

**6. COMMUNICATIONS.**

**6.1 Methods of Communications.**

**6.1.1 Full-Time Communications Facility Requirement.**

Each Scheduling Coordinator, Utility Distribution Company, Participating TO, Participating Generator, Balancing Authority (to the extent the agreement between the Balancing Authority and the CAISO so provides), and MSS Operator must provide a communications facility manned twenty-four (24) hours a day, seven (7) days a week capable of receiving Dispatch Instructions issued by the CAISO.

**6.1.2 Information Transfer from Scheduling Coordinator to CAISO.**

Unless otherwise agreed by the CAISO, Scheduling Coordinators who wish to submit Bids into CAISO Markets for Energy or Ancillary Services to the CAISO must submit the information to the CAISO's secure communication system. Scheduling Coordinators that wish to submit Dynamic Schedules or Bids for Ancillary Services to the CAISO must also comply with the applicable requirements of Sections 4.5.4.3, 8.4.5 and 8.4.7.2.1.

**6.1.3 Submitting Information to the CAISO's Secure Communication System.**

For Scheduling Coordinators submitting information to the CAISO's secure communication system, each such Scheduling Coordinator shall establish a network connection with the CAISO's secure communication system. Link initialization procedures shall be necessary to establish a connection to the CAISO's secure communication system. In order to log in, each Scheduling Coordinator will be furnished a digital certificate by the CAISO.

**6.1.3.1** The CAISO will make available data templates and validation rules information that provides a description of the templates which will be utilized to enter data into the CAISO's secure communication system.

**6.1.4 Information Transfer from CAISO to Scheduling Coordinator.**

Unless otherwise agreed between a Scheduling Coordinator and the CAISO, the CAISO shall furnish scheduling information to Scheduling Coordinators by electronic transfer as described in Section 6. If electronic data transfer is not available, the information may be furnished by facsimile. If it is not possible to communicate with the Scheduling Coordinator using the primary means of communication, an alternate means of communication shall be selected by the CAISO.

**6.1.5 Information to be Provided By Connected Entities to the CAISO.**

Each Connected Entity shall provide to the CAISO:

- (a) A single and an alternative telephone number and a single and an alternative facsimile number by which the CAISO may contact twenty-four (24) hours a day a representative of the Connected Entity in, or in relation to, a System Emergency; and
- (b) The names or titles of the Connected Entity's representatives who may be contacted at such telephone and facsimile numbers.

**6.1.5.1** Each representative specified pursuant to this Section 6.1.5 shall be a person having appropriate experience, qualification, authority, responsibility and accountability within the Connected Entity to act as the primary contact for the CAISO in the event of a System Emergency.

**6.1.5.2** The details required under this Section 6.1.5 shall at all times be maintained up to date and the Connected Entity shall notify the CAISO of any changes promptly and as far in advance as possible.

**6.2 CAISO's Secure Communication System.**

**6.2.1 Scheduling Coordinators.**

**6.2.1.1** Scheduling Coordinators shall arrange access to the CAISO's secure communication system. Scheduling Coordinators shall maintain a secure electronic communication system for receiving Dispatch Instructions that is approved by the CAISO.

**6.2.1.2** Details of the technical aspects of the CAISO's secure communication system, including information on how to change mechanisms and back-up procedures for individual Scheduling Coordinator failures, will be made available by the CAISO to Scheduling Coordinators on request. It is assumed that each Scheduling Coordinator has made application for and signed a Scheduling Coordinator Agreement. As such, each Scheduling Coordinator will already be familiar with and have arranged the mechanism, including security arrangements, by which it will initially communicate with the CAISO.

**6.2.1.3 Individually Assigned Login Accounts.**

The CAISO will provide an interface for data exchange between the CAISO and Scheduling Coordinators who shall each have individually assigned login accounts via digital certificates. Through the use of the security provisions of CAISO's secure communication system, data will be provided by the CAISO to Scheduling Coordinators on a confidential basis (such as Day-Ahead Schedules for individual Scheduling Coordinators). Other CAISO data that is not confidential (such as CAISO Demand Forecasts) will be published on the public access reporting system of the CAISO Website and be available to anyone.

**6.2.1.4 Failure or Corruption of the CAISO's Secure Communication System.**

The CAISO shall, in consultation with Scheduling Coordinators, make provision for procedures to be implemented in the event of a total or partial failure of the CAISO's secure communication system or the material corruption of data on the CAISO's secure communication system. The CAISO shall ensure that such alternative communications systems are tested periodically.

**6.2.1.5 Confidentiality.**

All information posted on the CAISO's secure communication system shall be subject to the confidentiality obligations contained in Section 20.

**6.2.1.6 Standards of Conduct.**

The CAISO and all Market Participants shall comply with their obligations, to the extent applicable, under the standards of conduct set out in 18 C.F.R. §37.

**6.2.2 Public Market Information.**

**6.2.2.1 Non-Discriminatory Access to Information.**

The CAISO shall provide non-discriminatory access to information concerning the status of the CAISO Controlled Grid or facilities that affect the CAISO Controlled Grid by posting that information on the CAISO Website, or other similar computer communications device, or by telephone or facsimile in the event of computer systems failure.

**6.2.2.2 Open Access Same-Time Information System.**

The CAISO shall provide a public access information reporting system, Open Access Same-Time Information System (OASIS), to deliver market operations and grid management information to accommodate users other than Market Participants. OASIS will be accessible to the public via a link on the CAISO Website.

**6.3 Communication of Dispatch Instructions.**

Normal verbal and electronic communication of Dispatch Instructions between the CAISO and Generators or Participating Loads will be via the relevant Scheduling Coordinator.

**6.3.1 Scheduling Coordinator Responsibility to Pass Dispatch Instructions to Participating Generator or Load.**

Each Scheduling Coordinator must immediately pass on to the Generator or Participating Load concerned any communication for the Generator or Participating Load which it receives from the CAISO.

Communication delays by the Scheduling Coordinator may result in Uninstructed Deviation Penalties or other adjustments pursuant to this CAISO Tariff. The CAISO may, with the prior permissions of the Scheduling Coordinator concerned, communicate with and give Dispatch Instructions to the operators of Generating Units and Loads directly without having to communicate through their appointed Scheduling Coordinator. In situations of deteriorating system conditions or emergency, the CAISO reserves the right to communicate directly with the Generator(s) as required to ensure System Reliability.

### **6.3.2 Recording of Dispatch Instructions.**

The CAISO shall maintain records of all electronic, fax and verbal communications related to a Dispatch Instruction. The CAISO shall maintain a paper or electronic copy of all Dispatch Instructions delivered by fax and all Dispatch Instructions delivered electronically. The CAISO shall record all voice conversations that occur related to Dispatch Instructions on the Dispatch Instruction communication equipment. These records, copies and recordings may be used by the CAISO to audit the Dispatch Instruction, and to verify the response of the Market Participant concerned to the Dispatch Instruction.

### **6.3.3 Contents of Dispatch Instructions.**

Dispatch Instructions shall include, but are not limited to, the following information:

- (a) specific resource being dispatched;
- (b) specific MW value of the resource being dispatched;
- (c) specific type of instruction (action required);
- (d) time the resource is required to begin initiating the Dispatch Instruction;
- (e) time the resource is required to achieve the Dispatch Instruction;
- (f) time of notification of the Dispatch Instruction; and
- (g) any other information which the CAISO considers relevant.

**6.4 Communication of Operating Orders.**

The CAISO shall use normal verbal and electronic communication to issue operating orders to the Connected Entity.

**6.5 CAISO Communications.**

The CAISO will provide a secure communication system to publish confidential information and communicate with Scheduling Coordinators, and OASIS to publish public information.

**6.5.1 Communication With Market Participants, Congestion Revenue Rights Participants, and the Public.**

**6.5.1.1 Market Participants With Non-Disclosure Agreements.**

**6.5.1.1.1** Annually, the CAISO shall provide information that will include, but is not limited to, the following:

- (a) CRR Full Network Model;
- (b) Constraints and Transmission Interface definitions;
- (c) Load Distribution Factors for each CRR Allocation and CRR Auction that is published prior to the CRR Allocation and CRR Auction; and
- (d) Nominations and/or parameters to be used for modeling in each annual CRR Allocation and CRR Auction processes: Transmission Ownership Rights, Existing Contracts and Converted Rights expected usage, and Merchant Transmission CRRs.

**6.5.1.1.2** Monthly, the CAISO shall provide information that will include, but is not limited to, the following:

- (a) CRR Full Network Model;
- (b) Constraints and Transmission Interface definitions;

- (c) Load Distribution Factors for each CRR Allocation and CRR Auction that is published prior to the CRR Allocation or CRR Auction; and
- (d) Nominations and/or parameters to be used for modeling in each monthly CRR Allocation and CRR Auction processes: Transmission Ownership Rights, Existing Contracts and Converted Rights expected usage, and Merchant Transmission CRRs.

**6.5.1.2 CRR Participants Without Non-Disclosure Agreements.**

**6.5.1.2.1** Annually, the CAISO shall provide CRR information specific to that CRR Holder or Candidate CRR Holder as it relates to participation in the annual CRR Allocation or CRR Auction.

**6.5.1.2.2** Monthly, the CAISO shall provide CRR information specific to that CRR Holder or Candidate CRR Holder as it relates to participation in the monthly CRR Allocation or CRR Auction.

**6.5.1.3 Public Market Information.**

**6.5.1.3.1** Annually, the CAISO shall publish the following information including, but not limited to:

- (a) Market Clearing Prices for all Aggregated PNodes used in the CRR Auction clearing for on-peak and off-peak;
- (b) CRR Holdings by CRR Holder (including):
  - (i) CRR Source name(s);
  - (ii) CRR Sink name(s);
  - (iii) CRR quantity (MW) for each CRR Source(s) and CRR Sink(s);
  - (iv) CRR start and end dates;
  - (v) Time of use specifications for the CRR(s); and
  - (vi) Whether the CRR is a CRR Option or CRR Obligation.

**6.5.1.3.2** Monthly, the CAISO shall publish the following information including, but not limited to:

- (a) Market Clearing Prices for all Aggregated PNodes used in the CRR Auction clearing for on-peak and off-peak;
- (b) CRR Holdings by CRR Holder (including):
  - (i) CRR Source name(s);
  - (ii) CRR Sink name(s);
  - (iii) CRR quantity (MW) for each CRR Source(s) and CRR Sink(s);
  - (iv) CRR start and end dates;
  - (v) Time of use specifications for the CRR(s); and
  - (vi) Whether the CRR is a CRR Option or a CRR Obligation.

**6.5.1.3.3** Seasonally, the CAISO shall publish the following information including, but not limited to:

- (a) Set of LDFs that represent typical seasonal on-peak and off-peak values, not used for Settlements, before the new season.

**6.5.1.4 Requirements to Obtain the CRR Full Network Model.**

The CAISO shall distribute the CRR Full Network Model only to those Market Participants and non-Market Participants that satisfy the following requirements and the related procedures set forth in the Business Practice Manual.

- (a) A Market Participant that is a member of the WECC and that requests the CRR Full Network Model: (i) shall execute the Non-Disclosure Agreement for CRR Full Network Model Distribution that is posted on the CAISO Website and (ii) shall provide to the CAISO a non-disclosure statement, the form of which is attached as an exhibit to the Non-Disclosure Agreement executed by the Market Participant, executed by each employee and consultant of the Market Participant who will have access to the CRR Full Network Model.



- (b) A Market Participant that is not a member of the WECC and that requests the CRR Full Network Model: (i) shall execute the Non-Disclosure Agreement for CRR Full Network Model Distribution that is posted on the CAISO Website, (ii) shall provide to the CAISO a fully executed WECC Non-Member Confidentiality Agreement for WECC Data, and (iii) shall provide to the CAISO a non-disclosure statement, the form of which is attached as an exhibit to the Non-Disclosure Agreement executed by the Market Participant, executed by each employee and consultant of the Market Participant who will have access to the CRR Full Network Model.
  
- (c) A non-Market Participant that is a member of the WECC and that requests the CRR Full Network Model: (i) shall reasonably demonstrate a legitimate business or governmental interest in the CAISO Markets, (ii) shall execute the Non-Disclosure Agreement for CRR Full Network Model Distribution that is posted on the CAISO Website, and (iii) shall provide to the CAISO a non-disclosure statement, the form of which is attached as an exhibit to the Non-Disclosure Agreement executed by the non-Market Participant, executed by each employee and consultant of the non-Market Participant who will have access to the CRR Full Network Model.

- (d) A non-Market Participant that is not a member of the WECC and that requests the CRR Full Network Model: (i) shall reasonably demonstrate a legitimate business or governmental interest in the CAISO Markets, (ii) shall execute the Non-Disclosure Agreement for CRR Full Network Model Distribution that is posted on the CAISO Website, (iii) shall provide to the CAISO a fully executed WECC Non-Member Confidentiality Agreement for WECC Data, and (iv) shall provide to the CAISO a non-disclosure statement, the form of which is attached as an exhibit to the Non-Disclosure Agreement executed by the non-Market Participant, executed by each employee and consultant of the non-Market Participant who will have access to the CRR Full Network Model.

**6.5.1.5 Non-Disclosure Agreement.**

The CAISO's Non-Disclosure Agreement for CRR Full Network Model Distribution shall be posted on the CAISO Website. This Non-Disclosure Agreement shall provide for the CAISO to receive the costs of litigation, including attorneys' fees, related to the Non-Disclosure Agreement if the CAISO prevails in litigation. Recipients of the CRR Full Network Model may use the CRR Full Network Model and related studies in pleadings to the FERC provided they request confidential treatment of all information subject to the Non-Disclosure Agreement.

**6.5.1.6 Obligation to Report Violations of Section 6.5.1.4.**

Each Market Participant, non-Market Participant, employee of a Market Participant, employee of a non-Market Participant, consultant, and employee of a consultant to whom the CAISO distributes the CRR Full Network Model shall be obligated to immediately report to the CAISO any violation of the requirements of Section 6.5.1.4.

**6.5.2 Communications Prior to the Day-Ahead Market.**

**6.5.2.1 Communications Regarding the State of the CAISO Controlled Grid.**

The CAISO shall use OASIS to provide public information to Market Participants regarding the CAISO Controlled Grid or facilities that affect the CAISO Controlled Grid. Such information may include but is not limited to:

- (a) Future planned Outages of transmission facilities;
- (b) Operational Transfer Capability (OTC); and
- (c) Available Transfer Capability (ATC) for WECC paths and Transmission Interfaces with external Balancing Authority Areas.

**6.5.2.2 Communications With Scheduling Coordinators.**

**6.5.2.2.1 Bid Adder Eligibility.**

**6.5.2.2.1.1** By the 20<sup>th</sup> of each month, the CAISO will notify Scheduling Coordinators of Bid Adder eligibility, applicable Bid Adder value for the following month, and Frequently Mitigated Units that are eligible for a Bid Adder.

**6.5.2.2.1.2** Scheduling Coordinators shall have one week to review Bid Adder information and provide comment back to the CAISO by the 27<sup>th</sup> of each month.

**6.5.2.2.2 Day-Ahead Market Bid Submittal.**

Seven (7) days prior to the target Day-Ahead Market, Scheduling Coordinators can begin submitting Bids for that DAM.

**6.5.2.3 Public Market Information.**

**6.5.2.3.1 Demand Forecasts.**

**6.5.2.3.1.1** Beginning seven (7) days prior to the target Day-Ahead Market, and updated as necessary, the CAISO will publish the CAISO Forecast of CAISO Demand.

**6.5.2.3.1.2** By 6:00 p.m. the day prior to the target Day-Ahead Market, the CAISO will publish the updated CAISO Forecast of CAISO Demand.

**6.5.2.3.2 Network and System Conditions.**

By 6:00 p.m. the day prior to the target Day-Ahead Market, the CAISO will publish known network and system conditions, including but not limited to OTC and ATC, the total capacity of inter-Balancing Authority Area Transmission Interfaces, and the available capacity.

**6.5.2.3.3 Ancillary Services Requirements.**

By 6:00 p.m. the day prior to the target Day-Ahead Market, the CAISO will publish forecasted Ancillary Services requirements and regional constraints by AS Region.

**6.5.2.3.4 Gas Price Indices.**

The CAISO will publish relevant gas price indices when available.

**6.5.2.3.5 Extremely Long-Start Unit Commitment.**

The CAISO will communicate commitment instructions to Scheduling Coordinators for Extremely Long-Start Resources by 3:00 p.m. two (2) days in advance of the Operating Day through a secure communication system.

**6.5.3 Day-Ahead Market Communications.**

**6.5.3.1 Communications With Scheduling Coordinators.**

**6.5.3.1.1** Prior to 6:00 a.m., the CAISO will continuously screen Inter-SC Trades of Energy for the DAM submitted by Scheduling Coordinators and will provide feedback to the Scheduling Coordinators about the consistency and validity of these Inter-SC Trades based on information available to the CAISO.

**6.5.3.1.2** Between 6:00 a.m. and the end of the Day-Ahead Inter-SC Trade Period, the CAISO performs the validation of Inter-SC Trades of Energy for the DAM and will notify the participants of the status of these Inter-SC Trades.

