ANCILLARY SERVICES REQUIREMENTS PROTOCOL

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ASRP APPENDIX F CERTIFICATION FOR BLACK START

ANCILLARY SERVICES REQUIREMENTS PROTOCOL (ASRP)

ASRP 1 OBJECTIVES, DEFINITIONS AND SCOPE

ASRP 1.1 Objectives

(a) The ISO needs to have available to it sufficient Ancillary Services of a standard necessary to enable it to maintain the reliability of the ISO Controlled Grid.

(b) This Protocol describes the ISO's basis for determining its Ancillary Services requirements and the required standard for each Ancillary Service.

(c) These requirements and standards apply to all Ancillary Services whether self-provided or procured by the ISO.

(d) This Protocol also describes the means by which the ISO will monitor performance of these Ancillary Services to ensure that the required standards are met and maintained.

ASRP 1.2 Definitions

ASRP 1.2.1 Master Definitions Supplement

Unless the context otherwise requires, any word or expression defined in the Master Definitions Supplement to the ISO Tariff shall have the same meaning where used in this Protocol. A reference to a Section or an Appendix is to a Section or an Appendix of the ISO Tariff. References to ASRP are to this Protocol or to the stated paragraph of or Appendix to this Protocol.

ASRP 1.2.2 Special Definitions for this Protocol

In this Protocol, the following expression shall have the meaning set opposite it:

"Area Control Error (ACE)" means the sum of the instantaneous difference between the actual net interchange and the scheduled net interchange between the ISO Control Area and all

adjacent Control Areas and the ISO Control Area's frequency correction and time error correction obligations.

"Dynamic Schedule" means a telemetered reading or value which is updated in real time and which is used as a schedule in the ISO EMS calculation of ACE and the integrated value of which is treated as a schedule for interchange accounting purposes.

"EOE" means an Existing Operating Entity operating under an Existing Operating Agreement.

"ISO Home Page" means the ISO internet home page at www.caiso.com/iso or such other internet address as the ISO shall publish from time to time.

ASRP 1.2.3 Rules of Interpretation

(a) Unless the context otherwise requires, if the provisions of this Protocol and the ISO Tariff conflict, the ISO Tariff will prevail to the extent of the inconsistency. The provisions of the ISO Tariff have been summarized or repeated in this Protocol only to aid understanding.

(b) A reference in this Protocol to a given agreement, ISO Protocol or instrument shall be a reference to that agreement or instrument as modified, amended, supplemented or restated through the date as of which such reference is made.

(c) The captions and headings in this Protocol are inserted solely to facilitate reference and shall have no bearing upon the interpretation of any of the terms and conditions of this Protocol.

(d) This Protocol shall be effective as of the ISO Operations Date.

ASRP 1.3 Scope

ASRP 1.3.1 Scope of Application to Parties

This Protocol applies to the ISO and to the following:

(a) Participating Generators

(b) Operators

(c) UDCs

(d) Providers of Curtailable Demand

(e) Scheduling Coordinators

(f) an existing entity operating under an EOA.

ASRP 1.3.2 Liability of the ISO

Any liability of the ISO arising out of or in relation to this Protocol shall be subject to Section 14 of the ISO Tariff as if references to the ISO Tariff were references to this Protocol.

ASRP 2 ANCILLARY SERVICES STANDARDS

ASRP 2.1 Basis of Standards

ASRP 2.1.1 Basic criteria

(a) The ISO shall base its Ancillary Services standards upon the Western System Coordinating Council (WSCC) Minimum Operating Reliability Criteria (MORC) and North American Electric Reliability Council (NERC) Criteria to the extent they are applicable to the ISO Controlled Grid.

(b) The ISO may adjust the Ancillary Services standards temporarily to take into account, among other things, variations in system conditions, real-time dispatch constraints, contingencies, and voltage and dynamic stability assessments.

ASRP 2.2 Review of Standards

ASRP 2.2.1 Grid Operations Committee Review

The ISO Grid Operations Committee shall periodically undertake a review of the ISO Controlled Grid operations to determine any revision to the Ancillary Services standards to be used in the ISO Control Area. As a minimum the ISO Technical Advisory Committee shall conduct such reviews to accommodate revisions to WSCC and NERC standards.

ASRP 2.2.2 Contents of Grid Operations Committee Reviews

Periodic reviews may include, but are not limited to:

(a) analysis of the deviation between actual and forecast Demand;

(b) analysis of patterns of unplanned Generating Unit Outages;

(c) analysis of compliance with NERC and WSCC Criteria;

(d) analysis of operation during system disturbances;

(e) analysis of patterns of shortfalls between Final Day-Ahead Schedules and actual Generation and Demand; and

(f) analysis of patterns of unplanned transmission Outages.

