2.5 Ancillary Services.

2.5.1 Scope.

The ISO shall be responsible for ensuring that there are sufficient Ancillary Services available to maintain the reliability of the ISO Controlled Grid consistent with WSCC and NERC criteria. The ISO's Ancillary Services requirements may be self provided by Scheduling Coordinators. Those Ancillary Services which the ISO requires to be available but which are not being self provided will be competitively procured by the ISO from Scheduling Coordinators in the Day-Ahead Market, Hour-Ahead Market and in real time or by longer term contracts. The ISO will manage both ISO procured and self provided Ancillary Services as part of the real time dispatch. The ISO will calculate payments for Ancillary Services to Scheduling Coordinators and charge the cost to Scheduling Coordinators.

For purposes of this ISO Tariff, Ancillary Services are: (i) Regulation, (ii) Spinning Reserve, (iii) Non-Spinning Reserve, (iv) Replacement Reserve, (v) Voltage Support, and (vi) Black Start capability. Bids for Non-Spinning Reserve and Replacement Reserve may be submitted by the Demand-side as well as by owners of Generation. Identification of specific services in this ISO Tariff shall not preclude development of additional interconnected operation services over time. The ISO and Market Participants will seek to develop additional categories of

these unbundled services over time as the operation of the ISO Controlled Grid matures.

2.5.2 Ancillary Services Standards.

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

2.5.2.1 Determination of Ancillary Service Standards. The ISO shall set the required standard for each Ancillary Service necessary to maintain the reliable operation of the ISO Controlled Grid. Ancillary Services standards shall be based on WSCC Minimum Operating Reliability Criteria (MORC) and ISO Controlled Grid reliability requirements. The ISO Technical Advisory Committee, in conjunction with the relevant reliability council (WSCC), shall develop these Ancillary Services standards to determine reasonableness, cost effectiveness, and adherence to national and WSCC standards. The standards developed by the ISO shall be used as a basis for determining the quantity and type of each Ancillary Service which the ISO requires to be available.

2.5.2.2 Time-frame For Revising Ancillary Service Standards. The ISO Technical Advisory Committee shall periodically undertake a review of the ISO Controlled Grid operation to determine any revision to the Ancillary Services standards to be used in the ISO Control Area. At a minimum the ISO Technical Advisory Committee shall conduct such reviews to accommodate revisions to WSCC and NERC standards. The ISO may adjust the Ancillary Services standards temporarily to take into account, among other things variations in system

conditions, real time dispatch constraints, contingencies, and voltage and dynamic stability assessments.

2.5.3 Quantities of Ancillary Services Required.

For each of the Ancillary Services, the ISO shall determine the quantity and location of the Ancillary Service which is required and which must be under the direct Dispatch control of the ISO on an hourly basis each day. The ISO shall determine the quantities it requires as follows:

2.5.3.1 Regulation Service. The ISO shall maintain sufficient Generating Units immediately responsive to AGC in order to provide sufficient Regulation service to allow the system to meet WSCC and NERC criteria.

2.5.3.2 Spinning And Non-spinning Reserves. The ISO shall maintain minimum contingency Operating Reserve made up of Spinning Reserve and Non-Spinning Reserve in accordance with WSCC MORC criteria equal to (a) 5% of the Demand (except the Demand covered by firm purchases from outside the ISO Control Area) to be met by Generation from hydroelectric resources plus 7% of the Demand (except the Demand covered by firm purchases from outside the ISO Control Area) to be met by Generation from other resources, or (b) the single largest Contingency, if this is greater or (c) by reference to such more stringent criteria as the ISO may determine from time to time. In addition, the ISO shall maintain Operating Reserve equal to the total amount of Interruptible Imports scheduled by Scheduling Coordinators for any hour. Such additional Operating

Reserve must be self-provided by Scheduling Coordinators. It may consist entirely of Non-Spinning Reserve.

2.5.3.3 Replacement Reserve. The ISO shall make its determination of the required quantity of Replacement Reserve based on:

(a) historical analysis of the deviation between actual and Day-Ahead forecast Demand,

(b) historical patterns of unplanned Generating Unit Outages,

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

(d) historical patterns of unexpected transmission Outages, and

(e) such other factors affecting ability of the ISO to maintain System Reliability as the ISO may from time to time determine.

The ISO shall have discretion to determine the quantity of Replacement Reserve it requires in each Zone.