**6.5.3.1.3** Between 5:00 a.m. and 10:00 a.m., the CAISO will provide feedback to Scheduling Coordinators about their validated ETC and TOR quantities, and calculated Default Energy Bids curves provided by Independent Entities, and in addition, the RMR Proxy Bids for Energy and the Minimum Load and Start-Up Cost Bid curves for RMR Units, as provided by Independent Entities.

**6.5.3.1.4** After the close of the DAM bidding at 10:00 a.m., the CAISO will send a message to the Scheduling Coordinators regarding the outcome of the Bid validation.

**6.5.3.1.5** By 1:00 p.m., the CAISO will publish the result of the DAM and the resource will be flagged if it is being dispatched under its RMR Contract. Any such Dispatch shall be deemed an RMR Dispatch Notice under the RMR Contract.

**6.5.3.1.6** After the results of the DAM are published by 1:00 p.m., the CAISO performs the Inter-SC Trade of Energy post-market validation and communicates the results back to the applicable Scheduling Coordinator.

**6.5.3.1.7** The results of the Day-Ahead Market will be published by 1:00 p.m. and will include:

- (a) Unit Commitment status for resources committed in the IFM;
- (b) Day-Ahead Schedules and prices;
- (c) Day-Ahead AS Awards and prices;
- (d) RUC Awards and RUC Capacity and resource-specific RUC Prices;
- (e) RUC Start-Up Instructions;
- (f) Start-Up Instructions resulting from the ELC Process;
- (g) Post-market summary of Day-Ahead and Real-Time Energy Schedules, Ancillary Service Awards, RMR Dispatches, and CCR results of RMR Units;
- (h) Day-Ahead final resource Bid mitigation results; and
- (i) Day-Ahead finally qualified Load following capacity.

**6.5.3.1.8** All Expected Energy results will be published at one (1) day after the Trading Day and will include post-market Energy accounting results for Settlement calculations.

**6.5.3.2 Public Market Information.**

**6.5.3.2.1** Before 10:00 a.m. one (1) day before the Operating Day) the CAISO will publish updated Outage information regarding the transmission system on OASIS. The updated Outage information will include planned and actual Outage events per Transmission Interface, including Outage description, Outage start time and end time, and rating of the curtailed line.

**6.5.3.2.2** The results of the Day-Ahead Market will be published on OASIS by 1:00 p.m. and will include:

- (a) Total Day-Ahead Schedules (MWh) for total Supply and Demand by TAC Area and for the entire CAISO Balancing Authority Area;
- (b) Total Day-Ahead Schedules (MWh) of imports and exports by Transmission Interface;
- (c) Total Day-Ahead AS Awards by AS Region and AS type;
- (d) RUC Prices by PNode and APNodes, RUC Forecast Demand for each RUC Zone, hourly RUC Capacity from Generation, and hourly RUC Capacity from imports for each TAC Area and the entire CAISO Balancing Authority Area;
- (e) Day-Ahead LMP for Energy for each PNode and APNode, including the Energy, MCC and MCL components;
- (f) Day-Ahead ASMP by AS Region and AS type;
- (g) Day-Ahead mitigation indicator;
- (h) CAISO Forecast of CAISO Demand for each TAC Area and the entire CAISO Balancing Authority Area;
- (i) Shadow Prices; and
- (j) Total Day-Ahead system Marginal Losses in MWh and Marginal Cost of Losses for each Trading Hour of the next Trading Day.

**6.5.4 HASP Communications.**

The HASP opens at 1:00 p.m. the day before the target Operating Day and Scheduling Coordinators can submit Bids into the HASP as of that time.

**6.5.4.1 Communications With Scheduling Coordinators.**

**6.5.4.1.1** Before one hundred thirty-five (135) minutes before the Trading Hour, the CAISO will continuously screen Inter-SC Trades of Energy for the HASP, Inter-SC Trades of Ancillary Services, and Inter-SC Trades of IFM Load Uplift Obligations submitted by Scheduling Coordinators and will communicate with the Scheduling Coordinators about the consistency and validity of these Inter-SC Trades based on information available to the CAISO.

**6.5.4.1.2** Between one hundred thirty-five (135) minutes before the Trading Hour and forty-five (45) minutes before the Trading Hour, the CAISO will perform the pre-market validation check for Inter-SC Trades for the HASP and Inter-SC Trades of Ancillary Services and will provide feedback to the Scheduling Coordinators about the validity of these Inter-SC Trades based on information available to the CAISO.

**6.5.4.1.3** At approximately seventy-five (75) minutes before the Trading Hour, the CAISO will send a message to the Scheduling Coordinators regarding the outcome of the Bid validation.

**6.5.4.1.4** In between two hundred seventy (270) minutes before the Trading Hour and the top of the Trading Hour, the CAISO will issue RTM Start-Up Instructions for Short Start Units consistent with the resource's Start-Up Time.

**6.5.4.1.5** No later than forty (40) minutes before the Trading Hour, on an hourly basis, the CAISO will publish via the secure communication system the following:

- (a) HASP Intertie Schedules and LMPs; and
- (b) HASP AS Awards and ASMPs



**6.5.4.1.6** No later than thirty (30) minutes before the Trading Hour, on an hourly basis, the CAISO will publish via the secure communication system the following:

- (a) HASP Advisory Schedules;
- (b) HASP AS Awards; and
- (c) HASP final resource Bid mitigation results.

**6.5.4.1.7** At approximately thirty (30) minutes before the Trading Hour, the CAISO performs the Inter-SC Trade of Energy post-market validation and sends the results back to the applicable Scheduling Coordinators.

**6.5.4.1.8** After thirty (30) minutes before the Trading Hour, on an hourly basis, the CAISO will publish via the secure communication system the following:

- (a) Advisory Resource-Specific Settlement Interval LMPs, and
- (b) Resource-Specific ASMPs.

**6.5.4.2 Public Market Information.**

**6.5.4.2.1** By one hundred five (105) minutes before the Trading Hour the CAISO will publish information regarding Outages on the transmission system on OASIS that will be used for HASP Schedules and Congestion Management.

**6.5.4.2.2** At thirty (30) minutes before the Trading Hour, on an hourly basis, the CAISO will publish on OASIS the following:

- (a) Total HASP Intertie Schedules for imports and exports by TAC Area and for the entire CAISO Balancing Authority Area;
- (b) HASP Intertie LMPs by PNodes and APNodes;
- (c) HASP advisory LMPs by PNode and APNode;
- (d) HASP Shadow Prices; and
- (e) Total HASP system Marginal Losses in MWh for the next Operating Hour.

**6.5.5 Real-Time Market Communications.**

The CAISO shall issue Dispatch Instructions to Scheduling Coordinators determined pursuant to the RTM throughout any given day.

**6.5.5.1 Communications with Scheduling Coordinators.**

Communications between the CAISO and Scheduling Coordinators shall take place via the CAISO's secure communication system to a dedicated terminal at the Scheduling Coordinator's scheduling center. If there is a failure of electronic communications with a Scheduling Coordinator, then, at the CAISO's discretion, the Scheduling Coordinator may communicate by facsimile. Communication by facsimile requires verbal approval by the CAISO.

**6.5.5.1.1** Every fifteen (15) minutes, the CAISO will communicate via the secure communication system Start-Up and Shut-Down Instructions and Real-Time AS Awards to internal resources.

**6.5.5.1.2** Every five (5) minutes for Target T+10, the CAISO will send Dispatch Instructions via the secure communication system. The Dispatch Instruction will be flagged if a resource is being dispatched under its RMR Contract.

**6.5.5.2 Public Market Information.**

**6.5.5.2.1** Every hour the CAISO shall post via OASIS information regarding the status of the RTM. This information shall include but is not limited to the following:

- (a) Mitigation indicator.

**6.5.5.2.2** Every fifteen (15) minutes the CAISO shall post via OASIS information regarding the status of the RTM. This information shall include but is not limited to the following:

- (a) Total Real-Time AS Awards by AS Region and AS type; and
- (b) Real-Time ASMPs by AS Region and AS type.

**6.5.5.2.3 [NOT USED]**

**6.5.5.2.4** Every five (5) minutes the CAISO shall post via OASIS information regarding the status of the RTM. This information shall include but is not limited to the following:

- (a) CAISO Forecast of CAISO Demand;
- (b) Total Real-Time dispatched Energy and Demand on a 24-hour delayed basis;
- (c) Real-Time Dispatch Interval LMP;
- (d) Real-Time system losses; and
- (e) Actual Operating Reserve.

**6.5.6 Market Bid Information.**

**6.5.6.1 Public Market Information.**

**6.5.6.1.1** The following information shall be published on OASIS 180 days following the applicable Trading Day, with the exclusion of the information that is specific to Scheduling Coordinators:

- (a) AS market Bids;
- (b) Energy market Bids; and
- (c) RUC market Bids.

**6.5.6.1.2** Within seven (7) days after the Trading Day, the CAISO will publish via OASIS all Start-Up Costs and Minimum Load Costs for CAISO committed resources.

**7. SYSTEM OPERATIONS UNDER NORMAL AND EMERGENCY OPERATING CONDITIONS.**

**7.1 CAISO Control Center Operations.**

**7.1.1 Maintain CAISO Control Center.**

The CAISO shall maintain a WECC approved Balancing Authority Area and Primary CAISO Control Center to direct the operation of all facilities forming part of the CAISO Controlled Grid, including Reliability Must-Run Units, System Resources, and Generating Units providing Ancillary Services.

**7.1.2 Maintain Back-up Control Facility.**

The CAISO shall maintain back-up control facilities remote from the Primary CAISO Control Center sufficient to enable the CAISO to continue to direct the operation of the CAISO Controlled Grid, Reliability Must-Run Units, System Resources and Generating Units providing Ancillary Services in the event of the Primary CAISO Control Center becoming inoperable. The CAISO may delegate responsibilities to the Backup Control Center in which case the Primary CAISO Control Center shall serve as the back-up control facility for those responsibilities.

**7.1.3 CAISO Control Center Authorities.**

The CAISO shall have full authority, subject to this CAISO Tariff, to direct the operation of the facilities referred to in Section 7.1.1 and 7.1.2 including (without limitation), to:

- (a) direct the physical operation by the Participating TOs of transmission facilities under the Operational Control of the CAISO, including (without limitation) circuit breakers, switches, voltage control equipment, protective relays, metering, and Load Shedding equipment;
- (b) commit and dispatch Reliability Must-Run Units, except that the CAISO shall only commit Reliability Must-Run Generation for Ancillary Services capacity according to Section 41;
- (c) order a change in operating status of auxiliary equipment required to control voltage or frequency;
- (d) take any action it considers to be necessary consistent with Good Utility Practice to protect against uncontrolled losses of Load or Generation and/or equipment damage resulting from unforeseen occurrences;
- (e) control the output of Generating Units, Interconnection schedules, and System Resources that are selected to provide Ancillary Services or Energy;
- (f) Dispatch Curtailable Demand which has been scheduled to provide Non-Spinning Reserve;
- (g) procure Energy for a threatened or imminent System Emergency;
- (h) require the operation of resources which are at the CAISO's disposal in a System Emergency, as described in Section 7.7;

- (i) exercise Operational Control of all transmission lines greater than 230kV and associated equipment on the CAISO Controlled Grid;
- (j) exercise Operation Control of all Interconnections; and
- (k) exercise Operational Control of all 230kV and lower voltage transmission lines and associated station equipment identified in the CAISO Register as that portion of the CAISO Controlled Grid.

The CAISO will exercise its authority under this Section 7.1.3 by issuing Dispatch Instructions to the relevant Market Participants using the relevant communications method described in this CAISO Tariff.

**7.2 Operating Reliability Criteria.**

The CAISO shall exercise Operational Control over the CAISO Controlled Grid in compliance with all Applicable Reliability Criteria and Operating Procedures.



**7.3 Transmission Planning Authority.**

**7.3.1** The CAISO shall exercise Operational Control over the CAISO Controlled Grid to meet planning and Operating Reserve criteria no less stringent than those established by WECC and NERC as those standards may be modified from time to time, and Local Reliability Criteria that are in existence on the CAISO Operations Date and have been submitted to the CAISO by each Participating TO pursuant to Section 2.2.1(v) of the TCA. All Market Participants and the CAISO shall comply with the CAISO Reliability Criteria, standards, and procedures.

**7.3.2** The CAISO Governing Board may establish planning guidelines more stringent than those established by NERC and WECC as needed for the secure and reliable operation of the CAISO Controlled Grid. The CAISO may revise the Local Reliability Criteria subject to and in accordance with Section 5 of the TCA.

### **7.3.3 NAESB Standards.**

The following standards of the Wholesale Electric Quadrant (WEQ) of the North American Energy Standards Board (NAESB) are incorporated by reference:

- Coordinate Interchange (WEQ-004, Version 001, October 31, 2007, with minor corrections applied on Nov. 16, 2007) including Purpose, Applicability, and Standards 004-0.1 through 004-17.2, and 004-A through 004-D;
- Area Control Error (ACE) Equation Special Cases Standards (WEQ-005, Version 001, Oct. 31, 2007, with minor corrections applied on Nov. 16, 2007) including Purpose, Applicability, and Standards 005-0.1 through 005-3.1.3, and 005-A;
- Manual Time Error Correction (WEQ-006, Version 001, Oct. 31, 2007, with minor corrections applied on Nov. 16, 2007) including Purpose, Applicability, and Standards 006-0.1 through 006-12;
- Inadvertent Interchange Payback (WEQ-007, Version 001, Oct. 31, 2007, with minor corrections applied on Nov. 16, 2007) including Purpose, Applicability, and Standards 007-0.1 through 007-2, and 007-A;
- Gas/Electric Coordination (WEQ-011, Version 001, Oct. 31, 2007, with minor corrections applied on Nov. 16, 2007) including Standards 011-0.1 through 011-1.6; and
- Public Key Infrastructure (PKI) (WEQ-012, Version 001, Oct. 31, 2007, with minor corrections applied on Nov. 16, 2007) including Recommended Standard, Certification, Scope, Commitment to Open Standards, and Standards 012-0.1 through 012-1.26.5.

The CAISO has applied for a waiver of the following NAESB WEQ standards:

- Business Practices for Open Access Same-Time Information Systems (OASIS), Version 1.4 (WEQ-001, Version 001, Oct. 31, 2007, with minor corrections applied on Nov. 16, 2007) including Standards 001-0.2 through 001-0.8, 001-0.14 through 001-0.20, 001-2.0 through 001-9.6.2, 001-9.8 through 001-12.5.2, and 001-A and 001-B;
- Business Practices for Open Access Same-Time Information Systems (OASIS) Standards & Communication Protocols, Version 1.4 (WEQ-002, Version 001, Oct. 31, 2007, with minor corrections applied on Nov. 16, 2007) including Standards 002-0.1 through 002-5.10;
- Open Access Same-Time Information Systems (OASIS) Data Dictionary, Version 1.4 (WEQ-003, Version 001, Oct. 31, 2007, with minor corrections applied on Nov. 16, 2007) including Standard 003-0;
- Transmission Loading Relief – Eastern Interconnection (WEQ-008, Version 001, Oct. 31, 2007, with minor corrections applied on Nov. 16, 2007) including Purpose, Applicability, and Standards 008-0.1 through 008-3.11.2.8, and 008-A through 008-D; and
- Business Practices for Open Access Same-Time Information Systems (OASIS) Implementation Guide, Version 1.4 (WEQ-013, Version 001, Oct. 31, 2007, with minor corrections applied on Nov. 16, 2007) including Introduction and Standards 013-0.1 through 013-4.2.

**7.4 General Standard of Care.**

When the CAISO is exercising Operational Control of the CAISO Controlled Grid, the CAISO and Market Participants shall comply with Good Utility Practice.

**7.5 Routine Operation of the CAISO Controlled Grid.**

The CAISO shall operate the CAISO Controlled Grid in accordance with the standards described in Section 7.2 and within the limit of all applicable Nomograms and established operating limits and procedures.

**7.5.1 CAISO Controlled Facilities.**

**7.5.1.1 General.**

The CAISO shall have Operational Control of all transmission lines and associated station equipment that have been transferred to the CAISO Controlled Grid from the Participating TOs as listed in the CAISO Register.

**7.5.2 Clearing Equipment for Work.**

The clearance procedures of the CAISO and the relevant UDC and Participating TO must be adhered to by all parties, to ensure the safety of all personnel working on CAISO Controlled Grid transmission lines and equipment. In accordance with Section 9.3, no work shall start on any equipment or line which is under the Operational Control of the CAISO unless final approval has first been obtained from the appropriate CAISO Control Center. Prior to starting the switching to return any line or equipment to service the CAISO shall confirm that all formal requests to work on the cleared line or equipment have been released.

**7.5.3 Equipment De-energized for Work.**

In some circumstances, System Reliability requirements may require a recall capability that can only be achieved by allowing work to proceed with the line or equipment de-energized only (i.e. not cleared and grounded). Any personnel working on such de-energized lines and equipment must take all precautions as if the line or equipment were energized. Prior to energizing any such lines or equipment de-energized for work, the CAISO shall confirm that all formal requests to work on the de-energized line or equipment have been released.

**7.5.4 Hot-Line Work.**

The CAISO has full authority to approve requests by Participating TOs to work on energized equipment under the Operational Control of the CAISO, and no such work shall be commenced until the CAISO has given its approval.

**7.5.5 Intertie Switching.**

The CAISO and the appropriate single point of contact for the relevant Participating TO and the adjacent Balancing Authority Area shall coordinate during the de-energizing or energizing of any Interconnection.