ASRP 2.3 Communications

A Participating Generator or provider of Curtailable Demand wishing to offer any Ancillary Service must provide a direct ring down voice communications circuit (or a dedicated telephone line available 24 hours a day every day of the year) between the control room operator for the Generating Unit or Curtailable Demand providing the Ancillary Service and the ISO Control Center. Each Participating Generator must also provide an alternate method of voice communications with the ISO from the control room in addition to the direct communication link required above.

ASRP 3 ANCILLARY SERVICE OBLIGATIONS FOR SCHEDULING COORDINATORS

ASRP 3.1 Ancillary Service Obligations

The ISO shall assign to each Scheduling Coordinator a share of the ISO's total Regulation, Spinning Reserve, Non-Spinning Reserve and Replacement Reserve requirements. The ISO will calculate the share for which each Scheduling Coordinator is responsible (its "obligation") in accordance with the standards set forth in the ASRP.

ASRP 3.2 Right to Self Provide

Each Scheduling Coordinator may self provide all, or a portion, of its Regulation and Reserve obligation within each Zone.

ASRP 4 REGULATION STANDARDS

ASRP 4.1 Standard for Regulation: Quantity Needed

ASRP 4.1.1 Basis for Standard

The ISO needs sufficient Generating Units immediately responsive to Automatic Generation Control (AGC) in order to allow the ISO Control Area to meet the WSCC and NERC control performance criteria by continuously balancing Generation to meet deviations between actual and scheduled Demand and to maintain interchange schedules.

ASRP 4.1.2 Determination of Regulation Quantity Needed

The quantity of Regulation capacity needed for each Settlement Period of the Day-Ahead Market and the Hour-Ahead Markets shall be determined as a percentage of the aggregate scheduled Demand for that Settlement Period.

ASRP 4.1.3 Percentage Determination

The exact percentage required for each Settlement Period of the Day-Ahead Market and the Hour-Ahead Markets shall be determined by the ISO based upon its need to meet the WSCC and NERC control performance criteria.

ASRP 4.1.4 Publication of Estimated Percentage for Day-Ahead Market

The ISO will publish on WEnet its estimate of the percentage it will use for determining the quantity of Regulation it requires for each Settlement Period of the Day-Ahead Market for that Trading Day.

ASRP 4.1.5 Publication of Estimated Percentage for Hour-Ahead Market

The ISO will publish on WEnet its estimate of the percentage it will use to determine the quantity of Regulation it requires for each Hour-Ahead Market.

ASRP 4.1.6 Additional Regulation Requirement

Additional Regulation capacity may be procured by the ISO for the real-time operating period if needed to meet the WSCC and NERC control performance criteria.

ASRP 4.2 Standard for Regulation: Performance

ASRP 4.2.1 Operating Characteristics of Generating Unit

A Generating Unit offering Regulation must have the following operating characteristics:

(a) it must be capable of being controlled and monitored by the ISO Energy Management System (EMS);

(b) it must be capable of achieving at least the ramp rates (increase and decrease in MW/minute) stated in its bid for the full amount of Regulation capacity offered;

(c) the Regulation capacity offered must not exceed the maximum ramp rate (MW/minute) of that Unit times ten; and

(d) the Generating Unit to ISO Control Center telemetry must include indications of whether the Generating Unit is on or off AGC at the Generating Unit end.

ASRP 4.2.2 Operational EMS/SCADA Equipment

Each Participating Generator must ensure that the ISO EMS control and related SCADA equipment is operational throughout the time period during which Regulation is required to be provided.

ASRP 4.3 SC's Obligation for Regulation

Each Scheduling Coordinator's Obligation for Regulation for each Settlement Period of the Day-Ahead Market and for each Hour-Ahead Market in each Zone shall be calculated based upon the ratio of metered Demand by each Scheduling Coordinator in each identified Zone for that Settlement Period to the total metered Demand for that Settlement Period in that Zone.

ASRP 4.4 Standard for Regulation: Control

The ACE will be calculated by the ISO EMS. Control signals will be sent from the ISO EMS to raise or lower the output of Generating Units providing Regulation when ACE exceeds the allowable ISO Control Area dead band for ACE. Use of dynamic schedules to provide regulation must be certified and approved by the ISO.

ASRP 4.4.1 **Dynamic Scheduling of Regulation from External Resources**

Scheduling Coordinators are allowed to self-provide their Regulation obligation in whole or in part from resources located outside the ISO Control Area by dynamically scheduling such use of existing transmission service rights under Existing Contracts; if it can be demonstrated that the control function will use existing computer links (either directly or through existing utility EMS computers) to provide this function.

ASRP 4.5 **Standard for Regulation: Procurement**

ASRP 4.5.1 **Procurement of Non Self-Provided Regulation**

Regulation necessary to meet ISO requirements not met by self-provided Regulation will be procured by the ISO as described in the ISO Tariff.

ASRP 4.5.2 **Certification and Testing Requirements**

Each Generating Unit and Generating Units which an EOE intends to include in any System Unit used to bid Regulation or used to self provide Regulation must have been certified and tested by the ISO using the process defined in Appendix A to this Protocol.

