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

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.

"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.

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;

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

In accordance with the requirements of SP 3.2.1, 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 and technical capabilities:

(a) it must be capable of being controlled and monitored by the ISO Energy Management System (EMS) by means of the installation and use of a standard ISO direct communication and direct control system, a description of which and criteria for any temporary exemption from which, the ISO shall publish on the ISO internet "Home Page;"

(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 a value within a range from a minimum of ten minutes to a maximum of thirty minutes, which value shall be specified by the ISO and published on the ISO's internet "Home Page;"

(d) the Generating Unit to ISO Control Center telemetry must in a manner meeting ISO standards include indications of whether the Generating Unit is on or off AGC at the Generating Unit terminal equipment; and

(e) the Generating Unite must be capable of the full range of movement within the amount of Regulation capability offered without manual Generating Unit operator intervention of any kind.

ASRP 4.2.2 Operational EMS/SCADA Equipment

Each Participating Generator must ensure that the ISO EMS control and related SCADA equipment for its generating facility are 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

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 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

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.

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.

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 Coordinator'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 metered output 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 metered output shall be calculated as the sum of 5% of its Demand (except the Demand covered by firm purchases from outside the ISO Control Area) met by Generation from hydroelectric resources plus 7% of its Demand (except the Demand covered by firm purchases from outside the ISO Control Area) 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 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

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.

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 (excluding exports) by each Scheduling Coordinator in each identified Zone for that Settlement Period to the total metered Demand (excluding exports) 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 operating within the ISO Control Area and external imports of System Resources.

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 11 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