**7.5.6 Operating Voltage Control Equipment.**

**7.5.6.1 Operating Voltage Control Equipment Under CAISO Control.**

The CAISO will direct each Participating TO's single point of contact in the operation of voltage control equipment that is under the CAISO's Operational Control.

**7.5.6.2 Operating Voltage Control Equipment Under UDC Control.**

Each UDC must operate voltage control equipment under UDC control in accordance with existing UDC voltage control guidelines.

**7.5.6.3 Special CAISO Voltage Control Requirements.**

The CAISO may request a Participating TO via its single point of contact or a UDC via its single point of contact to operate under special voltage control requirements from time to time due to special system conditions.

**7.6 Normal System Operations.**

**7.6.1 Actions for Maintaining Reliability of CAISO Controlled Grid.**

The CAISO shall obtain the control over Generating Units that it needs to control the CAISO Controlled Grid and maintain reliability by ensuring that sufficient Energy and Ancillary Services are procured through the CAISO Markets. When the CAISO responds to events or circumstances, it shall first use the generation control it is able to obtain from the Energy and Ancillary Services Bids it has received to

respond to the operating event and maintain reliability. Only when the CAISO has used the Energy and Ancillary Services that are available to it under such Energy and Ancillary Services Bids which prove to be effective in responding to the problem and the CAISO is still in need of additional control over Generating Units, shall the CAISO assume supervisory control over other Generating Units. It is expected that at this point, the operational circumstances will be so severe that a Real-Time system problem or emergency condition could be in existence or imminent.

Each Participating Generator shall take, at the direction of the CAISO, such actions affecting such Generator as the CAISO determines to be necessary to maintain the reliability of the CAISO Controlled Grid. Such actions shall include (but are not limited to):

- (a) compliance with Dispatch Instructions including instructions to deliver Energy and Ancillary Services in Real-Time pursuant to the AS Awards, Day-Ahead Schedules and HASP Intertie Schedules, and HASP AS Awards;
- (b) compliance with the system operation requirements set out in this Section 7;
- (c) notification to the CAISO of the persons to whom an instruction of the CAISO should be directed on a 24-hour basis, including their telephone and facsimile numbers; and
- (d) the provision of communications, telemetry and direct control requirements, including the establishment of a direct communication link from the control room of the Generator to the CAISO in a manner that ensures that the CAISO will have the ability, consistent with this CAISO Tariff, to direct the operations of the Generator as necessary to maintain the reliability of the CAISO Controlled Grid, except that a Participating Generator will be exempt from CAISO requirements imposed in accordance with this subsection (d) with regard to any Generating Unit with a rated capacity of less than ten (10) MW, unless that Generating Unit is certified by the CAISO to provide Ancillary Services.

**7.7 Management of System Emergencies.**

**7.7.1 System Emergency.**

When, in the judgment of the CAISO, the System Reliability of the CAISO Controlled Grid is in danger of instability, voltage collapse or under-frequency caused by transmission or Generation trouble in the CAISO Balancing Authority Area, or events outside of the CAISO Balancing Authority Area that could result in a cascade of events throughout the WECC grid, the CAISO will declare a System Emergency. This declaration may include a notice to suspend the Day-Ahead Market, HASP and Real-Time Markets, authorize full use of Black Start Generating Units, initiate full control of manual Load Shedding, and authorize the curtailment of Curtailable Demand (even though not scheduled as an Ancillary Service). The CAISO will reduce the System Emergency declaration to a lower alert status when it is satisfied, after conferring with Reliability Coordinators within the WECC, that the major contributing factors have been corrected, and all involuntarily interrupted Demand is back in service (except interrupted Curtailable Demand selected as an Ancillary Service). This reduction in alert status will reinstate the competitive markets if they have been suspended.

**7.7.2 Emergency Procedures.**

In the event of a System Emergency, the CAISO shall take such action as it considers necessary to preserve or restore stable operation of the CAISO Controlled Grid. The CAISO shall act in accordance with Good Utility Practice to preserve or restore reliable, safe and efficient service as quickly as reasonably practicable. The CAISO shall keep system operators in adjacent Balancing Authority Areas informed as to the nature and extent of the System Emergency in accordance with WECC procedures and, where practicable, shall additionally keep the Market Participants within the Balancing Authority Area informed.



**7.7.2.1           Declarations of System Emergencies.**

The CAISO shall, when it considers that conditions giving rise to a System Emergency exist, declare the existence of such System Emergency. A declaration by the CAISO of a System Emergency shall be binding on all Market Participants until the CAISO announces that the System Emergency no longer exists.

**7.7.2.2           Responsibilities of UDCs and MSSs Operators During a System Emergency.**

In the event of a System Emergency, UDCs shall comply with all directions from the CAISO concerning the management and alleviation of the System Emergency and shall comply with all procedures concerning System Emergencies set out in this CAISO Tariff, the Business Practice Manuals, and the Operating Procedures, and each MSS Operator shall comply with all directions from the CAISO concerning the avoidance, management and alleviation of the System Emergency and shall comply with all procedures concerning System Emergencies set forth in the CAISO Tariff, Business Practice Manuals and Operating Procedures. During a System Emergency, the CAISO and UDCs shall communicate through their respective control centers and in accordance with procedures established in individual UDC Operating Agreements, and the CAISO and the MSS Operator shall communicate through their respective control centers and in accordance with procedures established in the MSS Agreement.

**7.7.2.3           Responsibilities of Generating Units, System Units and System Resources During System Emergencies.**

All Generating Units and System Units that are owned or controlled by a Participating Generator are (without limitation to the CAISO's other rights under this CAISO Tariff) subject to control by the CAISO during a System Emergency and in circumstances in which the CAISO considers that a System Emergency is imminent or threatened. The CAISO shall, subject to this Section 7, have the authority to instruct a Participating Generator to bring its Generating Unit on-line, off-line, or increase or curtail the output of the Generating Unit and to alter scheduled deliveries of Energy and Ancillary Services

into or out of the CAISO Controlled Grid, if such an instruction is reasonably necessary to prevent an imminent or threatened System Emergency or to retain Operational Control over the CAISO Controlled Grid during an actual System Emergency. The CAISO shall have the authority to instruct an RMR Unit whose owner has selected Condition 2 of its RMR Contract to start-up and change its output if the CAISO has reasonably used all other available and effective resources to prevent a threatened System Emergency without declaring that a System Emergency exists. If the CAISO so instructs a Condition 2 RMR Unit, it shall compensate that unit in accordance with Section 11.5.6.3 and allocate the costs in accordance with Section 11.5.6.3.2. Each QF subject to an existing agreement with a Participating TO for the supply of Energy to the Participating TO and not subject to a QF PGA will make reasonable efforts to comply with the CAISO's instructions during a System Emergency without penalty for failure to do so.

### **7.7.3 Notifications by CAISO of System Conditions.**

The CAISO will provide the following notifications to Market Participants to communicate unusual system conditions or emergencies.

#### **7.7.3.1 System Alert.**

CAISO will give an AWE Notice of a system alert when the operating requirements of the CAISO Controlled Grid are marginal because of Demand exceeding forecast, loss of major Generation or loss of transmission capacity that has curtailed imports into the CAISO Balancing Authority Area, or if it otherwise appears that there is insufficient Energy and Ancillary Services to meet Real-Time Demand in the CAISO Balancing Authority Area.

**7.7.3.2 System Warning.**

The CAISO will give an AWE Notice of a system warning when the operating requirements for the CAISO Controlled Grid are not being met in the HASP or Real-Time Market, or the quantity of Regulation, Spinning Reserve, Non-Spinning Reserve, and Energy available to the CAISO is not acceptable for the Applicable Reliability Criteria. This system warning notice will notify Market Participants that the CAISO will, acting in accordance with Good Utility Practice, take such steps as it considers necessary to ensure compliance with Applicable Reliability Criteria, including the negotiation of Generation through processes other than competitive Bids.

**7.7.4 Intervention in CAISO Market Operations.**

The CAISO may intervene in the operation of the CAISO Markets and set the Administrative Price, if the CAISO determines that such intervention is necessary in order to prevent, contain or correct a System Emergency as follows.

- (1) The CAISO will not intervene in the operation of the Day-Ahead Market unless there has been a total or major collapse of the CAISO Controlled Grid and the CAISO is in the process of restoring it. The CAISO shall, where reasonably practicable, utilize Ancillary Services which it has the contractual right to instruct and which are capable of contributing to containing or correcting the actual, imminent or threatened System Emergency prior to issuing instructions to a Participating Generator under Section 7.7.2.3. In the event that the CAISO has exhausted all Economic Bids in the IFM, the CAISO shall use the scheduling priorities listed in Section 31.4 to clear the IFM.

- (2) Before any such intervention the CAISO must (in the following order):
  - (a) dispatch all Supply Bids offered or available to it regardless of price (including all Energy Bids and Ancillary Services Bids);
  - (b) dispatch all interruptible Loads made available by UDCs to the CAISO in accordance with the relevant agreements with UDCs;
  - (c) dispatch or curtail all price-responsive Demand that has been bid into the Day-Ahead Market and exercise its rights under all Load curtailment contracts available to it;
  - (d) exercise Load Shedding to curtail Demand on an involuntary basis to the extent that the CAISO considers necessary.
- (3) The Administrative Price in relation to each of the markets for Imbalance Energy and Ancillary Services shall be set at the applicable price in the Settlement Period immediately preceding the Settlement Period in which the intervention took place.
- (4) The intervention will cease as soon as the CAISO has restored all Demand that was curtailed on an involuntary basis.

#### **7.7.5 Emergency Guidelines.**

The CAISO shall issue guidelines for all Market Participants to follow during a System Emergency. These guidelines shall be consistent with the specific obligations of Scheduling Coordinators and Market Participants referenced in Sections 7.7.10, 7.7.11, 7.7.2, 7.7.2.3 and 7.7.4(1). All Market Participants shall respond to CAISO Dispatch Instructions with an immediate response during System Emergencies.

**7.7.5.1** The CAISO shall in accordance with this Section 7.7.5 implement the Electrical Emergency Plan in consultation with the UDCs, the MSS Operators, or other entities, at the CAISO's discretion, when Energy reserve margins are forecast to be at the levels specified in the plan.

**7.7.5.2** Each UDC and MSS Operator will notify its End-Use Customers connected to the UDC's or the MSS's Distribution System of any voluntary curtailments notified to the UDC or to the MSS Operator by the CAISO pursuant to the provisions of the EEP.

**7.7.6 Periodic Tests of Emergency Procedures.**

The CAISO shall develop and administer periodic unannounced tests of System Emergency procedures. Such tests shall be designed to ensure that the CAISO Market Participants are capable of promptly and efficiently responding to imminent or actual System Emergencies.

**7.7.7 Prioritization Schedule for Shedding and Restoring Load.**

On an annual basis, the CAISO shall, in consultation with Market Participants and subject to the provisions of Section 3, develop a prioritization schedule for Load Shedding should a System Emergency require such action. The prioritization schedule shall also establish a sequence for the restoration of Load in the event that multiple Scheduling Coordinators or Market Participants are affected by service interruptions and Load must be restored in blocks. For Load shed in accordance with Section 7.7.11.4.2, the prioritization schedule will only include those UDCs or MSS Operators that have Scheduling Coordinators that have failed to submit Bids with sufficient resources to meet the Load in the UDC or MSS Service Area. For Load shed in accordance with Section 7.7.11.4.3, the prioritization schedule will include all UDCs and MSS Operators.

**7.7.8 Under Frequency Load Shedding (UFLS).**

**7.7.8.1** Each UDC's UDCOA with the CAISO and each MSS Agreement through which the MSS Operator undertakes to the CAISO to comply with the provisions of the CAISO Tariff shall describe the UFLS program for that UDC or for that MSS. The CAISO and UDC or the CAISO and the MSS Operator shall review the UFLS program periodically to ensure compliance with Applicable Reliability Criteria.

**7.7.8.2** The CAISO shall perform periodic audits of each UDC's UFLS system and of each MSS's UFLS system to verify that the system is properly configured for each UDC or MSS.

**7.7.8.3** The CAISO will use its reasonable endeavors to ensure that UFLS is coordinated among the UDCs and MSSs so that no UDC bears a disproportionate share of the CAISO's UFLS program.

**7.7.8.4** In compiling its UFLS program, the CAISO, at its discretion, may also coordinate with other entities, and review and audit their UFLS programs and systems as described in this Section 7.7.8.

**7.7.9** **[NOT USED]**

**7.7.10** **Further Obligations Relating to System Emergencies.**

The CAISO and Participating TOs shall comply with their obligations in Section 9 of the TCA.

**7.7.11** **Use of Load Curtailment Programs.**

**7.7.11.1** **Use of UDC's Existing Load Curtailment Programs.**

As an additional resource for managing System Emergencies, the CAISO will, subject to Section 3, notify the UDCs when the conditions to implement their Load curtailment programs have been met in accordance with their terms. The UDCs will exercise their best efforts, including seeking any necessary regulatory approvals, to enable the CAISO to rely on their curtailment rights at specified levels of Operating Reserve. Each UDC shall by not later than October 1 of each year advise the CAISO of the capabilities of its Load curtailment programs for the forthcoming year, and the conditions under which those capabilities may be exercised, and shall give the CAISO as much notice as reasonably practicable of any change to such programs.

**7.7.11.2 Load Curtailment.**

A Scheduling Coordinator may specify that Loads will be reduced at specified prices or, pursuant to a Participating Load Agreement, offer the right to exercise Load curtailment to the CAISO as an Ancillary Service or utilize Load curtailment itself (by way of self-provision of Ancillary Services) as Non-Spinning Reserve. The CAISO, at its discretion, may require direct control over such Curtailable Demand to assume response capability for managing System Emergencies. However, non-firm Loads shall not be eligible to provide Curtailable Demand if they are receiving incentives for interruption under existing programs approved by a Local Regulatory Authority, unless: a) participation in the CAISO's Ancillary Services markets is specifically authorized by such Local Regulatory Authority, and b) there exist no contingencies on the availability, nor any unmitigated incentives encouraging prior curtailment, of such interruptible Load for Dispatch as Curtailable Demand as a result of the operation of such existing program. The CAISO may establish standards for automatic communication of curtailment instructions to implement Load curtailment as a condition for accepting any offered Load curtailment as an Ancillary Service.

**7.7.11.3** The CAISO shall have the authority to direct a UDC or an MSS Operator to disconnect Load from the CAISO Controlled Grid if necessary to avoid an anticipated System Emergency or to regain Operational Control over the CAISO Controlled Grid during an actual System Emergency. The CAISO shall direct the UDC or the MSS Operator to shed Load in accordance with the prioritization schedule developed pursuant to Section 7.7.7. When CAISO Controlled Grid conditions permit restoration of Load, the CAISO shall restore Load according to the prioritization schedule developed pursuant to Section 7.7.7. The MSS Operator shall restore Load internal to the MSS.

**7.7.11.4 Load Shedding.**

**7.7.11.4.1 [NOT USED]**

**7.7.11.4.2** If the CAISO forecasts in advance of the HASP that Load curtailment will be necessary due to a resource deficiency as determined pursuant to Section 40.7, the CAISO will identify any UDC or MSS Service Area that is resource deficient. The CAISO will provide notice to all Scheduling Coordinators if one or more UDC or MSS is deficient. If Load curtailment is required to manage a System Emergency associated with a resource deficiency determined pursuant to Section 40.7, the CAISO will determine the amount and location of Load to be curtailed and will allocate a portion of that required Load curtailment to each UDC or MSS Operator whose Service Area has been identified as being resource-deficient based on the ratio of its resource deficiency to the total Balancing Authority Area resource deficiency. Each UDC or MSS Operator shall be responsible for notifying its customers and Generators connected to its system of curtailments and service interruptions.

**7.7.11.4.3** If a Load curtailment is required to manage System Emergencies, in any circumstances other than those described in Section 7.7.11.4.2, the CAISO will determine the amount and location of Load to be reduced and to the extent practicable, will allocate a portion to each UDC or MSS Operator based on the ratio of its Demand (at the time of the Balancing Authority Area annual peak for the previous year) to total Balancing Authority Area annual peak Demand for the previous year taking into account system considerations and the UDC's or MSS Operator's curtailment rights under their tariffs. Each UDC or MSS Operator shall be responsible for notifying its customers and Generators connected to its system of curtailments and service interruption.



**7.7.12 Curtailment Under Emergency and Non-Emergency Conditions.**

**7.7.12.1 Emergency Conditions.**

To the extent practicable, the CAISO shall allocate necessary curtailments of Existing Rights or non-Converted Rights under emergency conditions in accordance with the instructions submitted by the Responsible PTO pursuant to Section 16. If circumstances prevent the CAISO's compliance with such instructions, the CAISO shall allocate such curtailments in a non-discriminatory manner consistent with Good Utility Practice.

**7.7.12.2 Non-Emergency Conditions.**

Unless otherwise specified by the Responsible PTO in the instructions that it submits to the CAISO under Section 16, the CAISO will allocate any necessary curtailments under non-emergency conditions, pro rata, among holders of Existing Rights, at particular Scheduling Points and/or on particular contract paths, in the order of: (1) non-firm, (2) each priority of conditional firm, and (3) each priority of firm rights. Priorities for firm and conditional firm transmission service are indicated using the TRTC Instructions as described in Section 16.