ASRP 4.5.3 **Procurement as of Operations Date**

The ISO will procure, with the exception of ASRP 4.4.1, Regulation only from providers with Generating Units connected to and operating within the ISO Control Area.

ASRP 4.5.4 **Self Provision of Regulation**

Scheduling Coordinators may not self provide Regulation from resources outside the ISO Control Area except under Existing Contracts as described in Section 4.4.1.

ASRP 5 **OPERATING RESERVE STANDARDS**

The ISO needs, as a minimum, Operating Reserve, consisting of Spinning Reserve and Non-Spinning Reserve, sufficient to meet WSCC MORC. The Operating Reserve requirement shall be equal to (a) 5% of the Demand (except the Demand covered by firm purchases from outside the ISO Control Area) to be met by Generation from hydroelectric resources, plus 7% of the Demand (except the Demand covered by firm purchases from

outside the ISO Control Area) to be met by Generation from other resources, or (b) the single largest Contingency, if this is greater or (c) by reference to such more stringent criteria as the ISO may determine from time to time. This Operating Reserve requirement does not include the Operating Reserve required to cover the Generation or services described in ASRP 5.2(a) and (b).

ASRP 5.1 Standard for Spinning Reserve: Quantity Needed

ASRP 5.1.1 Minimum Spinning Reserve Quantity

The Spinning Reserve component of Operating Reserve shall be no less than one-half the Operating Reserve required for each Settlement Period of the Day-Ahead Market, the Hour-Ahead Market and the Real Time Market.

ASRP 5.1.2 Providing both Spinning Reserve and Regulation

Spinning Reserve and Regulation may be provided as separate services from the same Generating Unit, provided that the sum of Spinning Reserve and Regulation provided is not greater than the maximum ramp rate of the Generating Unit (MW/minute) times ten.

ASRP 5.2 Standard for Non-Spinning Reserve: Quantity Needed

The required quantity of Non-Spinning Reserve shall be equal to the required quantity of Operating Reserve less the quantity of Spinning Reserve determined in ASRP 5.1 plus;

(a) an amount of Non-Spinning Reserve equal to Interruptible Imports (which must either be self provided by the Scheduling Coordinators responsible for the Interruptible Imports from resources within the ISO Controlled Grid or purchased from the ISO); and

(b) an amount of Non-Spinning Reserve equal to on-demand obligations to other entities or Control Areas (which must be self provided by the Scheduling Coordinators responsible for the on-demand obligations from resources within the ISO Controlled Grid).

Scheduling Coordinators may self provide their allocated quantity of Non-Spinning Reserve under ASRP 5.2(a) and (b) from Spinning Reserve not already committed to the ISO, if they wish.

ASRP 5.3 Standard for Spinning Reserve: Performance

ASRP 5.3.1 Spinning Reserve Capability

Each Generating Unit or external import of a System Resource scheduled to provide Spinning Reserve must be capable of converting the full capacity reserved to Energy production within ten minutes after the issue of the Dispatch instruction by the ISO, and of maintaining that output or scheduled interchange for at least two hours or, if earlier, until such time as the ISO can Dispatch additional resources to permit the Generating Unit to return to its scheduled Set Point or to permit the Energy schedule of the external import to be returned to zero for the current Settlement Period or such other level directed by an ISO Dispatch instruction.

ASRP 5.3.2 Availability

Each Participating Generator shall ensure:

(a) that its Generating Units scheduled to provide Spinning Reserve are available for Dispatch throughout the Settlement Period for which it has been scheduled; and

(b) that its Generating Units scheduled to provide Spinning Reserve are responsive to frequency deviations throughout the Settlement Period for which they have been scheduled.

ASRP 5.4 Standard for Non-Spinning Reserve Performance

ASRP 5.4.1 Non-Spinning Reserve Resources

Non-Spinning Reserve may be provided by, among others, the following resources:

(a) Demand which can be reduced by Dispatch;

(b) interruptible exports;

(c) on-demand rights from other entities or Control Areas;

(d) off line Generating Units qualified to provide Non-Spinning Reserve; and

(e) external imports of System Resources.

ASRP 5.4.2 Non-Spinning Reserve Capability

Each resource providing Non-Spinning Reserve must be capable of converting the full capacity reserved to Energy production within ten minutes after the issue of the Dispatch instruction by the ISO, and of maintaining that output for at least two hours,

or, if earlier, until such time as the ISO can Dispatch additional resources to permit the resource to return to its scheduled Set Point or operating level for the current Settlement Period or such other level directed by an ISO Dispatch instruction.

ASRP 5.4.3 Availability

Each provider of Non-Spinning Reserve must ensure that its resources scheduled to provide Non-Spinning Reserve are available for Dispatch throughout the Settlement Period for which they have been scheduled.