2.5.3.4 Voltage Support.

The ISO 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 WSCC and NERC criteria using a power flow study based on the quantity and location of scheduled Demand. The ISO shall issue daily voltage schedules which are required to be maintained for ISO Controlled Grid reliability.

All Participating Generators shall maintain the ISO 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 ISO Operations Date that are unable to meet this operating power factor requirement may apply to the ISO for an exemption. Prior to granting such an exemption, the ISO 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 ISO 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 ISO shall not grant any exemption under this Section from such existing contractual requirements. The ISO shall be entitled to instruct Participating Generators to operate their Generating Units at specified points within their power factor ranges. Generators shall receive no compensation for operating within these specified ranges.

If the ISO 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 compensated in accordance with Section 2.5.18.

All Loads directly connected to the ISO 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 ISO 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 ISO Controlled Grid. The ISO will develop and will be authorized to levy penalties against Participating Generators, UDCs or Loads whose Voltage Support does not comply with the ISO's requirements. The ISO will establish voltage control standards with UDCs and the operators of other Control Areas and will enter into operational agreements providing for the coordination of actions in the event of a voltage problem occurring.

Wheeling Through and Wheeling Out transactions may also be subject to a reactive charge as developed by the ISO. If the ISO shall determine that a reactive charge should be payable at a future date, it shall, subject to FERC acceptance and approval, publish annually the Voltage Support obligations and applicable charges for Wheeling Through and Wheeling Out transactions at Scheduling

Points. The obligations shall be predetermined by the ISO based on the estimated amount of the Wheeling Through and Wheeling Out transactions each year.

2.5.3.5 Black Start Capability. The ISO shall determine the amount and location of Black Start Generation it requires through contingency studies that are used as the basis of the ISO'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, ISO Controlled Grid, or WSCC), the assumed status of Generation after the initiating disturbance, the status of interconnections, the system load 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 ISO) which are expected to fail to start, and

(d) expected transmission system damage.

The ISO shall also specify the following load restoration performance goals:

(i) Black Start unit startup and connection times;

(ii) ISO Controlled Grid restoration times; and

(iii) load restoration times.

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

2.5.4 Locational Quantities of Ancillary Services.

For each of the Ancillary Services, the ISO shall determine the required locational dispersion in accordance with ISO Controlled Grid reliability requirements. These standards shall be used as guidance only. The actual location of Ancillary Services on a daily and hourly basis shall depend on the locational spread of Demand within the ISO Control Area, the available transmission capacity, the locational mix of Generation, and historical patterns of transmission and Generation availability.

2.5.4.1 Black Start Units.

(a) must be located in the ISO Control Area;

(b) may be located anywhere in the ISO Controlled Area provided that the Black Start resource is capable of meeting the ISO performance requirements for starting and interconnection to the ISO Controlled Grid; but

(c) must be dispersed throughout the ISO Control Area.

2.5.5 Time-frame For Contracting for Ancillary Services.

The ISO shall procure on a daily and hourly basis, each day, Regulation, Spinning, Non-Spinning and Replacement Reserves. The ISO shall procure Replacement Reserve on a longer term basis pursuant to Section 2.3.5.1.3 if necessary to meet reliability criteria. The ISO Governing Board must approve all long term Replacement Reserve contracts. The ISO shall contract for Voltage Support annually (or for such other period as the ISO may determine is economically

advantageous) and on a daily or hourly basis as required to maintain system reliability. The ISO shall contract annually (or for such other period as the ISO may determine is economically advantageous) for Black Start Generation.

2.5.6 Technical Requirements for Providing Ancillary Services.

All Generating Units, Loads and System Resources providing Ancillary Services shall comply with the technical requirements set out in Sections 2.5.6.1 to 2.5.6.4 below relating to their operating capabilities, communication capabilities and metering infrastructure. No Scheduling Coordinator shall be permitted to submit a bid to the ISO for the provision of an Ancillary Service from a Generating Unit, Load or System Resource, or to submit a schedule for self provision of an Ancillary Service from that Generating Unit, Load or System Resource, unless the Scheduling Coordinator is in possession of a current certificate issued by the ISO confirming that the Generating Unit, Load or System Resource complies with the ISO's technical requirements for providing the Ancillary Service concerned. Generating Units, Loads, System Resources and Scheduling Coordinators can apply for Ancillary Services certificates in accordance with the ISO's Protocols for considering and processing such applications. The ISO shall have the right to inspect Generating Units, Loads 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 ISO's technical requirements are not being met, the ISO may withdraw the certificate for the Generating Unit, Load or System Resource concerned.