**7.7.13 System Emergency Reports and Sanctions.**

**7.7.13.1 Review of Major Outages.**

The CAISO with the cooperation of any affected UDC shall jointly perform a review following a major Outage that affects at least ten (10) percent of the Load served by the Distribution System of a UDC or any Outage that results in major damage to the CAISO Controlled Grid or to the health and safety of personnel. The review shall address the cause of the Outage, the response time and effectiveness of emergency management efforts, and whether the operation, maintenance or scheduling practices of the CAISO, any Participating TOs, Eligible Customers, UDCs or Participating Generators enhanced or undermined the ability of the CAISO to maintain or restore service efficiently and in a timely manner.

**7.7.13.2 Provide Information to Review Outages.**

Participating TOs, Participating Generators, Eligible Customers, Scheduling Coordinators and UDCs shall promptly provide information requested by the CAISO to review Outages pursuant to Section 7.7.13.1 and to prepare Outage reports. The CAISO shall seek the views of any affected Participating TOs, Participating Generators, Eligible Customers, Scheduling Coordinator or UDCs and allow such affected Participating TOs, Participating Generators, Eligible Customers, Scheduling Coordinators or UDCs to comment on any issues arising during the preparation of a report. All findings and reports arising from the CAISO's review shall be shared with Participating TOs, Participating Generators, Eligible Customers and UDCs.

**7.7.13.3 Imposing Sanctions.**

If the CAISO finds that the operation and maintenance practices of any Participating TOs, Participating Generators, Eligible Customers, or UDCs prolonged the response time or contributed to the Outage, the CAISO may impose sanctions on the responsible Participating TOs, Participating Generators, Eligible Customers, or UDCs provided that no sanction shall be imposed in respect of actions taken in compliance with the CAISO's instructions or pursuant to a Remedial Action Scheme. The CAISO shall develop and file with FERC a schedule of such sanctions. Any dispute concerning whether sanctions should be imposed under this Section shall be resolved through the CAISO ADR Procedures. The schedule of sanctions filed with FERC (including categories and levels of sanctions) shall not be subject to the CAISO ADR Procedures. The CAISO shall publish on the CAISO Website details of all instances in which a sanction has been imposed.

**7.7.14 CAISO Facilities and Equipment.**

**7.7.14.1 CAISO Facility and Equipment Outages.**

The CAISO has installed redundant control centers, communication systems and computer systems. Most, but not necessarily all, equipment problems or failures should be transparent to Market Participants. This Section 7.7.14.1 addresses some situations when Market Participants could be affected, but it is impossible to identify and plan for every type of equipment problem or failure. Real-Time situations will be handled by the Real-Time CAISO dispatchers. The CAISO control room in Folsom is the Primary CAISO Control Center and the CAISO control room in Alhambra is the Backup CAISO Control Center.

**7.7.14.2 CAISO's Secure Communication System Unavailable.**

**7.7.14.2.1 Unavailable Critical Functions of CAISO's Secure Communication System.**

During a total disruption of the CAISO's secure communication system several critical functions of the CAISO will not be available including:

- (a) the CAISO's scheduling infrastructure computer systems will not be able to communicate with Scheduling Coordinators to receive any type of updated Bid or Schedule information;
- (b) the CAISO's scheduling infrastructure computer systems will not be able to communicate Congestion Management information and Schedule changes to the Scheduling Coordinators; and
- (c) the CAISO will not be able to communicate general information, including emergency information, to any Market Participants.

**7.7.14.2.2 Communications during Unavailability of CAISO's Secure Communication System.**

During any period of CAISO's secure communication system unavailability, the CAISO shall:

- (a) make all reasonable efforts to keep Market Participants aware of current CAISO Controlled Grid status using voice communications;
- (b) use the most recent set of Day-Ahead Schedules, RUC Schedules, AS Awards, HASP Intertie Schedules, and Dispatch Instructions for each Scheduling Coordinator for the current and all future Settlement Periods and/or Trading Days until the CAISO's secure communication system is restored; and
- (c) attempt to take critical Bids, including ETC and TOR Self-Schedules changes, from Scheduling Coordinators via voice communications as time and personnel availability allows.

**7.7.14.2.3 Primary CAISO Control Center – Loss of all Voice Communications.**

In the event of loss of all voice communication at the Primary CAISO Control Center, the Primary CAISO Control Center will use alternate communications to notify the Backup CAISO Control Center of the loss of voice communications. The Backup CAISO Control Center will post information on the situation on the CAISO's secure communication system. Additional voice notifications will be made as time permits.

Once voice communications have been restored to the Primary CAISO Control Center, the CAISO will post this information on the CAISO's secure communication system.

**7.7.14.2.4 Primary CAISO Control Center – Control Center Completely Unavailable.**

In the event that the Primary CAISO Control Center becomes completely unavailable, the Primary CAISO Control Center will use alternate communications to notify the Backup CAISO Control Center that the Primary CAISO Control Center is unavailable. The Backup CAISO Control Center will post information on the situation on the CAISO's secure communication system. Additional voice notifications will be made as time permits.

The Backup CAISO Control Center will post confirmation on the CAISO's secure communication system that all computer systems are functioning normally (if such is the case) and take complete control of the CAISO Controlled Grid. The Backup CAISO Control Center will notify the single point of contact at the transmission operations center of Pacific Gas and Electric Company by direct voice communication of the situation.

Once the Primary CAISO Control Center is again available, all functions will be transferred back, and the Primary CAISO Control Center will notify all Market Participants via the CAISO's secure communication system.

**7.7.14.2.5 Primary CAISO Control Center - CAISO Energy Management System (EMS) Unavailable.**

Should an outage occur to the redundant EMS computer systems in the Primary CAISO Control Center, an auto transfer should occur to transfer EMS operation to the redundant EMS back up computers at the Backup CAISO Control Center. Due to the severity of a total CAISO EMS computer outage, the Primary CAISO Control Center will post information on the CAISO's secure communication system that the Primary CAISO Control Center EMS computer is unavailable and that EMS control has been transferred to the Backup CAISO Control Center.

When the Primary CAISO Control Center EMS computer is restored, the Backup CAISO Control Center will initiate a transfer back of the EMS system to the Primary CAISO Control Center. The Primary CAISO Control Center will post information on the restored EMS computer system status on the CAISO's secure communication system.

**7.7.14.2.6 Backup CAISO Control Center – Loss of all Voice Communications.**

In the event of a loss of all voice communications at the Backup CAISO Control Center, the Backup CAISO Control Center will use alternate communications to notify the Primary CAISO Control Center of the loss of voice communications. The Primary CAISO Control Center will post information on the situation via the CAISO's secure communication system. Additional voice notifications will be made as time permits. Once voice communications have been restored to the Backup CAISO Control Center, the Primary CAISO Control Center will post this information on the CAISO's secure communication system.

**7.7.14.2.7 Backup CAISO Control Center – Control Center Completely Unavailable.**

In the event that the Backup CAISO Control Center becomes completely unavailable, the Backup CAISO Control Center will use alternate communications to notify the Primary CAISO Control Center that the Backup CAISO Control Center is unavailable. The Primary CAISO Control Center will post information on the situation on the CAISO's secure communication system. Additional voice notifications will be made as time permits.

The Primary CAISO Control Center will post confirmation on the CAISO's secure communication system that all computer systems are functioning normally (if such is the case) and take complete control of the CAISO Controlled Grid. The Primary CAISO Control Center will notify the grid control center of Southern California Edison Company by direct voice communications of the situation.

Once the Backup CAISO Control Center is again available, all functions will be transferred back, and the Backup CAISO Control Center will notify all Market Participants via the CAISO's secure communication system.

**7.7.14.2.8 Use of IOUs' Energy Control Center Computers.**

The CAISO and the IOUs will comply with the procedures for the utilization by the CAISO of the IOUs' Energy control center computers when developed. The CAISO will post such procedures on the CAISO's secure communication system when agreed.

**7.7.15 System Operations in the Event of a Market Disruption.**

**7.7.15.1 Actions in the Event of a Market Disruption, to Prevent a Market Disruption or to minimize the Extent of a Market Disruption.**

The CAISO may take one or more of the following actions in the event of a Market Disruption, to prevent a Market Disruption, or to minimize the extent of a Market Disruption:

- (a) postpone the closure of the applicable CAISO Market;
- (b) remove Bids, including Self-Schedules, that have resulted in a Market Disruption previously;
- (c) close the applicable CAISO Market and manually copy Bids, including Self-Schedules, from the previous day or other applicable market period;
- (d) close the applicable CAISO Market and use submitted Bids, including Self-Schedules, to the extent possible;
- (e) cancel the applicable CAISO Market, in which case import/export schedules shall be determined by submittal of E-Tags;
- (f) utilize Administrative Prices to settle metered Supply and Demand; and
- (g) utilize Exceptional Dispatch and issue operating orders for resources to be committed and dispatched to meet Demand.

**7.7.15.2 Removal of Bids, in the Event of a Market Disruption, to Prevent a Market Disruption, or to minimize the Extent of a Market Disruption.**

**7.7.15.2.1 Objective Measures.**

In the event of a Market Disruption, to prevent a Market Disruption, or to minimize the extent of a Market Disruption, as provided in Section 7.7.15.1 (b), the CAISO may remove Bids, which as defined include Self-Schedules, from the relevant CAISO Market. The types of Bids that the CAISO may remove include those that have previously caused a Market Disruption. These are Bids that are not feasible based on the misalignment of resource-specific conditions and physical constraints represented in the Master File, current outage information, and the Bid itself. For example, these include: (1) Bids that pass through the automated Bid validation rules but are invalid for other reasons not detectable by the automated Bid validation, including derates reflected in SLIC; (2) Bids that are identified prior to the end of the CAISO Market run as causing a feasibility issue that prevents the CAISO Market run from clearing in the time allotted for the run, including ramp rates in SLIC that result in infeasible generation Bids; and (3) multiple Bids that do not pose a problem for processing through the CAISO Market when considered individually, but may when submitted in combination with other Bids become infeasible and present an impediment to the successful completion of the CAISO Market.



#### **7.7.15.2.2 Consequences of Removal of a Bid.**

The CAISO may remove part of a Bid, but retain other parts of the Bid for the applicable CAISO Market run and interval for the same or different product, and may retain parts of the Bid for subsequent CAISO Market runs or intervals. If a particular Energy or Ancillary Service Bid must be removed pursuant to Section 7.7.15.2.1, the CAISO will remove the entire Bid for that particular service and market. The Scheduling Coordinator may resubmit removed Bids in subsequent CAISO Markets, provided the Scheduling Coordinator complies with any operator instructions regarding the subject Bids. In the event a Bid is removed from an IFM run, the RUC Availability Bid associated with the removed IFM Bid may still be accepted for the corresponding RUC run, unless the RUC Availability Bid is determined to be the cause of the disruption. A problematic Bid as described in Section 7.7.15.2.1 will typically be identified as infeasible prior to publication of the CAISO Market interval in which it is causing a problem, in which case to the extent practicable the CAISO may remove the Bid, execute the CAISO Market without the removed Bid, and publish a CAISO Market result for that interval. In some instances, a Bid may be able to clear through the IFM without causing an infeasibility issue, but then it may be necessary to remove the RUC Availability Bid associated with the IFM Bid for the corresponding RUC run due to infeasibility issues raised for the RUC run. In the Real-Time Market, for example, for reasons discussed above the CAISO may be required to remove a Bid for a Non-Dynamic System Resource that would normally be dispatched in the HASP, yet may be able to utilize and accept the Bids submitted for the RTD and non-HASP RTUC runs of the Real-Time Market included within the same Scheduling Coordinator Bid submission. If an Ancillary Service Bid or Submission to Self-Provide Ancillary Services is removed from the IFM, the Scheduling Coordinator may resubmit these components in the RTM provided the issues identified in the IFM have been resolved and the Bid or submission is otherwise consistent with the Ancillary Service bidding rules in the CAISO Tariff.

If, for the reasons discussed above, the CAISO is required to remove a Bid in the advisory RTUC or RTD runs conducted for future intervals during the Real-Time Market, the removed Bid may still be used in the binding runs of the Real-Time Market for the same interval if the problems previously experienced with the Bid do not arise. If the CAISO is required to remove an Ancillary Services Bid submitted in the Real-Time Market for consideration in the RTUC run, the CAISO may retain the Energy Bid submitted in association with the Ancillary Services Bid for that CAISO Market run.

**7.7.15.2.3 Settlement Consequences of Removal of Bids.**

In the event that a Bid is removed from the Day-Ahead Market, the Scheduling Coordinator whose Bid is removed will not be subject to Settlement for the Day-Ahead Market for the affected service. The Scheduling Coordinator may then resubmit the Bid in the HASP/Real-Time Market for the same service and, to the extent the Bid is feasible and the issues identified have been resolved, it may be accepted in the Real-Time Market consistent with the CAISO Tariff requirements that apply to the HASP/Real-Time Market. In the case of Ancillary Services Bids, including Submissions to Self-Provide an Ancillary Service, that are removed from the Day-Ahead Market, the Scheduling Coordinator will not receive Settlement for the Ancillary Services in the Day-Ahead Market and will not receive an opportunity cost payment in the Day-Ahead Market for the offered service. If the Bid is accepted in the HASP/Real-Time Market, the Scheduling Coordinator will be subject to Settlement based on the CAISO Market in which the Bid actually clears. In the event that a Bid is removed from a CAISO Market run or interval, the CAISO may subsequently be required to issue an Exceptional Dispatch for the resource, in which case the Scheduling Coordinator will receive Exceptional Dispatch Settlement as provided in Section 11.5.6. In the event that a Demand Bid is removed from the Day-Ahead Market, because no Demand Bids for load can be submitted in the Real-Time Market, Scheduling Coordinators for the load not cleared in the Day-Ahead Market will be settled as Uninstructed Imbalance Energy as provided in Section 11.5.2.

**7.7.15.2.4 Reporting to Affected Scheduling Coordinators.**

To the extent practicable, the CAISO will contact a Scheduling Coordinator's representative before removing a Bid and advise the representative of the issues encountered with the Bid. In the event that a Bid is removed, the Scheduling Coordinator's Bid will not be cleared through the specific CAISO Market from which it was removed. The CAISO will notify the Scheduling Coordinator as soon as practicable, but no later than three (3) Business Days, after the applicable Bid was removed and will provide information specifying when its Bid was removed and the nature of the disruption.

**7.7.15.3 Choices of Action to Prevent a Market Disruption, in the Event of a Market Disruption, or to minimize the Extent of a Market Disruption.**

The CAISO's choice of action in the event of a Market Disruption shall depend on the CAISO Market that is disrupted, the cause of the Market Disruption, the expected time to resolve the Market Disruption, and the status of submitted Bids and Self-Schedules at the time the Market Disruption occurs. Nothing in this Section 7.7.15 shall prevent the CAISO from taking any other action permitted under the CAISO Tariff.

**7.7.15.4 Reporting Requirements under Section 7.7.15.**

The CAISO shall include reports on actions taken pursuant to Section 7.7.15 in the Exceptional Dispatch report provided in Section 34.9.4 of the ISO Tariff. The report shall detail the frequency and types of actions taken by the CAISO pursuant to this Section 7.7.15, as well as the nature of the specific Market Disruptions that caused the CAISO to take action and the CAISO rationale for taking such actions, or the Market Disruption that was successfully prevented or minimized by the CAISO as a result of taking action pursuant to its authority under Section 7.7.15. This informational filing shall also contain general information on the Bids removed pursuant to Section 7.7.15, which may include the megawatt quantity, point of interconnection, specification of the Day-Ahead versus Real-Time Bid, and Energy or Ancillary Services Bid, and the CAISO's rationale for removal; provided, however, that any Scheduling Coordinator-specific individual Bid information will be submitted on a confidential basis consistent with FERC's rules and regulations governing requests for confidential treatment of commercially sensitive information.

**7.8 Management of Overgeneration Conditions.**

The CAISO's management of Overgeneration relates only to Real-Time. In the event that Overgeneration conditions occur during Real-Time, the CAISO will direct the Scheduling Coordinators to take the steps described in this Section 7.8 and Scheduling Coordinators shall implement CAISO directions without delay. Overgeneration in Real-Time will be mitigated by the CAISO as follows; provided that the CAISO Operator will have the discretion, if necessary to avoid a System Emergency, to eliminate one or more of the following steps.

**7.8.1** Commencing one hour prior to the start of the Settlement Period, the CAISO will, based on available Bids issue Dispatch Instructions to Scheduling Coordinators to reduce Generation and imports for the next Operating Hour.

**7.8.2** To the extent that there are insufficient Bids available for the Operating Hour to fully mitigate the Overgeneration condition, the CAISO will notify Scheduling Coordinators of the projected amount of Overgeneration to be mitigated in that hour.

**7.8.3** In addition to the action taken under 7.8.2, the CAISO will, if it considers it necessary to maintain the reliable operation of the CAISO Balancing Authority Area, offer Energy for sale on behalf of Scheduling Coordinators to adjacent Balancing Authorities at the estimated LMP or, if the CAISO considers it necessary, at a price established by the CAISO on behalf of Scheduling Coordinators, to be paid to adjacent Balancing Authorities.