ASRP 5.5 SC's Obligation for Operating Reserve

ASRP 5.5.1 Obligation for Spinning and Non-Spinning Reserve

Except for the requirement for Non-Spinning Reserve referred to in paragraph ASRP 5.5.2, each Scheduling Coordinaor's Operating Reserve obligation in each Zone shall be pro rata based upon the same proportion as the product of its percentage obligation based on Schedules and the sum of its metered Demand and firm exports bears to the total of such products for all Scheduling Coordinators in the Zone. The Scheduling Coordinator's percentage obligation based on Schedules shall be calculated as the sum of 5% of its scheduled Demand (except the Demand covered by firm purchases from outside the ISO Control Area) scheduled to be met by Generation from hydroelectric resources plus 7% of its scheduled Demand (except the Demand covered by firm purchases from outside the ISO Control Area) scheduled to be met by Generation from non-hydroelectric resources in that Zone.

ASRP 5.5.2 Additional Non-Spinning Reserve Requirements

Additional Non-Spinning Reserve required pursuant to ASRP 5.2(a) and (b) is the responsibility of the Scheduling Coordinator implementing such Schedules and is in addition to the obligation provided in paragraph ASRP 5.5.1.

ASRP 5.6 Standard for Spinning Reserve: Control

Each provider of Spinning Reserve must be capable of receiving a Dispatch instruction within one minute from the time the ISO Control Center elects to Dispatch the Spinning Reserve resource and must ensure that its resource can be at the Dispatched

operating level within ten minutes after issue of the Dispatch instruction.

ASRP 5.7 **Standard for Non-Spinning Reserve: Control**

Each provider of Non-Spinning Reserve must be capable of receiving a Dispatch instruction within one minute from the time the ISO Control Center elects to Dispatch the Non-Spinning Reserve resource and must ensure that its resource can be at the Dispatched operating level or condition within ten minutes after issue of the Dispatch instruction.

ASRP 5.8 **Standard for Operating Reserve: Procurement**

ASRP 5.8.1 **Procurement of Non Self-Provided Operating Reserve**

Operating Reserve necessary to meet ISO requirements not met by self-provided Operating Reserve will be procured by the ISO as described in the ISO Tariff.

ASRP 5.8.2 **Procurement Not Limited to ISO Control Area**

The ISO will procure Spinning and Non-Spinning Reserves from Generating Units connected to and operating within the ISO Control Area and external imports of System Resources.

ASRP 5.8.3 **Spinning Reserve Certification and Testing Requirements**

Spinning Reserve may only be provided from

(1) Generating Units;

(2) System Resources from external imports; or

(3) Generating Units which an EOE intends to include in any System Unit;

which have been certified and tested by the ISO using the process defined in Appendix B to this Protocol.

ASRP 5.8.4 **Non-Spinning Reserve Certification and Testing Requirements**

Non-Spinning Reserve may only be provided from resources including

(1) Loads;

(2) Generating Units;

(3) System Resources from external imports; and

(4) Generating Units which an EOE intends to include in any System Unit;

which have been certified and tested by the ISO using the process defined in Appendix C to this Protocol.

ASRP 5.8.5 Self Provision of Operating Reserve

Scheduling Coordinators may self provide Spinning and Non-Spinning Reserves from resources outside the ISO Control Area.

ASRP 6 REPLACEMENT RESERVE STANDARDS

ASRP 6.1 Standard for Replacement Reserve: Quantity Needed

ASRP 6.1.1 Basis for Standard

The ISO needs sufficient Replacement Reserve to be available to allow restoration of Dispatched Operating Reserve within sixty minutes to its Set Point scheduled for the Settlement Period concerned.

ASRP 6.1.2 Replacement Reserve Requirements

The ISO shall have discretion to determine the quantity of Replacement Reserve it requires in each Zone. The ISO shall make its determination of the required quantity of Replacement Reserve based on:

(a) analysis of the deviation between aggregate forecast Demands supplied by Scheduling Coordinators and that forecast by ISO;

(b) analysis of patterns of unplanned Generating Unit Outages;

(c) analysis of patterns of shortfalls between Final Day-Ahead Schedules and actual Generation and Demand;

(d) analysis of patterns of unexpected transmission Outages;

(e) analysis of seasonal variations that may require additional Replacement Reserves; and

(f) other factors influencing the ISO Controlled Grid's ability to meet Applicable Reliability Criteria.

ASRP 6.2 Standard for Replacement Reserve: Performance

ASRP 6.2.1 Replacement Reserve Supply Capability

Each resource providing Replacement Reserve must be capable of supplying any level of output up to and including its full reserved capacity within sixty minutes after issue of Dispatch instructions by the ISO.

ASRP 6.2.2 Replacement Reserve Availability

Each resource providing Replacement Reserve must be capable of sustaining the instructed output for at least two hours, or, if

earlier, until such time as the ISO can Dispatch additional resources to permit the Replacement Reserve resource to return to its scheduled Set Point or operating level for the current Settlement Period or such other level directed by an ISO Dispatch instruction.

