

Response prepared by: Danielle Jaussaud and Paul Curtis

Sponsoring witness: Danielle Jaussaud

5-21. Please state whether Protocols § 5.8.1.2 in effect during the penalty period provides for a specific manner of communicating to ERCOT that a generating entity has blocked its governor.

Response

Yes, it does: Promptly, through its QSE.

Response prepared by: Danielle Jaussaud and Paul Curtis

Sponsoring witness: Danielle Jaussaud

1-22 Please identify all other enforcement actions or other penalty proceedings in which the Commission Staff has sought a penalty for a failure to respond to an e-mail request for information.

Response

Staff has not identified, after diligent search, any documents that are responsive to this request.

Response prepared by Shelah Cisneros with information from Danielle Jaussaud

Staff's 7th Supplemental Response to IPA Parties' RFI 1-22

Sponsoring Witness: Danielle Jaussaud

Supplemental Response Preparers: Carrie R. Tournillon and Paul Curtis

PRODUCTION REQUESTS

4-5. Admit or deny that for a QSE that is not able to provide frequency response, a zero frequency bias signal is the appropriate frequency bias reading to be sent to ERCOT. If you cannot fully admit, please explain the basis why you cannot do so.

Original Response

Staff has objected to this question as vague and because it calls for speculation. Subject to those objections and Staff's General Objections filed on pages 2 through 5 of its Objections pleading, Staff provides the following response:

This question is misleading. It incorrectly assumes that a generating entity that disables the frequency controls of its turbines does not provide any frequency response. As explained in my testimony on p. 62 ln. 4-7 and footnote No. 85, and as demonstrated by the data in this case, there are ways to provide some level of frequency response that do meet ERCOT requirements, but that would require the generator's QSE to report a non-zero bias. If the QSE's portfolio is unable to provide any frequency response in any way, the QSE is required to inform ERCOT immediately.

Response prepared by: Danielle Jaussaud and Paul Curtis
Sponsoring witness: Danielle Jaussaud

First Supplemental Response to IPA Revised RFI No. 4-5

Staff admits. This response replaces Staff's original response.

Response prepared by: Danielle Jaussaud and Paul Curtis
Sponsoring witness: Danielle Jaussaud

5-7. Can a QSE comply with its governor response obligation under the ERCOT Protocols and Operating Guides if it does not put its governor in service but through other means responds to frequency deviations or otherwise operates its generating units in such a way that they supply the required amount of governor response for all times that the ERCOT system frequency is outside the 60 HZ±0.036 range?

Response

No. See Protocols § 5.8.1.1 and OG § 2.2.5

Response prepared by: Danielle Jaussaud and Paul Curtis

Sponsoring witness: Danielle Jaussaud

6-30. Confirm that Attachment DJ-28 lists all days and times in which you allege that ANP QSE reported a "zero" frequency bias to ERCOT, but ANP's portfolio provided governor response. If there are any others please provide. Identify the person or entity who calculated the "ERCOT calculated Frequency Bias". If done by Ms Jaussaud please identify her methodology and provide all calculations, workpapers and spreadsheets. If calculated by ERCOT, please produce all documents produced by ERCOT in connection with same.

Response

Staff has objected to this question. Subject to its objections, Staff provides the following response:

Attachment DJ-28 lists all days and times in which ANP QSE reported a "zero" frequency bias to ERCOT during Frequency events when ERCOT calculated that the ANP QSE frequency bias was not zero since April 2005, as recorded by ERCOT in its Secure Document Library. No dates previous to April 2005 are available to Staff.

The identity of the ERCOT technical staff member or members that performed the "ERCOT calculated Frequency Bias" calculations is not known to Staff, but IPA Parties may request it from ERCOT directly. Ms. Jaussaud is not employed by ERCOT and did not perform the "ERCOT calculated Frequency Bias" calculations. Some documents supporting the "ERCOT calculated Frequency Bias" calculations are protected from disclosure because they contain highly sensitive information on other ERCOT market participants, and may require ERCOT to give notice to market participants prior to their disclosure. IPA Parties on or about June 6, 2008, issued subpoenas to ERCOT and TRE requesting information which would appear responsive to this question.[1] To the extent IPA Parties want additional information about the "ERCOT calculated Frequency Bias," they may subpoena it directly from ERCOT.