**7.8.4** To the extent that the steps described in Sections 7.8.1 through 7.8.3 fail to mitigate Overgeneration, the CAISO will instruct Scheduling Coordinators to reduce either Generation, or imports, or both. The amount of the reduction for each Scheduling Coordinator will be calculated pro rata based on the product of the total required reduction in Generation and imports (or increase in exports) and the ratio of its Demand to the total Demand in the CAISO Balancing Authority Area.

**7.8.5** To the extent that the above steps fail to fully mitigate the Overgeneration, the CAISO will issue mandatory Dispatch Instructions for specific reductions in Generating Unit output and external imports and all relevant Scheduling Coordinators shall be obligated to comply with such Dispatch Instructions.

**7.8.6** Any costs incurred by the CAISO in implementing Section 7.8.3 shall be reimbursed to the CAISO by Scheduling Coordinators based upon the extent to which they supplied Energy, in metered amounts, greater than the Generation and imports dispatched by the CAISO as provided in the Day-Ahead Schedule or in response to Dispatch Instructions and consumed Energy, in metered amounts, less than the Demand scheduled, as a proportion of the total amount of such excess or shortfall among all Scheduling Coordinators.

**8. ANCILLARY SERVICES.**

**8.1 Scope.**

The CAISO shall be responsible for ensuring that there are sufficient Ancillary Services available to maintain the reliability of the CAISO Controlled Grid consistent with NERC and WECC reliability standards, including any requirements of the NRC. The CAISO's Ancillary Services requirements may be self-provided by Scheduling Coordinators as further provided in the Business Practice Manuals. Those Ancillary Services which the CAISO requires to be available but which are not being self-provided will be competitively procured by the CAISO from Scheduling Coordinators in the Day-Ahead Market, the HASP, and the RTM consistent with Section 8.3. The provision of Ancillary Services from the Interties with interconnected Balancing Authority Areas is limited to Ancillary Services bid into the competitive procurement processes in the IFM , HASP, and RTM. The CAISO will not accept Submissions to Self-Provide Ancillary Services that are imports to the CAISO Balancing Authority Area over the Interties with interconnected Balancing Authority Areas, except from Dynamic System Resources certified to provide Ancillary Services or if provided pursuant to ETCs, TORs or Converted Rights. The CAISO will calculate payments for Ancillary Services supplied by Scheduling Coordinators and charge the cost of Ancillary Services to Scheduling Coordinators based on their Ancillary Service Obligations.

For purposes of this CAISO Tariff, Ancillary Services are: (i) Regulation Up and Regulation Down, (ii) Spinning Reserve, (iii) Non-Spinning Reserve, (iv) Voltage Support, and (v) Black Start capability.

These services will be procured as stated in Section 8.3.5. Bids for Non-Spinning Reserve may be submitted by Scheduling Coordinators for Curtailable Demand as well as for Generation. Bids for Regulation, Spinning Reserve, Non-Spinning Reserve, and Voltage Support may be submitted by a Scheduling Coordinator for other non-generation resources that are capable of providing the specific service and that meet applicable Ancillary Service standards and technical requirements, as set forth in Sections 8.1 through 8.4, and are certified by the CAISO to provide Ancillary Services. The provision of Regulation, Spinning Reserve, Non-Spinning Reserve, and Voltage Support by other non-generation resources is subject to the same requirements applicable to other providers of these Ancillary Services, as set forth in Sections 8.5 through 8.11. Identification of specific services in this CAISO Tariff shall not preclude development of additional interconnected operation services over time. The CAISO and Market Participants will seek to develop additional categories of these unbundled services over time as the operation of the CAISO Controlled Grid matures or as required by regulatory authorities.



## **8.2 Ancillary Services Standards.**

All Ancillary Services shall meet the CAISO's Ancillary Services standards.

### **8.2.1 Determination of Ancillary Service Standards.**

The CAISO shall set the required standard for each Ancillary Service necessary to maintain the reliable operation of the CAISO Controlled Grid. Ancillary Services standards shall meet NERC and WECC reliability standards, including any requirements of the NRC. In setting Ancillary Service standards, the CAISO shall consider reasonableness, cost-effectiveness, and adherence to NERC and WECC reliability standards, including any requirements of the NRC. The standards developed by the CAISO shall be used as a basis for determining the quantity and type of each Ancillary Service which the CAISO requires to be available. These requirements and standards apply to all Ancillary Services whether self-provided or procured by the CAISO.

### **8.2.2 Time-frame For Revising Ancillary Service Standards**

The CAISO shall periodically undertake a review of the CAISO Controlled Grid operation to determine any revision to the Ancillary Services standards to be used in the CAISO Balancing Authority Area. At a minimum the CAISO shall conduct such reviews to accommodate revisions to NERC and WECC reliability standards, including any requirements of the NRC. The CAISO 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. Where practicable, the CAISO will provide notice, via the CAISO Website, of any temporary adjustments to Ancillary Service standards by 6:00 p.m. two (2) days ahead of the Operating Day to which the adjustment will apply. Periodic reviews by the CAISO 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 WECC reliability standards, including any requirements of the NRC; (d) analysis of operation during system disturbances; (e) analysis of patterns of shortfalls between Day-Ahead Schedules and actual Generation and Demand; and (f) analysis of patterns of unplanned transmission Outages.

### **8.2.3 Quantities of Ancillary Services Required and Use of Ancillary Service Regions.**

For each of the Ancillary Services, the CAISO shall determine the quantity and location of the Ancillary Service which is required using Ancillary Service Regions as described in Section 8.3.3. For each of the Ancillary Services, the CAISO shall determine the required locational dispersion in accordance with CAISO Controlled Grid reliability requirements. The Ancillary Services provided must be under the direct Dispatch control of the CAISO on a Real-Time Dispatch Interval basis. The CAISO shall determine the quantities it requires as provided for in Sections 8.2.3.1 to 8.2.3.3.

#### **8.2.3.1 Regulation Service.**

The CAISO shall maintain sufficient Generating Units immediately responsive to AGC in order to provide sufficient Regulation service to allow the CAISO Balancing Authority Area to meet NERC and WECC reliability standards, including any requirements of the NRC by continuously balancing Generation to meet deviations between actual and scheduled Demand and to maintain Interchange Schedules. The quantity of Regulation Down and Regulation Up capacity needed for each Settlement Period of the Day-Ahead Market and in each fifteen (15) minute period in Real-Time shall be determined by the CAISO as a percentage of the applicable CAISO Forecast of CAISO Demand for the Day-Ahead and Real-Time Markets. In HASP, the amount of advisory Regulation from Dynamic System Resources required for each Settlement Period in the next Trading Hour is also determined based on the CAISO Forecast of CAISO Demand. The advisory awards of Regulation from Dynamic System Resources in HASP are not binding and are re-optimized through the RTUC and RTD processes in the Real-Time Market. The CAISO's determination is based upon its need to meet the NERC and WECC reliability standards, including any requirements of the NRC.

The CAISO will publish on OASIS the estimated quantity, or the percentage used to determine the estimated quantity, of Regulation Reserves required for each hour of the Day-Ahead Market and in each fifteen (15) minute period in Real-Time for the Trading Day.

**8.2.3.2 Spinning and Non-Spinning Reserves.**

The CAISO shall maintain minimum contingency Operating Reserve made up of Spinning Reserve and Non-Spinning Reserve in accordance with NERC and WECC reliability standards, including any requirements of the NRC. The CAISO from time to time may determine to use more stringent criteria.

**8.2.3.3 Voltage Support.**

The CAISO shall determine on an hourly basis for each day the quantity and location of Voltage Support required to maintain voltage levels and reactive margins within NERC and WECC reliability standards, including any requirements of the NRC using a power flow study based on the quantity and location of scheduled Demand. The CAISO shall issue daily voltage schedules (Dispatch Instructions) to Participating Generators, Participating TOs and UDCs, which are required to be maintained for CAISO Controlled Grid reliability. All other Generating Units shall comply with the power factor requirements set forth in contractual arrangements in effect on the CAISO Operations Date, or, if no such contractual arrangements exist and the Generating Unit exists within the system of a Participating TO, the power factor requirements applicable under the Participating TO's TO Tariff or other tariff on file with the FERC. All Participating Generators shall maintain the CAISO specified voltage schedule at the transmission interconnection points to the extent possible while operating within the power factor range specified in

their interconnection agreements or, for Regulatory Must-Take Generation, Regulatory Must-Run Generation and Reliability Must-Run Generation, consistent with existing obligations. For Generating Units that do not operate under one of these agreements, the minimum power factor range will be within a band of 0.90 lag (producing VARs) and 0.95 lead (absorbing VARs) power factors. Participating Generators with Generating Units existing at the CAISO Operations Date that are unable to meet this operating power factor requirement may apply to the CAISO for an exemption. Prior to granting such an exemption, the CAISO shall require the Participating TO or UDC to whose system the relevant Generating Units are interconnected to notify it of the existing contractual requirements for Voltage Support established prior to the CAISO Operations Date for such Generating Units. Such requirements may be contained in CPUC Electric Rule 21 or the Interconnection Agreement with the Participating TO or UDC. The CAISO shall not grant any exemption under this Section from such existing contractual requirements. The CAISO shall be entitled to instruct Participating Generators to operate their Generating Units at specified points within their power factor ranges. Participating Generators shall receive no compensation for operating within these specified ranges.

If the CAISO requires additional Voltage Support, it shall procure this either through Reliability Must-Run Contracts or, if no other more economic sources are available, by instructing a Generating Unit to move its MVar output outside its mandatory range. Only if the Generating Unit must reduce its MW output in order to comply with such an instruction will it be eligible to recover its opportunity cost in accordance with Section 11.10.1.4.

All Loads directly connected to the CAISO Controlled Grid shall maintain reactive flow at grid interface points within a specified power factor band of 0.97 lag to 0.99 lead. Loads shall not be compensated for the service of maintaining the power factor at required levels within the bandwidth. A UDC interconnecting with the CAISO Controlled Grid at any point other than a Scheduling Point shall be subject to the same power factor requirement.

The power factor for both the Generating Units and Loads shall be measured at the interconnection point with the CAISO Controlled Grid. The CAISO will develop and will be authorized to levy penalties against Participating Generators, UDCs or Loads whose Voltage Support does not comply with the CAISO's requirements. The CAISO will establish voltage control standards with UDCs and the operators of other Balancing Authority Areas and will enter into operational agreements providing for the coordination of actions in the event of a voltage problem occurring.

**8.2.3.4 Black Start Capability.**

The CAISO shall determine the amount and location of Black Start Generation it requires through contingency studies that are used as the basis of the CAISO's emergency plans. The studies shall specify:

- (a) the initiating disturbance;
- (b) the magnitude of the Outage, including the extent of the Outage (local area, CAISO Controlled Grid, or WECC), the assumed status of Generation after the initiating disturbance, the status of interconnections, the system Demand level at the time of the disturbance, the interconnection support, and assumptions regarding the availability of support from other utilities to help restore Generation and Demand;
- (c) the Generator performance including a percentage of Black Start units (to be determined by the CAISO) which are expected to fail to start, and;
- (d) expected transmission system damage.

The CAISO shall also specify the following Load restoration performance goals:

- (i) Black Start unit startup and connection times;
- (ii) CAISO Controlled Grid restoration times; and
- (iii) Load restoration times.

Scheduling Coordinators shall provide the CAISO with their Load restoration time requirements for any Loads that provide emergency services.

#### **8.2.3.4.1 Black Start Units.**

The CAISO 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 CAISO. Black Start Generating Units:

- (a) must be located in the CAISO Balancing Authority Area;
- (b) may be located anywhere in the CAISO Balancing Authority Area provided that the Black Start resource is capable of meeting the CAISO performance requirements for starting and interconnection to the CAISO Controlled Grid; but
- (c) must be dispersed throughout the CAISO Balancing Authority Area.

#### **8.2.3.4.2 Black Start Services.**

- (a) All Participating Generators with Black Start Generating Units must satisfy technical requirements specified by the CAISO.
- (b) The CAISO shall from time to time undertake performance tests, with or without prior notification.

- (c) The CAISO shall have the sole right to determine when the operation of Black Start Generating Units is required to respond to conditions on the CAISO Controlled Grid.
- (d) If the CAISO has intervened in the market for Energy and/or Ancillary Services pursuant to Section 7.7.4, the price paid by the CAISO for Black Start services shall be sufficient to permit the relevant Participating Generator to recover its costs over the period that it is directed to operate by the CAISO.
- (e) If a Black Start Generating Unit fails to achieve a Black Start when called upon by the CAISO, or fails to pass a performance test administered by the CAISO, the Market Participant that has contracted to supply Black Start service from the Generating Unit shall re-pay to the CAISO any reserve payment(s) that it has received since the administration of the last performance test or the last occasion upon which it successfully achieved a Black Start when called upon by the CAISO, whichever is the shorter period.

**8.2.3.5 Ancillary Service Substitution.**

The CAISO, whenever possible, will increase its purchases of an Ancillary Service that can substitute for another Ancillary Service, when doing so is expected to reduce its total cost of procuring Ancillary Services while meeting reliability requirements. The substitution described in this section can only occur with the purchase of bid-in Ancillary Services; substitution may not involve Self-Provided Ancillary Services. The CAISO will make such adjustments in accordance with the following principles:

- (a) The Regulation requirement must be satisfied only by Regulation Bids for resources qualified to provide Regulation;
- (b) Additional Regulation Up capacity can be used to satisfy requirements for Spinning Reserve, or Non-Spinning Reserve;



- (c) Regulation Up and Spinning Reserve requirements must be collectively satisfied by the combination of Regulation Up and Spinning Reserve Bids. Spinning Reserve and Regulation may be provided as separate services from the same Generating Unit, provided that the sum of Spinning Reserve and Regulation Up provided is not greater than the maximum Ramp Rate of the Generating Unit (MW/minute) times ten (10);
- (d) Additional Regulation Up and Spinning Reserve capacity can be used to satisfy requirements for Non-Spinning Reserve.
- (e) Regulation Up, Spinning Reserve, and Non-Spinning Reserve requirements must be collectively satisfied by the combination of Regulation Up, Spinning Reserve and Non-Spinning Reserve Bids;
- (f) Total MW purchased from the Regulation Up, Spinning Reserve, and Non-Spinning Reserve markets will not be changed by this Section 8.2.3.5; and
- (g) Regulation Energy resulting from Regulation that substituted for another Ancillary Service continues to be treated as Regulation Energy regardless of for what service it substituted.

### **8.3 Procurement of Ancillary Services, Certification and Testing Requirements for Providers of Ancillary Services, and Time-frame For Contracting for Ancillary Services.**

#### **8.3.1 Procurement of Ancillary Services.**

The CAISO shall operate a competitive Day-Ahead Market, HASP, and Real-Time Markets to procure Ancillary Services. The Security Constrained Unit Commitment (SCUC) and Security Constrained Economic Dispatch (SCED) applications used in the Integrated Forward Market (IFM), HASP, and the Real-Time Market (RTM) shall calculate optimal resource commitment, Energy, and Ancillary Services Awards and Schedules at least cost to End-Use Customers consistent with maintaining System Reliability. Any

Scheduling Coordinator representing Generating Units, System Units, Participating Loads or imports of System Resources may submit Bids into the CAISO's Ancillary Services markets provided that it is in possession of a current certificate for the Generating Units, System Units, imports of System Resources or Participating Loads concerned. Regulation Up, Regulation Down, and Operating Reserves necessary to meet CAISO requirements not met by self-provision will be procured by the CAISO as described in this CAISO Tariff. The amount of Ancillary Services procured in the IFM is based on the CAISO Forecast of CAISO Demand and the forecasted intertie schedules in HASP for the Operating Hour net of (i) Self-Provided Ancillary Services from Generating Units internal to the CAISO Balancing Authority Area and Dynamic System Resources certified to provide Ancillary Services and (ii) Ancillary Services self-provided pursuant to an ETC, TOR or Converted Right. The amount of additional Ancillary Services procured in the HASP is based on the CAISO Forecast of CAISO Demand, the Day-Ahead Schedules established net interchange, and the forecast of the intertie schedules for the Operating Hour in the HASP net of (i) available awarded Day-Ahead Ancillary Services, (ii) Self-Provided Ancillary Services from Generating Units internal to the CAISO Balancing Authority Area and Dynamic System Resources certified to provide Ancillary Services, and (iii) Ancillary Services self-provided pursuant to an ETC, TOR or Converted Right. The amount of Ancillary Services procured in the Real-Time Market is based upon the CAISO Forecast of CAISO Demand and the HASP Intertie Schedule established net interchange for the Operating Hour net of (i) available awarded Day-Ahead Ancillary Services, (ii) Self-Provided Ancillary Services from Generating Units internal to the CAISO Balancing Authority Area and Dynamic System Resources certified to provide Ancillary Services, (iii) additional Operating Reserves procured in HASP, and (iv) Ancillary Services self-provided pursuant to an ETC, TOR or Converted Right.

The CAISO will manage the Energy from both CAISO procured and Self-Provided Ancillary Services as part of the Real-Time Dispatch. In the Day-Ahead Market, the CAISO procures one-hundred percent (100%) of its Ancillary Service requirements based on the Day-Ahead Demand Forecast net of Self-Provided Ancillary Services. After the Day-Ahead Market, the CAISO procures additional Ancillary Services needed to meet system requirements from all resources, including imports from Non-Dynamic System Resources in the HASP, and Dynamic System Resources and Generation from internal resources in the Real-Time Market. The amount of Ancillary Services procured in the HASP and Real-Time Market is based upon the CAISO Forecast of CAISO Demand for the Operating Hour and RTUC Time Horizon, respectively, net of Self-Provided Ancillary Services.