ASRP 6.2.3 **Resources already Providing Ancillary Service**

Replacement Reserve may be supplied from resources already providing another Ancillary Service, such as Spinning Reserve, but only to the extent that the ability to provide the other Ancillary Service is not restricted in any way by the provision of Replacement Reserve. The sum of Ancillary Service capacity supplied by the same resource cannot exceed the capacity of said resource.

ASRP 6.3 **Scheduling Coordinator's Obligation for Replacement Reserve**

Scheduling Coordinator's Obligation for Replacement Reserve for each Settlement Period of the Day-Ahead Market and for each Hour-Ahead Market in each zone shall be based upon the ratio of the metered Demand by each Scheduling Coordinator in each identified Zone for that Settlement Period to the total metered Demand for that Settlement Period in that Zone.

ASRP 6.4 **Standard for Replacement Reserve: Control**

Each provider of Replacement Reserve must be capable of receiving a Dispatch instruction within one minute from the time the ISO Control Center elects to Dispatch the Replacement Reserve resource and must ensure that its resource can be at the Dispatched operating level or condition within sixty minutes after issue of the Dispatch instruction.

ASRP 6.5 **Standard for Replacement Reserve: Procurement**

ASRP 6.5.1 **Procurement of Non Self-Provided Replacement Reserve**

Replacement Reserve necessary to meet ISO requirements not met by self-provided Replacement Reserve will be procured by the ISO as described in the ISO Tariff.

ASRP 6.5.2 **Procurement Not Limited to ISO Control Area**

The ISO will procure Replacement Reserves from Generating Units connected to and operating within the ISO Control Area and external imports of System Resources.

ASRP 6.5.3 **Self Provision of Replacement Reserve**

Scheduling Coordinators may self provide Replacement Reserves as external imports from System Resources located outside the ISO Control Area.

ASRP 6.5.4 **Certification and Testing Requirements**

Replacement Reserve may only be provided from resources including

(1) Loads;

(2) Generating Units;

(3) System Resources from external imports; and

(4) Generating Units which an EOE intends to include in any System Unit

which have been certified and tested by the ISO using the process defined in Appendix C to this Protocol.

ASRP 7 **VOLTAGE SUPPORT STANDARDS**

ASRP 7.1 **Standard for Voltage Support: Quantity Needed**

The ISO shall determine on a daily basis for each Settlement Period for each Trading Day the quantity and location of Voltage Support required to maintain voltage levels and reactive margins within WSCC and NERC criteria using a power flow study based on the quantity and location of Demand scheduled in each Settlement Period of the Day-Ahead Market. The ISO shall issue daily voltage schedules (Dispatch instructions) to Generators, Participating TOs and UDCs for each Trading Day, which are required to be maintained for ISO Controlled Grid reliability.

ASRP 7.2 **Standard for Voltage Support: Performance**

ASRP 7.2.1 **Automatic Voltage Regulation Requirement**

A Generating Unit providing Voltage Support must be under the control of generator automatic voltage regulators throughout the time period during which Voltage Support is required to be provided. A Generating Unit may be required to operate underexcited (absorb reactive power) at periods of light system Demand to avoid potential high voltage conditions, or overexcited (produce reactive power) at periods of heavy system Demand to avoid potential low voltage conditions.

ASRP 7.2.2 **Compensation for Operating Outside of Range**

The ISO will not compensate Generators for operating their Generating Units within the power factor band of 0.90 lag to 0.95 lead. If the ISO requires additional Voltage Support in the

short term it may instruct a reduction in a Generating Unit's MW output so that it operates outside its specified power factor range. The ISO will compensate Generators for this service as provided in the ISO Tariff.

ASRP 7.3 **Standard for Voltage Support: Distribution and Location**

Each Generator, Participating TO and UDC shall ensure that sufficient Voltage Support is available in the vicinity of each designated substation bus to maintain voltage within the Voltage Limits prescribed by the ISO in its voltage schedules for each Settlement Period. Each Generator, Participating TO and UDC shall provide sufficient reactive supply in each local area to take into account real power losses created by reactive power flow on the system. Reactive power flow at Scheduling Points shall be maintained within a power factor bandwidth of 0.97 lag to 0.99 lead.

ASRP 7.4 **Standard for Voltage Support: Control**

Generating Units providing Voltage Support must have automatic voltage regulators which can correct the bus voltages to be within the prescribed voltage limits and within the machine capability in less than one minute.

ASRP 7.5 **Standard for of Voltage Support: Procurement**

ASRP 7.5.1 **Long Term Voltage Support**

As of the ISO Operations Date, the ISO will contract for long term Voltage Support service with Owners of Reliability Must-Run Units under Reliability Must-Run Contracts.