Response prepared by: Danielle Jaussaud and Paul Curtis

Sponsoring witness: Danielle Jaussaud

[1] IPA Parties subpoenaed from ERCOT "All documents, including but not limited to internal communications, concerning IPA/ANP's compliance with governor control response, frequency response, or frequency bias reporting requirements during the period from January 1, 2004 until December 31, 2006. See IPA Parties Subpoena to ERCOT at Attachment A, Question No. 10 (June 6, 2008). IPA Parties subpoenaed from TRE "All documents, including but not limited to internal communications, concerning IPA/ANP's compliance with governor control response, frequency response, or frequency bias reporting requirements...." See IPA Parties Subpoena to TRE at Attachment A, Question No. 5 (June 6, 2008).

1-11 Describe all adverse impacts to the wholesale market as a whole that IPA caused as a consequence of the allegedly wrongful conduct described in the NOV and the Jaussaud memorandum. To the extent that this includes a dollar impact, please state the specific dollar amount and describe the method used for calculating that amount. Please provide all supporting calculations and workpapers related to such benefits.

Response

IPA's failure to provide adequate frequency response and a frequency bias signal to ERCOT is very serious. Frequency response from generators is critical to grid operations following significant frequency swings since the response occurs automatically within the initial seconds of an event. Data show that ERCOT-wide, the response to stabilize frequency after disturbances has steadily declined over the past few years. If the trend continues, ERCOT believes that it may experience deeper frequency declines and oscillations following disturbances, increasing the risk of load shed and other undesirable results. According to ERCOT, analysis suggests that a decrease in generator frequency response is a key factor causing the observed decline in frequency recovery following a disturbance.[1] Likewise, without a frequency bias signal from each QSE, ERCOT systems cannot properly evaluate the impact of QSE portfolio governor action on SCE or spinning reserves during frequency deviations. Furthermore, lack of a bias complicates analysis of the primary response from generators for ERCOT as a whole and for a particular QSE.

Participation in frequency response is a requirement for all generators connected to the grid in ERCOT, but it is not a paid service. Therefore, regardless of whether a generator's frequency response function is turned on or off, no payment occurs. However, when one generator does not respond, other generators have to work harder to make up for it. This increases the wear and tear on the generators that do comply with the requirement, and it increases their maintenance costs. Hence a generator that fails to provide governor response unfairly shifts these costs onto other generators. The generators that do respond to high frequency events by reducing output also disproportionately lose revenues to generators that fail to respond. This shifting of costs in turn creates disincentives for other generators to observe governor response requirements. Furthermore, by failing to respond to ERCOT's repeated requests for information and for a corrective action plan within a timely manner, IPA delayed bringing its units into compliance, which extended the period in which other generators were subject to greater wear and tear on their equipment.

Documents produced in response to other requests for information may be responsive, in part, to this request.

Response prepared by Shelah Cisneros with information from Danielle Jaussaud.

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[1] See letter from ERCOT to QSEs and Generation Resources on May 3, 2004, regarding Governor Response Requirements in the ERCOT Protocols and Operating Guides.

Staff's 7th Supplemental Response to IPA Parties' RFI 1-11

IPA's failure to provide adequate frequency response and a frequency bias signal to ERCOT is very serious. Frequency response from generators is critical to grid operations following significant frequency swings since the response occurs automatically within the initial seconds of an event. Data show that ERCOT-wide, the response to stabilize frequency after disturbances has steadily declined over the past few years. If the trend continues, ERCOT believes that it may experience deeper frequency declines and oscillations following disturbances, increasing the risk of load shed and other undesirable results. According to ERCOT, analysis suggests that a decrease in generator frequency response is a key factor causing the observed decline in frequency recovery following a disturbance.[2] Likewise, without a frequency bias reported by each QSE for the portfolios they represent, ERCOT systems cannot properly evaluate the impact of QSE portfolio governor action on SCE or spinning reserves during frequency deviations. Furthermore, lack of a bias complicates analysis of the primary response from generators for ERCOT as a whole and for a particular QSE.

When one generator does not respond to frequency deviations, other generators have to work harder. This increases the wear and tear on the generators that do comply with the requirement, and it increases their maintenance costs. Hence a generator that fails to provide governor response unfairly shifts these costs onto other generators. This shifting of costs in turn creates disincentives for other generators to observe governor response requirements. Furthermore, by failing to respond to ERCOT's repeated requests for a corrective action plan within a timely manner, IPA delayed bringing its units into compliance, which extended the period in which other generators were subject to greater wear and tear on their equipment.