The CAISO procurement of Ancillary Services from Non-Dynamic System Resources in the HASP is for the entire next Operating Hour. The CAISO procurement of Ancillary Services from Dynamic System Resources and internal Generation in the Real-Time Market is for a fifteen (15) minute RTUC Time Horizon. The CAISO's procurement of Ancillary Services from Non-Dynamic System Resources in HASP and from Dynamic System Resources and internal Generation in the Real-Time Market is based on the Ancillary Service Bids submitted or generated in the HASP consistent with the requirements in Section 30. The CAISO may also procure Ancillary Services pursuant to the requirements in Section 42.1 and as permitted under the terms and conditions of a Reliability Must-Run Contract.

As of the CAISO Operations Date, the CAISO will contract for long-term Voltage Support service with owners of Reliability Must-Run Units under Reliability Must-Run Contracts. Black Start capability will initially be procured by the CAISO through individual contracts with Scheduling Coordinators for Reliability Must-Run Units and other Generating Units which have Black Start capability. These requirements and standards apply to all Ancillary Services whether self-provided or procured by the CAISO.

### **8.3.2 Procurement Internal and External Resources**

The CAISO will procure Spinning Reserves and Non-Spinning Reserves from Generating Units operating within the CAISO Balancing Authority Area and from imports of System Resources. Scheduling Coordinators are allowed to bid Regulation from resources located outside the CAISO Balancing Authority Area by dynamically scheduling such System Resources certified to provide Regulation. Each System Resource used to bid Regulation must comply with the Dynamic Scheduling Protocol in Appendix X. Scheduling Coordinators may submit Bids for Operating Reserves from Non-Dynamic System Resources but they may not submit Bids for Regulation from such resources because these resources cannot be dynamically scheduled consistent with Appendix X. When bidding to supply Ancillary Services in the IFM, HASP, or RTM, imports compete for use of Intertie transmission capacity when the requested use is in the same direction, e.g., imports of Ancillary Services compete with Energy on Interties in the import direction and exports of Ancillary Services (i.e., on demand obligations) compete with Energy on Interties in the export direction. To the extent there is Congestion, imports of Ancillary Services will pay Congestion costs in the IFM, HASP, and RTM markets pursuant to Section 11.

### **8.3.3 Ancillary Service Regions and Regional Limits.**

The CAISO will procure Ancillary Services using Ancillary Service Regions and Ancillary Service Sub-Regions. There are two Ancillary Service Regions and eight Ancillary Service Sub-Regions. The two Ancillary Service Regions are the System Region (i.e., the CAISO Balancing Authority Area) and the Expanded System Region (i.e., the System Region and Intertie Scheduling Points with adjacent

Balancing Authority Areas). As defined by a Business Practice Manual, the eight identified Ancillary Service Sub-Regions are (1) the South of Path 15 Sub-Region, (2) the Expanded South of Path 15 Sub-Region, (3) the South of Path 26 Sub-Region, (4) the Expanded South of Path 26 Sub-Region, (5) the North of Path 15 Sub-Region, (6) the Expanded North of Path 15 Sub-Region, (7) the North of Path 26 Sub-Region, and (8) the Expanded North of Path 26 Sub-Region. The eight Ancillary Service Sub-Regions are embedded within either the System Region or the Expanded System Region. The CAISO may use Ancillary Service Sub-Regions within the System Region or the Expanded System Region to ensure appropriate distribution of the Ancillary Services procured for the CAISO Balancing Authority Area. The definition of the Expanded System Region, the System Region, and the eight Sub-Regions shall apply collectively to the following Ancillary Services: Regulation Up, Regulation Down, Spinning Reserves and Non-Spinning Reserves.

#### **8.3.3.1 Use of Ancillary Service Regions and Ancillary Service Regional Limits.**

Within the Expanded System Region, the System Region, and the Sub-Regions, the CAISO may establish limits on the amount of Ancillary Services that can be provided from each region or can be provided within each region. When used, these Ancillary Service Regional Limits identify either a maximum or a minimum (or both a maximum and a minimum) amount of Ancillary Services to be obtained within the region. The minimum Ancillary Service limit in the Expanded System Region shall be the quantities of each Ancillary Service required to meet NERC and WECC reliability standards, including any requirements of the NRC for the CAISO Balancing Authority Area. The CAISO may establish a restriction on the amount of Ancillary Services to be procured from outside the CAISO Balancing Authority Area by establishing a minimum limit for the System Region.

### **8.3.3.2 Criteria For Use of Ancillary Service Regions and Sub-Regions.**

The CAISO's use of an Ancillary Service Sub-Region occurs when the CAISO establishes a minimum or maximum limit for that Sub-Region. The CAISO's use of minimum and maximum procurement limits for Ancillary Services help to ensure that the Ancillary Services required in the CAISO Balancing Authority Area are dispersed appropriately throughout the CAISO Balancing Authority Area and accurately reflect the system topology and deliverability needs. The factors the CAISO will look to in determining whether to establish or change minimum or maximum limits, include but are not limited to, the following: (a) the CAISO Forecast of CAISO Demand, (b) the location of Demand within the Balancing Authority Area, (c) information regarding network and resource operating constraints that affect the deliverability of Ancillary Services into or out of an Ancillary Service Region, (d) the locational mix of generating resources, (e) generating resource Outages, (f) historical patterns of transmission and generating resource availability, (g) regional transmission limitations and Constraints, (h) transmission Outages, (i) Available Transfer Capability, (j) DA Schedules or HASP Intertie Schedules, (k) whether any Ancillary Services provided from System Resources requiring a NERC tag fail to have a NERC tag, and (l) other factors affecting System Reliability. Ancillary Services procured within a Sub-Region count toward satisfying the Ancillary Service requirements for the System Region or the Expanded System Region.

### **8.3.3.3 Notice to Market Participants.**

Pursuant to Section 6.5.2.3.3, the CAISO will publish forecasted Ancillary Service requirements, regional constraints, and the minimum and/or maximum Ancillary Service Regional Limits for the Ancillary Service Regions and any Sub-Regions by 6:00 p.m. prior to the Day-Ahead Market (two days prior to the Operating Day). After the completion of the Day-Ahead Market for a given Trading Day, the CAISO will publish the limits that were used in the IFM. If prior to the close of the HASP for a Trading Hour the CAISO makes a substantial change to a minimum and/or maximum limit for an Ancillary Service Region or Sub-Region, it

will issue a Market Notice as soon as reasonably practicable after the occurrence of the circumstances that led to the change. After the close of the HASP for a Trading Hour, the CAISO will publish the limits that were used in the HASP and RTUC.

#### **8.3.3.4 Establishment of New Ancillary Service Regions or Sub-Regions.**

The CAISO will consider adjusting the boundaries of the existing Ancillary Service Regions or creating a new Ancillary Service Region through a stakeholder process if: (a) there is a persistent difficulty in obtaining an appropriate distribution of Ancillary Services in the CAISO Balancing Authority Area using market procurement mechanisms, and (b) adjusting the boundaries of the existing Ancillary Service Regions or creating a new Ancillary Service Region would reduce the persistent difficulty in obtaining an appropriate distribution of Ancillary Services in the CAISO Balancing Authority Area using market procurement mechanisms. Factors that would affect the CAISO's determination to consider adjusting the boundaries of the existing Ancillary Service Regions or creating a new Ancillary Service Region include, but are not limited to operational reliability needs, the pattern of the growth of Demand in the CAISO Balancing Authority Area, the addition of new generating resources, the retirement of existing generating resources, the addition of new transmission facilities, changes in regional transmission limitations, changes in Available Transfer Capability, and extended transmission or generating resource Outages. If the CAISO considers adjusting the boundaries of the existing Ancillary Service Regions or creating a new Ancillary Service Region, the CAISO will conduct an analysis to determine whether the adjustments being considered create market power issues in either the new Ancillary Service Regions being considered or the pre-existing Ancillary Service Regions. The CAISO's analysis will be included in the stakeholder process and stakeholders will be able to comment on any new market power mitigation measures proposed for the CAISO's procurement of Ancillary Services.

### **8.3.3.5 Base Market Model and Ancillary Services Procurement**

The **Base Market** Model is used in the SCUC application, which optimizes the provision of Ancillary Services and Energy in order to meet Ancillary Service requirements and Energy requirements. The **Base Market** Model models network constraints as described in Section 27.5.1. The Ancillary Services Awards reflect the Ancillary Service Region and Sub-Region definitions and requirements. The Ancillary Service requirements, the definition of Ancillary Service Regions and Ancillary Service Sub-Regions, and any minimum or maximum limit that is used within an Ancillary Service Region or Ancillary Service Sub-Region are all inputs to the CAISO Market Processes.

### **8.3.4 Certification and Testing Requirements.**

The owner of and Scheduling Coordinator for each Generating Unit, System Unit, Dynamic System Resource, or Participating Load for which a Bid to provide Ancillary Services or Submission to Self-Provide Ancillary Services is allowed under the CAISO Tariff, and all other System Resources that are allowed to submit a Bid to provide Ancillary Services under this CAISO Tariff, must comply with the CAISO's certification and testing requirements as contained in Appendix K and the CAISO's Operating Procedures. Each Generating Unit, Dynamic System Resource, and System Unit used to bid Regulation or used to self-provide Regulation must have been certified and tested by the CAISO using the process defined in Part A of Appendix K. Each Dynamic System Resource offering Regulation must comply with the Dynamic Scheduling Protocol in Appendix X. Spinning Reserve may be provided only from Generating Units, System Resources that submit Bids to provide Spinning Reserve from imports, or System Units, which have been certified and tested by the CAISO using the process defined in Part B of Appendix K. Non-Spinning Reserve may be provided from Curtailable Demand, on-demand rights from other entities or Balancing Authority Areas, Generating Units, System Resources that submit Bids to provide Non-Spinning Reserve from imports, or System Units, which have been certified and tested by the CAISO using the process defined in Part C of Appendix K. Voltage Support may only be provided



from resources including Loads, Generating Units, and System Units, which have been certified and tested by the CAISO using the process defined in Part D of Appendix K. Black Start capability may only be provided from Generating Units which have been certified and tested by the CAISO using the process defined in Part E of Appendix K. CAISO certification to provide Ancillary Services may be revoked by the CAISO under the provisions of this CAISO Tariff, including Appendix K.

### **8.3.5 Daily and Hourly Procurement**

The CAISO shall procure Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve on a daily and Real-Time basis in the IFM and RTM, respectively. The CAISO shall also procure Spinning and Non-Spinning Reserves on an hourly basis in the HASP. The CAISO shall procure Ancillary Services on a longer-term basis pursuant to Section 42.1.3 if necessary to meet Reliability Criteria. The CAISO shall contract for Voltage Support annually (or for such other period as the CAISO may determine is economically advantageous) and on a daily or hourly basis as required to maintain System Reliability. The CAISO shall contract annually (or for such other period as the CAISO may determine is economically advantageous) for Black Start Generation.

### **8.3.6 Market-Based Prices.**

Public utilities under the FPA must submit Bids for Ancillary Services capped at FERC authorized cost-based rates unless and until FERC authorizes different pricing. Public utilities under the FPA shall seek FERC Ancillary Services rate approval on bases consistent with the CAISO time-frame for contracting for each Ancillary Service (hourly rate for some Ancillary Services, annual rate or otherwise for other Ancillary Services) so that cost-based Bids and market-based Bids for each service shall be on comparable terms. All other entities may use market-based rates not subject to any restrictions apart from those found in this CAISO Tariff. Public utilities under the FPA which have not been approved to bid at market-based rates will not be paid above their cost-based Bid for the Ancillary Service concerned even if the relevant Market Clearing Price is higher.

### **8.3.7 AS Bidding Requirements**

Scheduling Coordinators may submit Bids or Submissions to Self-Provide an Ancillary Service consistent with the rules specified in Section 30 and any further requirements in this Section 8.3.7. Scheduling Coordinators may (i) submit Bids or Submissions to Self-Provide an Ancillary Service from resources located within the CAISO Balancing Authority Area or Dynamic System Resources certified to provide Ancillary Services, (ii) submit Submissions to Self-Provide an Ancillary Service from System Resources located outside the CAISO Balancing Authority Area if provided pursuant to ETCs, TORs, or Converted Rights, (iii) submit Bids for Ancillary Services from Dynamic and Non-Dynamic System Resources located outside the CAISO Balancing Authority Area certified to provide Ancillary Services, or (iv) submit Inter-SC Trades of Ancillary Services. Ancillary Services procured in the IFM and in the Real-Time Market are comprised of the following: Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve. The HASP process evaluates the need for Energy, Regulation and Operating Reserves from System Resources and internal Generating Units and issues binding Ancillary Services awards only for Operating Reserves Ancillary Services from Non-Dynamic System Resources. Each Generating Unit (including Physical Scheduling Plants), System Unit, Participating Load, or System Resource for which a Scheduling Coordinator wishes to submit Ancillary Service Bids must meet the requirements set forth in this CAISO Tariff. The same resource capacity may be simultaneously offered to the same CAISO Market for multiple Ancillary Services types. Ancillary Services Bids and Submissions to Self-Provide an Ancillary Service can be submitted up to seven (7) days in advance. The CAISO will only use Operating Reserve Ramp Rates for procuring capacity associated with the specific Ancillary Services. The CAISO will issue Real-Time Dispatch Instructions in the Real-Time Market for the Energy associated with the awarded capacity based upon the applicable Operational Ramp Rate submitted with the single Energy Bid Curve in accordance with Section 30.7.7. There is no ability to procure Ancillary Services for export.

To the extent a Scheduling Coordinator has an on-demand obligation to serve loads outside the CAISO Balancing Authority Area, it can do so provided that (1) it is using export transmission capacity available in Real-Time, and (2) the resource capacity providing Energy to satisfy the on-demand obligation is not under an RMR Contract or Resource Adequacy Capacity obligation, and has not been paid a RUC Availability Payment for the Trading Hour. All resources subject to the Ancillary Services must offer requirements, as specified in Section 40.6, must submit Bids consistent with the requirements specified therein and in Section 30.

**8.3.7.1 Requirement for Imports of Spinning or Non-Spinning Reserves.**

Scheduling Coordinators may submit Bids for imports of Spinning Reserve, or Non-Spinning Reserve from System Resources located outside the CAISO Balancing Authority Area including Dynamic System Resources, where technically feasible and consistent with NERC and WECC reliability standards, including any requirements of the NRC; and provided that such Scheduling Coordinators have certified to the CAISO their ability to deliver the service to the point of interchange with the CAISO Balancing Authority Area (including with respect to their ability to make changes, or cause such changes to be made, to Interchange Schedules during any interval of a Settlement Period at the discretion of the CAISO).

**8.3.7.2 Requirement for Imports of Regulation.**

Scheduling Coordinators may bid imports of Regulation from System Resources located outside the CAISO Balancing Authority Area, where technically feasible and consistent with NERC and WECC reliability standards, including any requirements of the NRC by dynamic scheduling; provided that the operator of the Balancing Authority Area in which the System Resources are located has entered into an agreement with the CAISO for interconnected Balancing Authority Area operations; and provided that such Scheduling Coordinator and the operator of the Balancing Authority Area in which the resources are located have been certified by the CAISO as to their ability to dynamically adjust Interchange Schedules based on control signals issued by the CAISO anytime during a Settlement Period at the discretion of the CAISO. Such certification shall include a demonstration of their ability to support the dynamic Interchange of Regulation service based on CAISO control signals received on dedicated communications links (either directly or through EMS computers) for CAISO computer control and telemetry to provide this function in accordance with CAISO standards and procedures posted on the CAISO Website.

**8.3.8 Procurement of Voltage Support.**

Any Participating Generator who is producing Energy shall, upon the CAISO's specific request, provide reactive energy output outside the Participating Generator's Voltage Support obligation defined in Section 8.2.3.3.

The CAISO shall select Participating Generators' Generating Units which have been certified for Voltage Support to provide this additional Voltage Support. Subject to any locational requirements, the CAISO shall select the least costly Generating Units from a computerized merit order stack to back down to produce additional Voltage Support in each location where Voltage Support is needed.

#### **8.4 Technical Requirements for Providing Ancillary Services.**

All Generating Units, System Units, Participating Loads and System Resources providing Ancillary Services shall comply with the technical requirements set out in Sections 8.4.1 to 8.4.3 below relating to their operating capabilities, communication capabilities and metering infrastructure. No Scheduling Coordinator shall be permitted to submit a Bid to the CAISO for the provision of an Ancillary Service from a Generating Unit, System Unit, Participating Load or System Resource, or to provide a Submission to Self-Provide an Ancillary Service from a Generating Unit, System Unit, Participating Load, or Dynamic System Resource, unless the Scheduling Coordinator is in possession of a current certificate issued by the CAISO confirming that the Generating Unit, System Unit, Participating Load or System Resource complies with the CAISO's technical requirements for providing the Ancillary Service concerned. Scheduling Coordinators can apply for Ancillary Services certificates in accordance with the requirements for considering and processing such applications in Appendix K and the CAISO's Operating Procedures. The CAISO shall have the right to inspect Generating Units, Participating Loads or the individual resources comprising System Units and other equipment for the purposes of the issue of a certificate and periodically thereafter to satisfy itself that its technical requirements continue to be met. If at any time the CAISO's technical requirements are not being met, the CAISO may withdraw the certificate for the Generating Unit, System Unit, Participating Load or System Resource concerned.