ASRP 7.5.2 **Certification and Testing Requirements**

Voltage Support may only be provided from resources including Loads, Generating Units and Generating Units which an EOE intends to include in any System Unit which have been certified and tested by the ISO using the process defined in Appendix E to this Protocol.

ASRP 8 **BLACK START STANDARDS**

ASRP 8.1 **Standard for Black Start: Quantity Needed**

ASRP 8.1.1 **Determination of Black Start Capability**

The ISO shall determine the amount and location of Black Start capability it requires by reference to contingency studies which will be used as the basis of the ISO's emergency plans.

ASRP 8.1.2 **Factoring in Failed Starts**

The ISO shall, in determining the quantity needed, account for the probability that some Black Start Generating Units may fail to start or that transmission system damage may prevent some Black Start Generating Units from serving their intended loads.

ASRP 8.1.3 **Submission of Load Restoration Time Requirements**

Scheduling Coordinators shall provide the ISO with their load restoration time requirements for any resources that provide emergency services.

ASRP 8.2 **Standard for Black Start: Performance**

ASRP 8.2.1 **10-Minute Start-Up Capability**

Each Black Start Generating Unit must be able to start up with a dead primary and station service bus within ten minutes of issue of a Dispatch instruction by the ISO requiring a Black Start.

ASRP 8.2.2 **Reactive Capability**

Each Black Start Generating Unit must provide sufficient reactive capability to keep the energized transmission bus voltages within emergency voltage limits over the range of no-load to full load.

ASRP 8.2.3 **12-Hour Minimum Output Capability**

Each Black Start Generating Unit must be capable of sustaining its output for a minimum period of 12 hours from the time when it first starts delivering Energy.

ASRP 8.3 **Standard for Black Start: Location**

The ISO will select Black Start capacity in locations where adequate transmission capacity can be made readily available (assuming no transmission damage) to connect the Black Start Generating Unit to the station service bus of a Generating Unit designated by the ISO.

ASRP 8.4 **Standard for Black Start: Control**

ASRP 8.4.1 **Voice Communication Requirement**

Each supplier of Black Start capability must ensure that normal and emergency voice communications are available to permit effective Dispatch of the Black Start capability.

ASRP 8.4.2 **ISO Confirmation**

No load served by the Black Start Generating Unit or by any designated Generating Unit or by any transmission facility used for Black Start service may be restored until the ISO has confirmed that the need for such service has passed.

ASRP 8.5 **Standard for Black Start: Procurement**

ASRP 8.5.1 **Initial Procurement**

Black Start capability will initially be procured by the ISO through individual contracts with Scheduling Coordinators for Reliability Must-Run Units and other Generating Units which have Black Start capability.

ASRP 8.5.2 **Certified Generating Units Requirement**

Black Start capability may only be provided from Generating Units which have been certified and tested by the ISO using the process defined in Appendix F to this Protocol.

ASRP 9 **TESTING FOR STANDARD COMPLIANCE**

The ISO shall periodically conduct unannounced tests of resources providing Ancillary Services to confirm the ability of such resources to meet the applicable Ancillary Service standard for performance and control. Scheduling Coordinators for Ancillary Service resources being tested will be compensated for Energy output or Demand reduction provided pursuant to such tests in accordance with the ISO Tariff.

ASRP 9.1 Compliance Testing for Regulation

The ISO may test the capability of any Generating Unit providing Regulation by using the ISO EMS to move that Generating Unit's output over the full range of its Regulation capacity within a ten-minute period.

ASRP 9.2 Compliance Testing for Spinning Reserve

The ISO may test the capability of any Generating Unit, System Unit or external import of a System Resource providing Spinning Reserve by issuing unannounced Dispatch instructions requiring the Generating Unit, System Unit or external import of a System Resource to ramp up to its stated ten minute capability in accordance with the Scheduling Coordinator's Bid. Such tests may not necessarily occur on the hour. The ISO shall measure the response of the Generating Unit, System Unit or external import of a System Resource to determine compliance with its stated capabilities.

ASRP 9.3 Compliance Testing for Non-Spinning Reserve

ASRP 9.3.1 Compliance Testing of a Generating Unit, System Unit or System Resource

The ISO may test the Non-Spinning Reserve capability of a Generating Unit, System Unit or an external import of a System Resource by issuing unannounced Dispatch instructions requiring the Generating Unit or System Unit to come on line and ramp up or, in the case of a System Resource, to affirmatively respond to real-time interchange schedule adjustment; all in accordance with the Scheduling Coordinator's bid. Such tests may not necessarily occur on the hour. The ISO shall measure the response of the Generating Unit, System Unit or external import of a System Resource to determine compliance with its stated capabilities.

ASRP 9.3.2 Compliance Testing of Curtailable Demand

The ISO may test the Non-Spinning Reserve capability of a Load providing Curtailable Demand by issuing unannounced Dispatch instructions requiring the operator of the Load to report the switchable Demand of that Load actually being served by the operator at the time of the instruction. No Load will be disconnected as part of the test.