Sponsoring Witness: Danielle Jaussaud

Supplemental Response Preparers: Carrie R. Tournillon and Paul Curtis

[2] See letter from ERCOT to QSEs and Generation Resources on May 3, 2004, regarding Governor Response Requirements in the ERCOT Protocols and Operating Guides.

1-12 Describe all adverse impacts to the health, safety, and economic welfare of the public caused by IPA's allegedly wrongful conduct described in the NOV and the Jaussaud memorandum. To the extent that this includes a dollar impact, please state the specific dollar amount and describe the method used for calculating that amount. Please provide all supporting calculations and workpapers related to such adverse impact.

Response

Staff has not identified any specific adverse impacts to the health, safety, and economic welfare of the public caused by IPA's conduct. Staff's response to 1-24 describes that if a number of generators fail to provide the expected frequency response, the frequency disturbance may worsen to the point where load shed becomes necessary and a series of cascading events may follow, with a potential for wide-spread blackouts to occur. Widespread blackouts may have serious adverse impacts to health, safety and the economic welfare of the public.

Documents produced in response to other requests for information may be responsive, in part, to this request.

Response prepared by Shelah Cisneros with information from Danielle Jaussaud.

Staff's 7th Supplemental Response to IPA Parties' RFI 1-12

Staff has not identified any specific adverse impacts to the health, safety, and economic welfare of the public caused by IPA's conduct. Staff's response to IPA Parties' RFI question No. 1-24 describes that if a number of generators fail to provide the expected frequency response, the frequency disturbance may worsen to the point where load shed becomes necessary and a series of cascading events may follow, with a potential for wide-spread blackouts to occur. Widespread blackouts may have serious adverse impacts to health, safety and the economic welfare of the public.

Documents produced in response to other requests for information may be responsive, in part, to this request.

Sponsoring Witness: Danielle Jaussaud

Supplemental Response Preparers: Carrie R. Tournillon and Paul Curtis

1-13 Describe all economic harm to property or the environment caused by IPA's allegedly wrongful conduct described in the NOV and the Jaussaud memorandum. To the extent that this includes a dollar impact, please state the specific dollar amount and describe the method used for calculating that amount. Please provide all supporting calculations and workpapers related to such economic harm.

Response

Staff has not identified any specific economic harm to property or the environment caused by IPA's conduct. Staff's response to 1-11 describes that when one generator does not meet its frequency response obligations, other generators have to work harder to make up for it which increases wear and tear on the generators who do comply with the requirements.

Documents produced in response to other requests for information may be responsive, in part, to this request.

Response prepared by Shelah Cisneros with information from Danielle Jaussaud.

Staff's 7th Supplemental Response to IPA Parties' RFI 1-13

When one generator does not respond, frequency instability results and other generators have to work harder to respond to increased frequency swings. This increases equipment wear and tear for the generators that do comply with the requirement, and it increases their maintenance costs. Hence a generator that fails to provide governor response unfairly shifts these costs onto other generators.[3] This shifting of costs in turn creates disincentives for other generators to observe Governor Response requirements. Furthermore, by failing to respond to ERCOT's repeated requests for information and for a corrective action plan in a timely manner, IPA delayed bringing its units into compliance, which extended the period in which other generators were subject to greater equipment wear and tear.

In addition to the direct economic harm caused to other generators, IPA' s actions had the potential to create severe economic harm to the public if firm load shed and loss of power to entire areas were to result, with financial losses to businesses and industry, and disruption of traffic, schools, and hospitals.

Sponsoring Witness: Danielle Jaussaud

Supplemental Response Preparers: Carrie R. Tournillon and Paul Curtis

[3] See Attachment DJ-4 to my direct testimony, email from Sydney Niemeyer (PDCWG) to Larry Grimm (TRE). Mr. Niemeyer writes: "We have found that many market participants have greatly improved their performance, but some are still not doing their share in providing frequency response to the Interconnection. This is not fair to the market participants that are performing as they experience "measurable" wear and tear on their equipment providing this service."