##### **8.4.1 Operating Characteristics Required to Provide Ancillary Services.**

Each Generating Unit, System Unit, Participating Load or System Resource for which a Scheduling Coordinator wishes to submit a Bid to provide Ancillary Services must comply with the requirements for the specific Ancillary Service as set forth in Appendix K and the Business Practice Manual. The

requirements in Appendix K and the Business Practice Manuals include Ancillary Service control, capability and availability standards. The requirements also involve the following operating characteristics:

- (a) Ramp Rate increase and decrease (MW/minute);
- (b) power factor (leading and lagging) as required by Section 8.2.3.3;
- (c) maximum output (real and reactive), except that System Resources shall be required to comply only with the requirement for maximum real power;
- (d) minimum output (real and reactive), except that System Resources shall be required to comply only with the requirement for minimum real power;
- (e) AGC capability, control scheme, and range; and
- (f) minimum length of time the resource can be available to provide the relevant Ancillary Service.

In Appendix K and the Business Practice Manuals the CAISO will differentiate the operating characteristics according to the Ancillary Service being provided.

#### **8.4.1.1 Regulation.**

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 CAISO Energy Management System (EMS) by means of the installation and use of a standard CAISO direct communication and direct control system, a description of which and criteria for any temporary exemption from which, the CAISO shall publish on the CAISO Website;

- (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 (10) minutes to a maximum of thirty (30) minutes, which value shall be specified by the CAISO and published on the CAISO Website;
- (d) the Generating Unit to CAISO Control Center telemetry must in a manner meeting CAISO standards include indications of whether the Generating Unit is on or off AGC at the Generating Unit terminal equipment;
- (e) the Generating Unit 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; and
- (f) each Participating Generator must ensure that the CAISO EMS control and related SCADA equipment for its generating facility are operational throughout the time period during which Regulation is required to be provided.

**8.4.1.2 Voltage Support.**

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.



**8.4.2 Ancillary Service Control Standards.**

The providers of Ancillary Services under this Tariff must comply with the following control standards:

- (a) Regulation. The Area Control Error will be calculated by the CAISO Energy Management System. Control signals will be sent from the CAISO EMS to raise or lower the output of Generating Units or System Resources providing Regulation when ACE exceeds the allowable CAISO Balancing Authority Area dead band for ACE;
- (b) Spinning Reserve and Non-Spinning Reserve. Each provider of Spinning Reserve or Non-Spinning Reserve must be capable of receiving a Dispatch Instruction within one (1) minute from the time the CAISO Control Center elects to Dispatch the Spinning Reserve resource or Non-Spinning Reserve resource and must ensure that its resource can be at the Dispatched operating level within ten (10) minutes after issue of the Dispatch Instruction;
- (c) Voltage Support. 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 (1) minute; and
- (d) Black Start. (i) Voice Communications: 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; (ii) CAISO 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 CAISO has confirmed that the need for such service has passed.

**8.4.3 Ancillary Service Capability Standards.**

The providers of Ancillary Services under this CAISO Tariff must comply with the following capability standards:

- (a) Spinning Reserve and Non-Spinning Reserve Capability. Each Generating Unit or external import of a System Resource scheduled to provide Spinning Reserve and each resource providing Non-Spinning Reserve must be capable of converting the full capacity reserved to Energy production within ten (10) minutes after the issue of the Dispatch Instruction by the CAISO, and of maintaining that output or scheduled Interchange for at least two (2) hours.
- (b) Black Start. Each Black Start Generating Unit must be able to start up with a dead primary and station service bus within ten (10) minutes of issue of a Dispatch Instruction by the CAISO requiring a Black Start. 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. Each Black Start Generating Unit must be capable of sustaining its output for a minimum period of twelve (12) hours from the time when it first starts delivering Energy.

**8.4.4 Ancillary Service Availability Standards.**

The providers of Spinning Reserve and Non-Spinning Reserve under this CAISO Tariff must comply with the following availability standards. Each Participating Generator shall ensure: (i) that its Generating Units scheduled to provide Spinning Reserve and Non-Spinning Reserve are available for Dispatch throughout the Settlement Period for which they have been scheduled; and (ii) that its Generating Units scheduled to provide Spinning Reserve are responsive to frequency deviations throughout the Settlement Period for which they have been scheduled.

**8.4.5 Communication Equipment.**

Unless otherwise authorized by the CAISO, all Scheduling Coordinators wishing to submit an Ancillary Service Bid must have the capability to submit to and receive information from the CAISO's secure communication system. In addition, they must be capable of receiving Dispatch Instructions electronically and they must provide the CAISO with a telephone number, or fax number through which Dispatch Instructions for each Generating Unit, System Unit, Load and System Resource may be given if necessary. The CAISO will determine which method of communication is appropriate; provided that the CAISO will consult with the Scheduling Coordinator, if time permits, and will consider the method of communication then utilized by such Scheduling Coordinator; provided further, that the CAISO shall make the final determination as to the additional communication methods. Participating Generators, owners or operators of Loads, and operators of System Units or System Resources whose resources are scheduled, bid in or under contract, shall ensure that there is a twenty-four (24) hour personal point of contact with the CAISO for the Generating Unit, System Unit, Load or System Resource. 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 twenty-four (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 CAISO Control Center. Each Participating Generator must also provide an alternate method of voice communications with the CAISO from the control room in addition to the direct communication link required above. Operators of Dynamic System Resources from which Dynamic Schedules or Bids are submitted to the CAISO shall provide communications links meeting CAISO standards for dynamic imports from System Resources. Participating Generators and operators of System Units providing Regulation shall also provide communication links meeting CAISO standards for direct digital control. Operators of System Resources providing Regulation shall provide communications links meeting CAISO standards for imports of Regulation. If any communication system

becomes unavailable, the relevant Participating Generators, operators of System Units, Loads and System Resources and the CAISO shall take immediate action to identify the cause of the interruption and to restore the communication system. A Scheduling Coordinator that has provided a Submission to Self-Provide an Ancillary Service, or has submitted a Bid to provide or contracted for Ancillary Services, shall ensure that the Generating Unit, System Unit, Load or System Resource concerned is able to receive and implement Dispatch Instructions.

#### **8.4.6 Metering Infrastructure.**

All Participating Generators, owners or operators of Loads and operators of System Units or System Resources which a Scheduling Coordinator wishes to bid to provide Ancillary Services shall have the metering infrastructure for the Generating Units, System Units, Loads or System Resources concerned which complies with requirements to be established by the CAISO relating to:

- (a) meter type;
- (b) meter location;
- (c) meter reading responsibility;
- (d) meter capability in regard to AGC response; and
- (e) any other aspect of metering infrastructure required by the CAISO under this CAISO Tariff.

#### **8.4.6.1 Additional Requirements for Black Start Units.**

A Participating Generator who wishes to offer Black Start must ensure that the requirements set out in Appendix D are met in relation to the Generating Units from which Black Start will be offered.

#### **8.5 Time Frame for Submitting and Evaluating Ancillary Services Bids.**

All Ancillary Services Bids must be submitted pursuant to the rules provided in Section 30.5.

**8.6 Obligations for and Self-Provision of Ancillary Services.**

**8.6.1 Ancillary Service Obligations.**

Each Scheduling Coordinator shall be assigned a share of the total Regulation Down, Regulation Up, Spinning Reserve, and Non-Spinning Reserve requirements by the CAISO, as set forth in Sections 11.10.2, 11.10.3 and 11.10.4, (i.e., a share of the total requirements for each Ancillary Service in the Day-Ahead Market, HASP, and the Real-Time Market). Any references in this CAISO Tariff to Regulation shall be read as referring to Regulation Up or Regulation Down.

**8.6.2 Right to Self-Provide.**

Each Scheduling Coordinator may choose to self-provide all, or a portion, of its Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve obligations in the IFM, and, to the extent needed to satisfy CAISO's additional requirement, HASP and the Real-Time Market, from resources eligible for self-provision, as may be permissible for any given Ancillary Service in these respective markets. The right to self-provide Ancillary Services from capacity that is under a contractual obligation to provide Energy, including but not limited to capacity subject to an RMR Contract and local Resource Adequacy Resources, shall be conditional; self-provision of Ancillary Services from such capacity will only be permitted to the extent that capacity is not needed for Energy as a result of the MPM-RRD process described in this CAISO Tariff. To self-provide Ancillary Services a Scheduling Coordinator must provide the CAISO with a Submission to Self-Provide an Ancillary Service. Both Ancillary Service Bids and Submissions to Self-Provide an Ancillary Service can be provided to the CAISO for the same Ancillary Service and for the same hour in the same market. To the extent the Submission to Self-Provide an Ancillary Service is from a resource that is a Partial Resource Adequacy Resource, and Energy is needed, including for purposes under Section 31.3.1.3, from that resource the

CAISO shall only disqualify the self-provision of Ancillary Services from the portion of the resource's capacity that has must-offer obligation, provided that the Scheduling Coordinator has not submitted an Energy Bid for the capacity that is not subject to a must-offer obligation. The CAISO will treat resources subject to Resource Adequacy requirements consistently with and such resources must comply with the bidding requirements in Section 40.6. If there is an Energy Bid submitted for the capacity of a Partial Resource Adequacy Resource that is not subject to a must-offer obligation the CAISO may disqualify the Submission to Self-Provide an Ancillary Service for the portion of the resources capacity that is not under a must-offer obligation consistent with the principles of co-optimization under the CAISO Tariff.

Prior to evaluating Ancillary Service Bids, the CAISO will determine whether Submissions to Self-Provide Ancillary Services are feasible with regard to resource operating characteristics and regional constraints and are qualified to provide the Ancillary Services in the markets for which they were submitted.

If the total Submissions to Self-Provide Ancillary Services exceed the maximum regional requirement for the relevant Ancillary Service in an Ancillary Service Region, the submissions that would otherwise be accepted by the CAISO as feasible and qualified will be awarded on a pro-rata basis among the suppliers offering to self-provide the Ancillary Service up to the amount of the Ancillary Services requirement. If a regional constraint imposes a limit on the total amount of Regulation Up, Spinning Reserve, and Non-Spinning Reserve, and the total self-provision of these Ancillary Services in that region exceeds that limit, Self-Provided AS are qualified pro rata from higher to lower quality service in three tiers: Regulation Up first, followed by Spinning Reserve, and then by Non-Spinning Reserve. Submissions to Self-Provide Ancillary Services in excess of the maximum regional requirement for the relevant Ancillary Service in an Ancillary Service Region will not be accepted and qualified by the CAISO as Self-Provided Ancillary Services.

The CAISO shall schedule Self-Provided Ancillary Services to the extent qualified in the IFM, HASP, and the RTM and Dispatch Self-Provided Ancillary Services in the Real-Time. To the extent that a Scheduling Coordinator self-provides Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve, the CAISO shall correspondingly reduce the quantity of the Ancillary Services it procures from Bids submitted in the IFM, HASP, and the Real-Time Market. To the extent a Scheduling Coordinator's Self-Provided Ancillary Service for a particular Ancillary Service is greater than the Scheduling Coordinator's obligation for that particular Ancillary Service in a Settlement Interval, the Scheduling Coordinator will receive the user rate for the Self-Provided Ancillary Service for the amount of the Self-Provided Ancillary Service in excess of the Scheduling Coordinator's obligation.

Scheduling Coordinators may trade Ancillary Services so that any Scheduling Coordinator may reduce its Ancillary Services Obligation through purchase of Ancillary Services capacity from another Scheduling Coordinator, or self-provide in excess of its obligation to sell Ancillary Services to another Scheduling Coordinator.

### **8.6.3 Services Which May Be Self-Provided.**

The CAISO shall permit Scheduling Coordinators to self-provide the following Ancillary Services:

- (a) Regulation Up;
- (b) Regulation Down;
- (c) Spinning Reserve; and
- (d) Non-Spinning Reserve.

Submissions to Self-Provide Ancillary Services for Regulation Up and Regulation Down capacity will be rejected if the Energy Bid provided in the submission is outside of the resource's Regulating Range. The CAISO may from time to time add other Ancillary Services to this list as it considers appropriate.

### **8.6.4 Time Frame for Informing CAISO of Self-Provision.**

#### **8.6.4.1 Day-Ahead Schedule.**

At the Day-Ahead Market, Scheduling Coordinators shall be required to submit information on Self-Provided Ancillary Services within the time frame stated in Section 30. Failure to submit the required information within the stated time frame for any hour shall lead to the self-provision for that hour being declared invalid by the CAISO.

#### **8.6.4.2 HASP.**

In the HASP, Scheduling Coordinators shall be required to submit information on Self-Provided Ancillary Services within the time frame stated in Section 30.1. Failure to submit the required adjusted information within the stated time frame shall lead to the self-provision being declared invalid by the CAISO.



**8.6.4.2.3 Information To Be Submitted By Scheduling Coordinators For Each Service.**

Scheduling Coordinators electing to self-provide Ancillary Services shall submit the information for each Self-Provided Ancillary Service as described in Section 30.

In the event of an Ancillary Service Inter-SC Trade, the Scheduling Coordinators who are parties to that trade must comply with requirements in Section 28.2.

**8.6.4.4 Acceptance of Self-Provided Ancillary Service Submissions.**

The CAISO will refuse to accept a Submission to Self-Provide an Ancillary Service to the extent it fails to meet the requirements contained in this CAISO Tariff. In particular, Self-Provided Ancillary Services must satisfy the following conditions:

- (a) the Scheduling Coordinator has a current certificate of technical eligibility for the Generating Units, System Units, Loads or System Resources selected for the Ancillary Services in question;
- (b) to the extent not provided under (a), the Generating Units, System Units, Loads and System Resources have the instrumentation, communication and metering equipment necessary to permit the CAISO to dispatch the offered Ancillary Services and verify that the services have been provided;
- (c) the Bid information provided by the Scheduling Coordinator is deemed to be valid in accordance with Appendix E and other provisions of the CAISO Tariff; and
- (d) the Generating Units, System Units, Loads or System Resources meet the CAISO's locational requirements for the Ancillary Services.

### **8.7 Ancillary Services Awards**

The CAISO shall provide Scheduling Coordinators with Ancillary Services Awards for the Day-Ahead, HASP and Real-Time Markets consistent with the provisions of the CAISO Tariff. The CAISO shall post the Ancillary Service Awards and Ancillary Service Schedules for the applicable Day-Ahead Market no later than the publication of the Day-Ahead Schedule for the applicable Day-Ahead Market; no later than approximately forty (40) minutes prior to the Operating Hour of their Ancillary Services Awards and Ancillary Service Schedules from Non-Dynamic System Resources in the HASP; and no later than approximately fifteen (15) minutes prior to the next Commitment Interval in the Real-Time Market. Where long-term contracts are involved, the information may be treated as standing information for the duration of the contract.

Once the CAISO has given Scheduling Coordinators notice of the Day-Ahead, HASP and Real-Time Market Ancillary Service Awards and Ancillary Service Schedules, these awards and Schedules represent binding commitments made in the markets between the CAISO and the Scheduling Coordinators concerned, subject to any amendments issued as described above.

### **8.8 Black Start.**

- (a) Black Start shall meet the standards specified for Black Start in this CAISO Tariff and Appendix K; and
- (b) the CAISO will dispatch Black Start Generating Units as required in accordance with the applicable Black Start agreement.

### **8.9 Verification, Compliance Testing, and Audit of Ancillary Services.**

Availability of contracted and Self-Provided Ancillary Services and RUC Capacity shall be verified by the CAISO by unannounced testing of Generating Units, Loads and System Resources, by auditing of response to CAISO Dispatch Instructions, and by analysis of the appropriate Meter Data, or Interchange Schedules. The CAISO may test the capability of any Generating Unit, System Unit, System Resource, external import of a System Resource, Participating Load, or reactive device providing Ancillary Services or RUC Capacity. Participating Generators, owners or operators of Participating Loads, operators of

System Units or System Resources, owners or operators of reactive devices and Scheduling Coordinators shall notify the CAISO immediately whenever they become aware that an Ancillary Service or RUC Capacity is not available in any way. All Participating Generators, owners or operators of Loads, operators of System Units or System Resources and owners or operators of reactive devices shall check, monitor and/or test their system and related equipment routinely to assure availability of the committed Ancillary Services and RUC Capacity. These requirements apply to Ancillary Services whether the Ancillary Services are contracted or self-provided. For a duration specified by the CAISO, the CAISO may suspend the technical eligibility certificate of a Scheduling Coordinator for a Generating Unit, System Unit, Load or System Resource, which repeatedly fails to perform. The CAISO shall develop measures to discourage repeated non-performance on the part of both bidders and self-providers.

**8.9.1 Compliance Testing for Spinning Reserve.**

Compliance testing for Spinning Reserve is addressed in Section 8.10.2.

**8.9.2 Compliance Testing for Regulation.**

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

**8.9.3 Compliance Testing for Non-Spinning Reserve.**

**8.9.3.1 Compliance Testing of a Generating Unit, System Unit or System Resource.**

The CAISO 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 CAISO shall

measure the response of the Generating Unit, System Unit or external import of a System Resource to determine compliance with its stated capabilities.