ASRP 9.4 Compliance Testing for Replacement Reserve

ASRP 9.4.1 Compliance Testing of a Generating Unit or System Resource

The ISO may test the Replacement Reserve capability of a Generating Unit, System Unit or an external import of a System Resource by issuing unannounced Dispatch instructions requiring the Generating Unit or System Unit to come on line and ramp up or, in the case of a System Resource, to affirmatively respond to a real-time interchange schedule adjustment; all in accordance with the Scheduling Coordinator's bid. Such tests may not necessarily occur on the hour. The ISO shall measure the response of the Generating Unit, System Unit or external import of a System Resource to determine compliance with its stated capabilities.

ASRP 9.4.2 **Compliance Testing of a Curtailable Demand**

The ISO may test the Replacement Reserve capability of a Load providing Curtailable Demand by issuing unannounced Dispatch instructions requiring the operator of the Load to report the switchable Demand of that Load actually being served by the operator at the time of the instruction. No Load will be disconnected as part of a test.

ASRP 9.5 **Compliance Testing for Voltage Support**

ASRP 9.5.1 **Compliance Testing of a Generating Unit**

The ISO may test the Voltage Support capability of a Generating Unit by issuing unannounced Dispatch instructions requiring the Generating Unit to adjust its power factor outside the specified power factor band of 0.90 lag to 0.95 lead, but within the limits of the Generating Unit capability curve.

ASRP 9.5.2 **Compliance Testing of Other Reactive Devices**

The ISO may test the Voltage Support capability of other reactive devices (shunt capacitors, static var compensators, synchronous condensers) by issuing unannounced Dispatch instructions requiring operation of such devices.

ASRP 9.6 **Compliance Testing for Black Start**

The ISO may test the Black Start capability of a Generating Unit by unannounced tests, which may include issuing Dispatch instructions to start and synchronize the resource, testing of all communications circuits, simulating switching needed to connect the Black Start Generating Unit to the transmission system, and testing the features unique to each facility that relate to Black Start service.

ASRP 9.7 **Consequences of Failure to Pass Compliance Testing**

ASRP 9.7.1 **Notification of Compliance Testing Results**

If a Generating Unit, Load, or System Resource fails a compliance test, the ISO shall notify the Scheduling Coordinator whose resource was the subject of the test and the Ancillary Service Provider or owner or operator of a System Resource providing Ancillary Services of such failure by any

means as soon as reasonably practicable after the completion of the test. In addition, regardless of the outcome of the test, the ISO shall provide the Scheduling Coordinator whose resource was subject to a compliance test written notice of the results of such test. The ISO shall at the same time send a copy of the notice to the Ancillary Service Provider or owner or operator of a System Resource providing Ancillary Services.

ASRP 9.7.2 **Penalties for Failure to Pass Compliance Testing**

The Scheduling Coordinator whose resource fails a compliance test shall be subject to the financial penalties provided for in the ISO Tariff. In addition, the ISO shall institute the sanctions described in ASRP 11.

ASRP 10 **PERFORMANCE AUDITS FOR STANDARD COMPLIANCE**

In addition to testing under ASRP 9, the ISO will periodically audit the performance of resources providing Ancillary Services to confirm the ability of such resources to meet the applicable Ancillary Service standard for performance and control.

ASRP 10.1 **Performance Audit for Regulation**

The ISO will audit the performance of a Generating Unit providing Regulation by monitoring its response to ISO EMS control around its Set Point within its rated MW/minute capability over the range of Regulation capacity scheduled for the current Settlement Period.

ASRP 10.2 **Performance Audit for Spinning Reserve**

The ISO will audit the performance of a Generating Unit or external import of a System Resource providing Spinning Reserve by auditing its response to Dispatch instructions and by analysis of Meter Data associated with the Generating Unit. Such audits may not necessarily occur on the hour. A Generating Unit providing Spinning Reserve shall be evaluated on its ability to respond to a Dispatch instruction, move at the MW/minute capability stated in its bid, reach the amount of Spinning Reserve capacity scheduled for the current Settlement Period within ten minutes of issue of the Dispatch instruction by the ISO, and respond to system frequency deviations outside the allowed frequency deadband. An external import of a System Resource providing Spinning Reserve shall be evaluated on its ability to respond to a Dispatch instruction, move at the MW/minute capability stated in its bid, reach the amount of Spinning Reserve capacity scheduled for the current settlement Period within ten minutes of issue of the Dispatch instruction by the ISO.