1-9 Please identify all complaints by any person regarding IPA's frequency response or frequency bias signal during the relevant period at issue. For each indicate the date of the complaint, summarize the substance of the complaint and state the disposition. Please produce all documents reviewed by Staff, and identify all *communications* between Staff and such person, concerning the complaint(s).

Response

Staff has not identified, after diligent search, any documents that are responsive to this request.

Response prepared by Shelah Cisneros with information from Danielle Jaussaud.

Staff's 7th Supplemental Response to IPA Parties' RFI 1-9

After a diligent search, Staff has not identified any documents that are responsive to this request.

Sponsoring Witness: Danielle Jaussaud

Supplemental Response Preparers: Carrie R. Tournillon and Paul Curtis

3-3. For the period January 1, 2004 through December 31, 2007, please state by month the number of: (1) investigations of market participants Staff initiated for potential violation of protocols related to accuracy of a frequency bias signal to ERCOT; (2) NOVs Staff issued for violation of protocols related to accuracy of a frequency bias signal to ERCOT; and (3) settlements reached with market participants for alleged violation of protocols related to accuracy of a frequency bias signal to ERCOT.

Staff's 1st Supplemental Response to IPA Parties' RFI 3-3

During the referenced period: (1) Two investigations were initiated for potential violation related to accuracy of a frequency bias signal to ERCOT. One was initiated in February 2006, and one in December 2007; (2) four NOVs were issued in September 2007 (One investigation initiated against a company and its subsidiaries resulted in four NOVs, one for each entity); (3) Zero settlements were reached with market participants for alleged violation of protocol related to accuracy of a frequency bias signal to ERCOT.

Sponsoring witness: Danielle Jaussaud.

Supplemental response preparers: Danielle Jaussaud and Paul Curtis.

SOAH DOCKET NO. 473-08-1153
P.U.C. DOCKET NO. 34738

NOTICE OF VIOLATION OF INTERNATIONAL POWER AMERICA, INC., HAYS ENERGY LIMITED PARTNERSHIP, MIDLOTHIAN ENERGY LIMITED PARTNERSHIP, AND ANP FUNDING I, LLC OF PURA §36.151(j) AND PUC SUBST. R. §25.503(f) AND (g), RELATING TO FAILURE TO ADHERE TO ERCOT PROTOCOLS §5.8.1.1, AND 6.5.1.1(1)(e) CONCERNING GOVERNOR IN SERVICE REQUIREMENTS AND FREQUENCY BIAS REQUIREMENTS AND OF PUC SUBST. R. 25.503(f)(10), RELATING TO FAILURE TO COMPLY WITH REQUESTS FOR INFORMATION BY ERCOT WITHIN THE TIME SPECIFIED BY ERCOT INSTRUCTIONS	§ § § § § § § § § § § § § §	**BEFORE THE STATE OFFICE OF** **ADMINISTRATIVE HEARINGS**

CUSTODIAN OF RECORDS AFFIDAVIT

Before me, the undersigned authority, personally appears Mark Henry, who, being by me duly sworn, deposed as follows:

"My name is Mark Henry, I am of sound mind, capable of making this affidavit, and personally acquainted with the facts herein stated. I am employed by Texas Regional Entity (Texas RE) and my title is Manager, Compliance Audits. I am a custodian of records for Texas RE. Texas RE's business address is 7620 Metro Center Drive, Austin, Texas, 78744.

Attached hereto is 1 page of records from Texas RE. This said page is in my custody or subject to my control, supervision or direction. I am able to identify these records as the originals or true and correct copies of the originals of documents created or received and maintained by Texas RE. These records were kept in the regular course of business of Texas RE and it was in the regular course of business of Texas RE for a person with knowledge of the acts, events, conditions, or opinions recorded to make or receive the record or to transmit information thereof to be included in such record. The entries on these records were made at or shortly after the time of the transaction recorded. The method of preparation and retention of these records is trustworthy."

Mark Henry, Manager, Compliance Audits

SWORN TO AND SUBSCRIBED before me this 17th day of November, 2008.