**8.9.3.2 Compliance Testing of Curtailable Demand.**

The CAISO 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 Curtailable 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.

**8.9.4 Compliance Testing for Voltage Support.**

**8.9.4.1 Compliance Testing of a Generating Unit.**

The CAISO 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.

**8.9.4.2 Compliance Testing of Other Reactive Devices.**

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

**8.9.5 Compliance Testing for Black Start.**

The CAISO 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.

**8.9.6 Compliance Testing for RUC Capacity.**

The CAISO may test the capability of a Generating Unit, System Unit or an external import of a System Resource to provide RUC Capacity 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 CAISO shall measure the response of the Generating Unit, System Unit or external import of a System Resource to determine compliance with its stated capabilities.

**8.9.7 Consequences of Failure to Pass Compliance Testing.**

**8.9.7.1 Notification of Compliance Testing Results.**

If a Generating Unit, Load, or System Resource fails a compliance test, the CAISO shall notify the Scheduling Coordinator whose resource was the subject of the test and the provider or owner or operator of the Generating Unit, Participating Load, or System Resource providing Ancillary Services or RUC Capacity 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 CAISO shall provide the Scheduling Coordinator whose resource was subject to a compliance test written notice of the results of such test. The CAISO shall at the same time send a copy of the notice to the provider or owner or operator of the Generating Unit, Load, or System Resource providing Ancillary Services or RUC Capacity. For any Resource Adequacy Resource failing a compliance test, the CAISO also will provide notification of the failure to the California Public Utilities Commission, Local Regulatory Authority, or federal agency with jurisdiction over the Load Serving Entity that listed the Resource Adequacy Resource on its Resource Adequacy Plan, and FERC.

**8.9.7.2 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 CAISO Tariff. In addition, the CAISO shall institute the sanctions described in Section 8.9.16.

**8.9.8 Performance Audits for Standard Compliance.**

In addition to testing under Section 8.10, the CAISO will periodically audit the performance of resources providing RUC Capacity or Ancillary Services to confirm the ability of such resources to provide the RUC Capacity or to meet the applicable Ancillary Service standard for performance and control.

**8.9.9 Performance Audit for Regulation.**

The CAISO will audit the performance of a Generating Unit providing Regulation by monitoring its response to CAISO EMS control or, in the case of an external import of a System Resource providing Regulation, by monitoring the dynamic Interchange response to CAISO EMS control around its Set Point within its rated MW/minute capability over the range of Regulation capacity scheduled for the current Settlement Period.

**8.9.10 Performance Audit for Spinning Reserve.**

The CAISO 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 (10) minutes of issue of the Dispatch Instruction by the CAISO, 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 (10) minutes of issue of the Dispatch Instruction by the CAISO.

**8.9.11 Performance Audit for Non-Spinning Reserve.**

The CAISO will audit the performance of a Generating Unit, Load, 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 in accordance with the time delay and MW/minute capability stated in its Bid, and reach the amount of Non-Spinning Reserve capacity under the control of the CAISO scheduled for the current Settlement Period within ten (10) minutes of issue of the Dispatch Instruction by the CAISO. An external import of a System Resource providing Non-Spinning Reserve shall be evaluated on its ability to respond to a Dispatch Instruction, move in accordance with the time delay and MW/minute capability stated in its Bid, and reach the amount of Non-Spinning Reserve capacity scheduled for the current Settlement Period within ten (10) minutes of issue of the Dispatch Instruction by the CAISO. A Load providing Non-Spinning Reserve from Curtailable Demand shall be evaluated on its ability to respond to a Dispatch Instruction, move in accordance with the time delay and MW/minute capability stated in its Bid, and reach the amount of Non-Spinning Reserve capacity scheduled for the current Settlement Period within ten (10) minutes of issue of the Dispatch Instruction by the CAISO.

**8.9.12 Performance Audit for Voltage Support.**

The CAISO 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 CAISO for the current Settlement Period.

**8.9.13 Performance Audit for Black Start.**

The CAISO 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.

**8.9.14 Performance Audit for RUC Capacity.**

The CAISO will audit the performance of a Generating Unit, Participating Load, or System Resource providing RUC Capacity 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 RUC Capacity shall be evaluated on its ability to respond to a Dispatch Instruction, start within the designated time delay, move at the MW/minute capability stated in its Bid, reach the amount of RUC Capacity scheduled for the Settlement Period concerned 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 RUC Capacity shall be evaluated on its ability to respond to a Dispatch Instruction, start within the designated time delay, move at the MW/minute capability stated in its Bid, reach the amount of RUC Capacity scheduled for the Settlement Period concerned and sustain operation at this level for a sufficient time to assure availability over the specified period.



**8.9.15 Consequences of Failure to Pass Performance Audits.**

**8.9.15.1 Notification of Performance Audit Results.**

The CAISO shall give the Scheduling Coordinator for a provider of RUC Capacity or Ancillary Services written notice of the results of such audit. The CAISO will at the same time send a copy of the notice to the provider of RUC Capacity or Ancillary Services. For any Resource Adequacy Resource failing to pass a performance audit, the CAISO also will provide notification of the failure to the California Public Utilities Commission, Local Regulatory Authority, or federal agency with jurisdiction over the Load Serving Entity that listed the Resource Adequacy Resource on its Resource Adequacy Plan, and the FERC.

**8.9.15.2 Penalties for Failure to Pass Performance Audit.**

The Scheduling Coordinator for a provider of RUC Capacity or an Ancillary Service whose resource fails a performance audit shall be subject to the financial penalties provided for in the CAISO Tariff. In addition the sanctions described in Section 8.10 shall come into effect.

**8.9.16 Sanctions for Poor Performance.**

**8.9.16.1 Warning Notice.**

If an Ancillary Service or RUC Capacity resource fails a compliance test or a performance audit, the CAISO 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.

**8.9.16.2 Scheduling Coordinator's Option to Test.**

On receipt of a warning notice the provider of the Ancillary Service or RUC Capacity may request the CAISO, through its Scheduling Coordinator, to test the capability of the Ancillary Service or RUC Capacity resource. The CAISO 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.

**8.9.16.3 Duration of Warning Notice.**

A warning notice shall continue in effect until:

- (a) the Ancillary Service or RUC Capacity resource is next tested by the CAISO whether such a test is called for by the Scheduling Coordinator under Section 8.9.16.2 or carried out by the CAISO under Section 8.10; or
- (b) the expiration of a period of six (6) calendar months from the date upon which the CAISO notified the Scheduling Coordinator that the Ancillary Service or RUC Capacity resource failed the test or the performance audit which gave rise to the issue of the warning notice, whichever is the earlier.

**8.9.16.4 Second failure.**

A RUC Capacity or 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 RUC Capacity or the Ancillary Service concerned (whether the Ancillary Service is part of the CAISO's auction or is part of a self-provision arrangement), and in the case of Ancillary Services, shall not be permitted to submit a Bid to the CAISO to provide the Ancillary Service concerned (or be part of an Ancillary Service self-provision arrangement) until such time as it has successfully re-passed the approval and certification procedure described in the relevant Part of Appendix K. For any Resource Adequacy Resource failing a compliance test or performance audit during the periods when a warning notice for that resource is in effect, the CAISO will notify the California Public Utilities Commission or the relevant Local Regulatory Authority of the failure and disqualification.

**8.10 Periodic Testing of Units.**

The CAISO shall periodically conduct unannounced tests of resources providing RUC Capacity or Ancillary Services. For RUC Capacity the unannounced tests will confirm the ability of the resource to respond to a Dispatch Instruction, start within the designated time delay, move at the MW/minute capability stated in its Bid, reach the amount of RUC Capacity scheduled for the Settlement Period concerned and sustain operation at this level for a sufficient time to assure availability over the specified period. For Ancillary Services the unannounced tests will confirm the ability of such resources to meet the applicable Ancillary Service standard for performance and control. The CAISO may test Generating Units, System Units, Loads and System Resources in the manner described herein. The frequency of testing shall be within such timeframes as are reasonable under all the circumstances. Scheduling Coordinators shall manage the resulting Energy output if notification of testing permits the Energy to be included in a Bid. If a Generating Unit, System Unit, Load, or System Resource fails to meet requirements in a test under this section, the CAISO shall notify the relevant Participating Generator, owner or operator of Loads, System Units or System Resources, or Scheduling Coordinator of such failure as soon as reasonably practicable after the completion of the test. Failure to meet requirements shall lead to the penalties described in Section 8.10.7.

**8.10.1 Regulation Up and Regulation Down Reserves.**

The CAISO shall continuously monitor the response of a Generating Unit, System Unit, or System Resource to the CAISO's Regulation instructions in order to determine the resource is under direct control of CAISO's Automatic Generation Control system and complies with CAISO's Dispatch Instructions.

**8.10.2 Spinning Reserve.**

The CAISO shall test the Spinning Reserve capability of a Generating Unit, System Unit or System Resource by issuing unannounced Dispatch Instructions requiring the Generating Unit, System Unit or System Resource to ramp up to its ten (10) minute capability. The CAISO shall measure the response of the Generating Unit, System Unit or System Resource to determine compliance with requirements. Such tests may not necessarily occur on the hour. The Scheduling Coordinator for the Generating Unit, System Unit or System Resource shall be paid pursuant to Section 11.5.6.

**8.10.3 Non-Spinning Reserve.**

The CAISO may test the Non-Spinning Reserve capability of a Generating Unit, Load, System Unit or System Resource by issuing unannounced Dispatch Instructions requiring the Generating Unit, Load, System Unit or System Resource to come on line and ramp up or to reduce Demand to its ten (10) minute capability. The CAISO shall measure the response of the Generating Unit, System Unit, System Resource or Load to determine compliance with requirements. The Scheduling Coordinator for the Generating Unit, System Unit, Load or System Resource shall be paid pursuant to Section 11.5.6.

**8.10.4 Voltage Support.**

The CAISO shall monitor a Generating Unit's response to Voltage Support instructions in order to determine compliance with Dispatch Instructions.

**8.10.5 Black Start.**

The CAISO may test the Black Start capability of a Generating Unit by issuing unannounced Dispatch Instructions requiring the Generating Unit to start on a Black Start basis. The CAISO shall measure the response of the Generating Unit to determine compliance with the terms of the Black Start contract. The Scheduling Coordinator or Black Start Generator as stated in Section 11.10.1.5 for the Generating Unit shall be paid the Generating Unit's contract price for the output under the Black Start test.

**8.10.6 RUC Capacity.**

The CAISO may test the capability of a Generating Unit, Load, System Unit or System Resource to provide RUC Capacity by issuing unannounced Dispatch Instructions requiring the Generating Unit, Load, System Unit or System Resource to follow the Dispatch Instruction. The CAISO shall measure the response of the Generating Unit, System Unit or System Resource to determine compliance with requirements. Such tests may not necessarily occur on the hour. The Scheduling Coordinator for the Generating Unit, Participating Load, System Unit or System Resource shall be paid the Energy Bid price of the Generating Unit, Participating Load, System Unit or System Resource for the output under the RUC test.

**8.10.7 Penalties for Failure to Pass Tests.**

A Generating Unit, Participating Load, System Unit or System Resource that fails an availability test, as determined under criteria to be established by the CAISO, shall be deemed not to have been available to provide the RUC Capacity or Ancillary Service concerned or the relevant portion of that service for the entire period the Generating Unit, Participating Load, System Unit or System Resource was committed to provide the service, unless appropriate documentation (i.e., daily test records) confirming the availability of that service during the committed period(s) is presented to the CAISO. The "committed period" is defined as the total of all the hours/days the Generating Unit, Participating Load, System Unit or System Resource was scheduled by the CAISO to provide the RUC Capacity or Ancillary Service beginning from: (i) the last successful availability test; or (ii) the last time the Generating Unit, Participating Load, System Unit or System Resource actually provided Energy or reduced Demand to provide RUC Capacity or provided Energy or reduced Demand as part of the Ancillary Service; whichever results in a shorter committed period. The Scheduling Coordinator for a Generating Unit, Participating Load, System Unit or System Resource that fails an availability test shall not be entitled to a RUC Availability Payment or payment for the Ancillary Service concerned for the committed period and adjustments to reflect this shall

be made in the calculation of payments to the Scheduling Coordinator, provided that any such penalty shall be reduced to reflect any adjustment made over the duration of the committed period under Section 8.10.8 or Section 31.5.7.

System Units providing RUC Capacity or providing Ancillary Services to the CAISO are subject to the same testing, compensation, and penalties as are applied to individual Generating Units providing RUC Capacity or provision of Ancillary Services.

If payments for RUC Capacity or for a particular Ancillary Service in a particular Settlement Period would be rescinded under more than one provision of this Section 8.10.7, the total amount to be rescinded for a particular Ancillary Service in a particular Settlement Period shall not exceed the total payment due in that Settlement Period.

**8.10.8 Rescission of Payments for Undispatchable, Unavailable, and Undelivered Ancillary Service Capacity.**

If Ancillary Services capacity that receives an AS Award or Self-Provided Ancillary Services capacity provided from a Generating Unit, Participating Load, System Unit or System Resource is Undispatchable Capacity, Unavailable Capacity, or Undelivered Capacity during the relevant Settlement Interval, then payments will be rescinded as described in this Section 8.10.8 and settled in accordance with Section 11.10.9. If the CAISO determines that non-compliance of a Participating Load, Generating Unit, System Unit or System Resource, with an operating order or Dispatch Instruction from the CAISO, or with any other applicable technical standard under the CAISO Tariff, causes or exacerbates system conditions for which the WECC imposes a penalty on the CAISO, then the Scheduling Coordinator of such Participating Load, Generating Unit, System Unit or System Resource shall be assigned that portion of the WECC penalty which the CAISO reasonably determines is attributable to such non-compliance, in addition to any other penalties or sanctions applicable under the CAISO Tariff.

**8.10.8.1 Rescission of Payments for Undispatchable Ancillary Service Capacity.**

The CAISO shall calculate the Real-Time ability of each Generating Unit, Participating Load, System Unit or System Resource to deliver Energy from Ancillary Services capacity or Self-Provided Ancillary Services capacity for each Settlement Interval based on its maximum operating capability, actual telemetered output, and Operational Ramp Rate as described in Section 30.10. System Resources that are awarded Ancillary Services capacity in the Day-Ahead Market are required to electronically tag (E-Tag as prescribed by the WECC) the Ancillary Services capacity. If the amounts of Ancillary Services capacity in an electronic tag differ from the amounts of Ancillary Services capacity for the System Resource, the Undispatchable Capacity will equal the amount of the difference, and will be settled in accordance with the provisions of Section 11.10.9.1.

**8.10.8.2 Rescission of Payments for Unavailable Ancillary Service Capacity.**

If the CAISO determines that a Scheduling Coordinator has supplied Uninstructed Imbalance Energy to the CAISO during a Settlement Interval from the capacity of a Generating Unit, Participating Load, System Unit or System Resource that is obligated to supply Spinning Reserve or Non-Spinning Reserve to the CAISO, payments to the Scheduling Coordinator for the Ancillary Service capacity used to supply Uninstructed Imbalance Energy shall be eliminated to the extent of the deficiency, in accordance with the provisions of Section 11.10.9.2.

**8.10.8.3 Rescission of Payments for Undelivered Ancillary Service Capacity.**

For each Settlement Interval in which a Generating Unit, Participating Load, System Unit or System Resource fails to supply Energy from Spinning Reserve or Non-Spinning Reserve capacity in accordance with a Dispatch Instruction, or supplies only a portion of the Energy specified in the Dispatch Instruction, the capacity payment will be reduced to the extent of the deficiency, in accordance with the provisions of Section 11.10.9.3.

**8.10.8.4 [NOT USED]**

**8.10.8.5 [NOT USED]**

**8.10.8.6 Rescission of Payments for Regulation Up and Regulation Down Capacity.**

Payment for Regulation Up and Regulation Down Capacity will be rescinded, in accordance with the provisions of Section 11.10.9, if the resource providing Regulation Up and Regulation Down capacity: (i) is off Regulation or off Automatic Generation Control, (ii) is not running, (iii) is not providing sufficient Regulating Range, (iv) is generating outside the Regulating Range, (v) has a Regulating Range that overlaps with its Forbidden Operating Regions, or (vi) has telemetry equipment that is not available.

**8.10.8.7 [NOT USED]**

**8.10.8.8 [NOT USED]**

**8.11 Temporary Changes to Ancillary Services Penalties.**

**8.11.1 Application and Termination.**

The temporary change, respecting Ancillary Services penalties, set out in Section 8.11.2 shall continue in effect until such time as the Chief Executive Officer of the CAISO issues a Notice of Full-Scale Operations, posted on the CAISO Website, at <http://www.CAISO.com>, or such other internet address as the CAISO may publish from time to time, specifying the date on which this Section 8.11 shall cease to apply, which date shall be not less than seven (7) days after the Notice of Full-Scale Operations is issued.

**8.11.2** For so long as this Section 8.11.2 remains in effect, Scheduling Coordinators shall not be liable for the penalties specified in Sections 8.10.7 and 8.10.8 if, as a result of limitations associated with the CAISO's Congestion Management software, the scheduled output of the resource from which the Scheduling Coordinator has committed to provide an Ancillary Service is adjusted by the CAISO to a level that conflicts with the Scheduling Coordinator's Ancillary Service capacity commitments, thereby resulting in a failed availability test.