ASRP 10.3 **Performance Audit for Non-Spinning Reserve**

The ISO will audit the performance of a Generating Unit or System Resource providing Non-Spinning Reserve by auditing its response to Dispatch instructions, and by analysis of Meter Data associated with the resource. Such audits may not necessarily occur on the hour. A Generating Unit providing Non-Spinning Reserve shall be evaluated on its ability to respond to a Dispatch instruction, move at the MW/minute capability stated in its bid, and reach the amount of Non-Spinning Reserve capacity under the control of the ISO scheduled for the current Settlement Period within ten minutes of issue of the Dispatch instruction by the ISO. An external import of a System Resource providing Non-

Spinning Reserve shall be evaluated on its ability to respond to a Dispatch instruction, move at the MW/minute capability stated in its bid, reach the amount of Non-Spinning Reserve capacity scheduled for the current Settlement Period within ten minutes of issue of the Dispatch instruction by the ISO.

ASRP 10.4 **Performance Audit for Replacement Reserve**

The ISO will audit the performance of a Generating Unit or System Resource providing Replacement Reserve by auditing its response to Dispatch instructions, and by analysis of Meter Data associated with the resource. Such audits may not necessarily occur on the hour. A Generating Unit providing Replacement Reserve shall be evaluated on its ability to respond to a Dispatch instruction, start within the designated time frame, move at the MW/minute capability stated in its bid, reach the amount of Replacement Reserve capacity scheduled for the Settlement Period concerned within sixty-minutes of issue of the Dispatch instruction, and sustain operation at this level for a sufficient time to assure availability over the specified period. An external import of a System Resource providing Replacement Reserve shall be evaluated on its ability to respond to a Dispatch instruction, start within the designated time frame, move at the MW/minute capability stated in its bid, reach the amount of Replacement Reserve capacity scheduled for the Settlement Period concerned within sixty minutes of issue of the Dispatch instruction, and sustain operation at this level for a sufficient time to assure availability over the specified period.

ASRP 10.5 **Performance Audit for Voltage Support**

The ISO will audit the performance of a resource providing Voltage Support by auditing of its response to Dispatch instructions, and by analysis of Meter Data associated with the resource. A resource providing Voltage Support shall be evaluated on its ability to provide reactive support over the stated power factor range of the resource, provide reactive support within the prescribed time periods, and demonstrate the effective function of automatic voltage control equipment for the amount of Voltage Support under the control of the ISO for the current Settlement Period.

ASRP 10.6 **Performance Audit for Black Start**

The ISO will audit the performance of a Black Start Generating Unit by analysis of Meter Data and other records to determine that the performance criteria relating to the Black Start from that Black Start Generating Unit were met when required.

ASRP 10.7 Consequences of Failure to Pass Performance Audits

ASRP 10.7.1 Notification of Performance Audit Results

The ISO shall give the Scheduling Coordinator for an Ancillary Service Provider whose resource was subject to a performance audit written notice of the results of such audit. The ISO will at the same time send a copy of the notice to the Ancillary Service Provider

ASRP 10.7.2 **Penalties for Failure to Pass Performance Audit**

The Scheduling Coordinator for an Ancillary Service Provider whose resource fails a performance audit shall be subject to the financial penalties provided for in the ISO Tariff. In addition the sanctions described in ASRP 10 shall come into effect.

ASRP 11 **SANCTIONS FOR POOR PERFORMANCE**

ASRP 11.1 **Warning Notice**

If an Ancillary Service resource fails a compliance test or a performance audit, the ISO will issue a warning notice to the Scheduling Coordinator for that resource and at the same time will send a copy of the notice to the owner and operator of the resource.

ASRP 11.2 **Scheduling Coordinator's Option to Test**

On receipt of a warning notice the Ancillary Service Provider for the resource concerned may request the ISO, through its Scheduling Coordinator, to test the capability of the Ancillary Service resource concerned. The ISO shall carry out such test as soon as practicable and the cost of such test shall be paid by the Scheduling Coordinator irrespective of the result of the test.

ASRP 11.3 **Duration of Warning Notice**

A warning notice shall continue in effect until:

(a) the Ancillary Service resource is next tested by the ISO whether such a test is called for by the Scheduling Coordinator under ASRP 11.2 or carried out by the ISO under ASRP 9; or

(b) the expiry of a period of six calendar months from the date upon which the ISO notified the Scheduling Coordinator that the Ancillary Service resource failed the test or the performance audit which gave rise to the issue of the warning notice, whichever is the earlier.

ASRP 11.4 **Second failure**

An Ancillary Service resource which fails a compliance test or a performance audit conducted during the period when a warning notice for that resource is in effect shall be disqualified immediately from providing the Ancillary Service concerned

whether as part of the ISO's auction or as part of a self-provision arrangement, and shall not be permitted to submit a bid to the ISO or be part of a self provision arrangement until such time as it has successfully re-passed the approval and certification procedure described in the relevant Appendix to this ASRP.

ASRP 12 AMENDMENTS TO THE PROTOCOL

If the ISO determines a need for an amendment to this Protocol, the ISO will follow the requirements as set forth in Section 16 of the ISO Tariff.