Sheila L. Massenburg
Notary Public – State of Texas

SHEILA L. MASSENBURG
Notary Public, State of Texas
My Commission Expires
September 29, 2010

From:	Henry, Mark
Sent:	Tuesday, February 27, 2007 9:44 AM
To:	Jaussaud, Danielle <danielle.jaussaud@puc.state.tx.us>
Cc:	Grimm, Larry <lgrimm@ercot.com>; Adib, Parviz <parviz.adib@puc.state.tx.us>; Totten, Jess <jess.totten@puc.state.tx.us>; Mailbox-Electric-Confidential <Mailbox-Electric-Confidential@puc.state.tx.us>
Bcc:	Kan, Kenneth <kkan@ercot.com>; Whitmer, Jeff <jwhitmer@ercot.com>
Subject:	RE: Concern about governor response compliance

Danielle,

Related to this, one of my team is working to send out a request for information that covers lasts year's governor response by QSE, as well as more letters regarding the self-certifications that we collected from each QSE with resources (and the Resource Entities themselves) in January. This will help address the concerns you raise. This has taken a backseat momentarily due to NERC-related efforts.

We did a "sweep" of frequency bias last year and did not find these problems, but we have another one in progress now. It is unacceptable for an RRS provider to not show a bias; this will be considered a violation of Protocol telemetry requirements just as with Sempra and ANP. Whether or not there were governors available with this 0 bias will likely come out in the QSE responses, too.

In general, we now have someone attending PDCWG and reviewing the material again. Our new staff is getting engaged but we are putting alot of time into NERC and the ERO transition efforts. Once that settles, we can focus more time on assessment in areas like this - but our program by nature is "after the fact" and the responsibility for education on such requirements belongs with the entities.

Thanks, again

MRH

(512) 225-7021

From: Jaussaud, Danielle
Sent: Friday, February 23, 2007 09:46
To: Henry, Mark
Cc: Grimm, Larry; Adib, Parviz; Totten, Jess; Mailbox-Electric-Confidential
Subject: Concern about governor response compliance

Mark:
As you know, I now attend the PDCWG meetings on a regular basis. At the last meeting, it was evident that at least one market participant was not providing any governor response at all and did not have a bias signal. To compound the problem, this entity was awarded RRS but it did not look like it was providing it at all. Sydney indicated that he would not send Compliance this information until he could compile it for 6 months. If this market participant continues to be out of compliance for the next six months, this is what will happen: it will receive a letter from Compliance, the PUC will be copied on it, WMO will be asked to start an investigation, and the entity will be penalized for six months or more of non-compliance with three, maybe more protocol requirements. Each violation can be penalized with a fine of up to $25,000 per violation per day since this is a reliability issue, so we are talking about possibly a couple millions of dollars in fines. Clearly, it would be better to inform this entity that it should address the issue immediately. I have made a pledge that I would not use the information I learn by attending the PDCWG meetings to start any investigation, but I think something

SOAH DOCKET NO. 473-08-1153
P.U.C. DOCKET NO. 34738

NOTICE OF VIOLATION OF INTERNATIONAL POWER AMERICA, INC., HAYS ENERGY LIMITED PARTNERSHIP, MIDLOTHIAN ENERGY LIMITED PARTNERSHIP, AND ANP FUNDING I, LLC OF PURA §36.151(j) AND PUC SUBST. R. §25.503(f) AND (g), RELATING TO FAILURE TO ADHERE TO ERCOT PROTOCOLS §5.8.1.1, AND 6.5.1.1(1)(e) CONCERNING GOVERNOR IN SERVICE REQUIREMENTS AND FREQUENCY BIAS REQUIREMENTS AND OF PUC SUBST. R. 25.503(f)(10), RELATING TO FAILURE TO COMPLY WITH REQUESTS FOR INFORMATION BY ERCOT WITHIN THE TIME SPECIFIED BY ERCOT INSTRUCTIONS	§ § § § § § § § § § § § § §	**BEFORE THE STATE OFFICE OF** **ADMINISTRATIVE HEARINGS**

CUSTODIAN OF RECORDS AFFIDAVIT

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Attached hereto are 3 pages of records from Texas RE. These said pages are in my custody or subject to my control, supervision or direction. I am able to identify the attached pages as the originals or true and correct copies of as pages of an originals document (record) that was received and maintained by Texas RE. This record was kept in the regular course of business of Texas RE and it was in the regular course of business of Texas RE for a person with knowledge of the acts, events, conditions, or opinions recorded to receive and maintain this record. The method of retention of these records is trustworthy."

Mark Henry, Manager, Compliance Audits

SWORN TO AND SUBSCRIBED before me this 17th day of November, 2008.

SHEILA L. MASSENBURG
Notary Public, State of Texas
My Commission Expires
September 29, 2010

Sheila L. Massenburg
Notary Public – State of Texas

4192538.1
53039.3

ERCOT
THE TEXAS CONNECTION

Frequency Control

- Turbine Governor Droop
- NERC Requirement
- Droop Setting and Turbine Response
- Governor underperformance
- ERCOT Droop
- Size does make a difference

Sydney Niemeyer

ERCOT
THE TEXAS CONNECTION

- Turbine Governor Droop, Speed Regulation or Speed Error are common terms used in describing a turbine's response to Changes in Interconnection Frequency (speed).
- Not the same as the "Regulation" Ancillary Service Deployment of ERCOT's Frequency Control System.
- NERC requires all generators greater than 10 MW's to have an operating governor.
- Droop distributes Frequency regulation to all generators in the interconnect.
- Recommended droop settings of 4 to 5% with a maximum dead band of +/- 0.036 Hz.

ERCOT
THE TEXAS CONNECTION

Testing Governor Performance

- ERCOT requires off line testing of Steam Turbine governors every 2 years.
  - Mechanical and Electro hydraulic test forms are in the Operating Guides.
- Combustion Turbines do not have an approved test procedure.
  - On Line observation verifies proper performance for limited frequency range.

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Mark Henry, Manager, Compliance Audits

SWORN TO AND SUBSCRIBED before me this 18th day of November 2008.

SHEILA L. MASSENBURG
Notary Public, State of Texas
My Commission Expires
September 29, 2010

Notary Public – State of Texas

March 9, 2006

Christi Shepard
Sempra Texas Services
2705 Bee Caves Road, Suite 340
Austin, Texas 78746

Dear Ms. Shepard:

On December 13, 2005, ERCOT's Compliance Office, met with you and APX management in San Jose California to discuss the 2005 audit questions and do a site visit with operations staff that are responsible for operating resources and communicating with ERCOT operations. This letter summarizes our findings after further review, including areas where we believe SEMPRA did and did not meet requirements, along with recommendations.

Key Findings:

ERCOT compliance finds that SEMPRA meets the majority of requirements examined in this review. The following items are determined to be in full compliance with ERCOT and NERC Standards at the time of the audit:

- Operators demonstrate that they are qualified to operate and communicate with ERCOT Operations in everyday operation of resources that are in their portfolio.
- Operators have good knowledge of what to do in EECP events.
- There are operators on duty 24/7 to attend to operational issues such as changes in resource plans and communication with ERCOT.
- Operators are available and authorized to follow verbal dispatch instructions.
- Operators deal with notification of forced outages, de-ratings and other resource information to ERCOT.
- Operators are knowledgeable of OOM instructions that impact ancillary service capabilities or deployments and how to deal with these.

The following two items, however, were not in compliance at the time of the audit and we believe they were violations of Protocol obligations. Corrective actions, if not taken already, are needed and a request for responses is underlined. These two findings are subject to posting at the ERCOT and NERC website; there are no financial sanctions, real or simulated, applied at this time. Sempra Texas Services should affirm whether they are in disagreement with the findings no later than April 15th, 2006. A confirmation of

corrective actions taken or planned is also needed (along with a schedule for completion if applicable).

1) Sempra Texas Services needs to develop and share with ERCOT a black start plan, per Operating Guides Section 4.6.4 and Attachment 4A. There was no documentation of actions to be taken by Sempra's operators in the event of a black out in the ERCOT grid. Even if a QSE does not have black start units, its operators need to understand what will happen and be prepared to support the restoration. The plan should cover at a minimum the requirements in the Guides ERCOT guide 4.6.4; it need not be too long. ERCOT Compliance would like to see a preliminary black start plan for Sempra Texas Services by April 15, 2006 along with a plan to distribute to APX shift operators and other personnel.
2) At the time of the audit, Sempra was not meeting the requirements for QSE frequency bias signals as directed in ERCOT Guide 2.2.3.1 and Protocol 6.5.1.1.(e). Sempra has pursued an action plan starting in September 2005 which will likely correct this, but this work was not complete at the time of the audit and should have been in place when QSE operations commenced. ERCOT Compliance would like to have confirmation that this has been addressed and documented by April 15, 2006.

The following eleven items are recommendations, which we do not believe are matters of non-compliance at this time. Most involve documentation, which will become more important over time as NERC and ERCOT standards mature (and as audits become more stringent).

1) Sempra should clarify the authority of operators – in this case the APX operators who interface with ERCOT - to take what action is deemed necessary to meet ERCOT dispatch orders within the real and reactive capability of its portfolio, up to and including dropping of generation, be clearly stated and. This also needs to be clear in the job description. We suggest that a statement to this effect be posted in the control room where the operators can see it. We also suggest that Sempra work with its generating plant staff to ensure that they understand the QSE operator's authority and the need to communicate status changes or other issues affecting unit capability through the QSE to ERCOT.
2) Sempra (and APX) should establish documentation of all training that is given to the operators who manage their portfolio, especially the 40-hour mandatory emergency training required in the Operating Guides. We suggest that personnel participate in ERCOT black start training and consider attending the annual ERCOT Operations seminar. Please also note that every QSE is required to have participants in the annual severe weather drill (Sect 1.8.5). That said, we believe that APX and Sempra's will be able to meet the 40 –hour requirement, in large part by internal drills on loss of primary control center and data. We request feedback from Sempra on how they will meet the requirements.
3) Sempra (and APX) should develop and document their training objectives for their real-time operators, again we are primarily considering the APX personnel who interface with ERCOT 24/7. We saw evidence of initial efforts. The QSE-

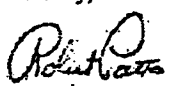
applicable material used in NERC Operator Certification and ERCOT fundamentals may provide useful components in building a training program, along with ongoing training on ERCOT Protocols, Guides and Procedures, APX software and practices, generator issues, and emergency procedures. NERC Balancing Authority Operator Certification is not required at this time, but may be in the future. Participation in the ERCOT Operations Working Group would help keep Sempra aware of opportunities for training as well as ongoing developments.

4) ERCOT Compliance recommends that Sempra and APX look at the Loss of Primary Control Center minimum criteria in ERCOT Guide 3.1.3.1. Additional phone service and current manuals at the back up facility would help operators communicate with ERCOT and other personnel in the event of actual operation from that site. Capability to add a ring-down circuit (hotline) should be investigated. We further recommend that a plan to provide real-time data in the event of loss of the primary data center be developed; the Operator at APX indicated that manual substitution for real-time data would be used. This may be acceptable for a small portfolio for a short length of time, but Sempra and its agent, APX, should formulate the means to handle a catastrophic loss. APX may already have plans in progress to address both the back-up operations site and the real-time data concerns.
5) It is recommended that Sempra review the requirement for reporting rolling 12-month outages in Protocol 8.1.3 2. Sempra management did not seem to be aware of this, although ERCOT Outage Coordinators did have several future outages in the Outage Scheduler software. Otherwise we found no issue with outage coordination.
6) QSEs are expected to forward unit test information to ERCOT. Sempra has provided quarterly real and bi-annual reactive tests upon ERCOT request, and Sempra is clearly aware of additional requirements for governor testing based on emails between Dale Lebshak and Robert Staples of ERCOT. We do ask that Sempra be aware that governor tests are expected every two years (Protocol 5.8.1.2 and OG 2.2.5) and there are also requirements for excitation system and Automatic Voltage Regulator (AVR) tests every five years (OG 2.2.4). Additional testing and model validation activities can be expected in the future with new NERC standards. We recommend that Sempra review these and consult with vendors or manufacturers as needed to prepare for ERCOT's eventual request for this information.
7) As a provider of Regulation Services, Sempra staff should consider how it reviews performance as compared to the ERCOT criteria for Schedule Control Error (SCE). The APX operator relied on a fixed MW SCE deviation (+/- 5 MW) to guide actions. Management indicated SCE deviations can be compared to baseline deviation data from APX outside of real-time; however, we didn't see much discussion of how this was used to improve performance, which has slipped lately for the Sempra sub-QSE. While PRR525 changes the measurement criteria somewhat, the basic concepts used in the regulation performance measure were retained in the new SCE measure in Protocol 6.10.5.3. QSEs who shadow the ERCOT criteria tend to perform better, and we see many QSEs who have real-time tracking of their 1 and 10 minute SCE performance as well.

8) Similarly to the item above, the QSE should consider more active review of its Responsive Reserve Performance. The performance criteria within ERCOT Protocols 6.10.5.4 are under revision but the basic concepts will be retained: initial governor response, delivery of 95-150% of award within 10 minutes and returning to schedules 10 minutes after recall, need to be understood. This apparent lack of initial governor response was raised last summer. We recommend that Sempra participate in the ERCOT Performance Disturbance Compliance Working Group, in which stakeholder and ERCOT staff regularly review disturbances confidentially.
9) Ensure that operators are prepared to receive and forward to ERCOT any instances of AVR status outside of normal operations during startup and shutdown from resources in the Sempra portfolio. Management indicated that this is the case, but the operator did not have any displays or records to assist him and did not have have knowledge of this subject. Regarding the AVRs at La Palma Units 4 and 5, please advise ERCOT Compliance of the timetable for installation and provide generator dynamic model updates if appropriate. Sempra's efforts to restore this AVR equipment are considered returning previously functional equipment back into service, rather than failure to provide what the Protocols require.
10) We recommend that basic information on reactive control be provide for APX operators awareness, along with training. Sempra has coordinated between its generators and the local transmission company for reactive support. However, Sempra's real-time operators at APX should be more aware of reactive issues. Based on brief observations at an operator's desk, there is a lack of available information, training or procedures on this subject. As the contact between the generators and ERCOT, they should be able to participate in discussions of voltage profile and reactive capability (through the reactive test results) of the Sempra portfolio, especially when an ERCOT dispatch order is required to request additional reactive output above a unit's "Corrected Unit Reactive Limits").
11) Sempra is asked to verify how the routers used to forward real time signals from the plants are powered, hopefully by Uninterruptible Power Supplies or batteries. Sempra has not confirmed this request from an email dated January 23, 2006. Personnel at the audit were not familiar with these details.

Again, I ask that you consider the above items and respond by April 15, 2006 with your proposed actions or, if you disagree with these findings, additional information where we may have omitted or overlooked something. A timeline for completion of blackstart plans and frequency bias signal development needs to be included. I am aware, that work, on several of these items has already began, please update us appropriately on their current status even if completed.

Sincerely,



Robert Potts
ERCOT Compliance
(512) 225-7022
rpotts@ercot.com

September 4, 2003

FPL Energy Power Marketing, Inc.
Jeffrey Palumbo
700 Universe Blvd
Juno Beach, FL 33408

RE: Non-compliance with Real Time Data Requirements in ERCOT Protocols and NERC Standards for FPL QSEs

Mr. Palumbo:

FPL has been contacted by ERCOT on more than one occasion to provide certain real time data. This missing or questionable data should have been provided to ERCOT at the time that the generators involved became part of the FPL QSE, or at the time FPL began providing regulation and responsive reserve ancillary services. Failure to provide this data appears to be a matter of non-compliance with requirements of ERCOT Protocols and the NERC Operating Standards.

Protocols 6.5.1.1(1) states:

> QSE representing a Generation Entity that has Generation Resources connected to a TDSP shall provide the following Real Time data to ERCOT for each individual generating unit at a Generation Resource plant location .:
>
> (e) Frequency bias of portfolio Generation Resources under QSE operation, ...
> (g) Generator breaker status,
> (h) High Operating Limit, and
> (i) Low Operating Limit.

Protocol 6.5.5.1 (3) states:

> Any QSE providing Regulation Service must provide appropriate Real Time feedback signals to report the control actions allocated to the QSEs Generation Resources.

The ERCOT Operating Guides, Section 8, provides additional detail on required data and format in Attachment 8A, under "Operating Period".

NERC Compliance Standard P4T2 calls for Operating Authorities to provide operational data to their Security Coordinator. Failure to provide real time data cited above, in particular the generator breaker status and unit operating limit data, violates this Standard as applied in ERCOT. Under the NERC compliance program, violations of assessed standards are assigned penalties based on level of severity. Failure to provide this data is a Level 4 violation. The NERC program is still in pilot status, and no fines are collected, but the sanction for first occurrence, Level 4 violation would have been a fine of $4,134 (based on $2/MW generating capacity in FPL's sub-QSE's).

TRE 002623