2.5.6.1 Operating Characteristics Required to Provide Ancillary Services. Each Generating Unit, Load or System Resource which a Scheduling Coordinator wishes to schedule or bid to provide Ancillary Services must comply with the requirements for the specific Ancillary Service in regard to the following:

(a) ramp rate increase and decrease (MW/minute);

(b) power factor (leading and lagging) as required by Section 2.5.3.4;

(c) maximum output (real and reactive);

(d) minimum output (real and reactive);

(e) AGC capability, control scheme, and range; and

(f) minimum length of time the resource can be available to provide the relevant Ancillary Service.

The ISO will differentiate the operating characteristics according to the Ancillary Service being provided.

2.5.6.2 Communication Equipment. Unless otherwise authorized by the ISO, all Scheduling Coordinators wishing to submit an Ancillary Service schedule or bid must have the capability to submit and receive information by direct computer link. In addition, they must provide the ISO with a telephone number or other approved voice communication system such as direct line access through which dispatch instructions for each Generating Unit, Load and System Resource may be given if necessary. All Participating Generators, owners or operators of Loads and operators of System Resources whose Generating Units, Loads or System Resources are scheduled, bid in or under contract, shall ensure that there is a 24

hour personal point of contact with the ISO for the Generating Unit, Load or System Resource. Participating Generators providing Regulation shall also provide communication links meeting ISO standards for direct digital control. If any communication system becomes unavailable, the relevant Participating Generators, operators of Loads and System Resources and the ISO shall take immediate action to identify the cause of the interruption and to restore the communication system. A Scheduling Coordinator which has scheduled or bid in or contracted for Ancillary Services shall ensure that the Generating Unit, Load or System Resource concerned is able to receive and implement Dispatch instructions.

2.5.6.3 Metering Infrastructure. All Participating Generators, owners or operators of Loads and operators of System Resources which a Scheduling Coordinator wishes to schedule or bid to provide Ancillary Services shall have the metering infrastructure for the Generating Units, Loads or System Resources concerned which complies with requirements to be established by the ISO 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 ISO under this ISO Tariff.

2.5.6.4 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 to this ISO Tariff are met in relation to the Generating Units from which Black Start will be offered.

2.5.7 Methodology For Procurement of Ancillary Services Upon Commencement of ISO Operations.

2.5.7.1 Five Minute Ex Post Price.

The ISO shall use the Hourly Ex Post Price to settle and pay for Energy dispatched from Regulation, Spinning Reserves, Non-Spinning Reserves, and Replacement Reserves.

2.5.7.2 Usage Charge in Ancillary Service Bid Evaluation.

As of the ISO Operations Date, the ISO will not incorporate forecast Usage Charges into its Ancillary Service bid evaluations as the means to evaluate Ancillary Service bids across Zones when Congestion is present.

2.5.7.3 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 ISO 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. 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.

2.5.7.4 Procurement of Ancillary Services from Resources Within ISO Control Area

As of the ISO Operations Date the ISO will purchase Ancillary Services only from resources located within the ISO Controlled Grid. The ISO will not procure Regulation from outside of the ISO Control Area, nor will it support self provision of Regulation from resources outside the ISO Control Area except under Existing Contracts. Scheduling Coordinators may utilize transmission service under Existing Contracts to self-provide Spinning Reserve, Non-Spinning Reserve or Replacement Reserve from resources located outside the ISO Control Area, where technically feasible, consistent with WSCC standards. As of the ISO Operations Date the ISO will not support any other self provision of these Ancillary Services from resources located outside the ISO Control Area.

2.5.8 The Bidding Process.

The ISO shall operate a competitive Day-Ahead and Hour-Ahead market to procure Ancillary Services. It shall purchase Ancillary Services capacity at least cost to End-Use Customers consistent with maintaining system reliability. Any Scheduling Coordinator representing Generating Units or Loads may bid into the

ISO's Ancillary Services market provided that it is in possession of a current certificate for the Generating Units or Loads concerned.

2.5.9 Provision of System Information to Market Participants.

By 6:00 p.m. two days prior to the Trading Day, the ISO shall make available to Scheduling Coordinators general system information including those items of information set forth in Section 2.2.10. This information shall be provided at the same time as the ISO provides general system information to all Scheduling Coordinators wishing to schedule power on the ISO Controlled Grid.

2.5.10 Time Frame for Submitting And Evaluating Bids.

2.5.10.1 Day-Ahead Auction. Bids for the ISO's Day-Ahead Regulation, Spinning Reserve, Non-Spinning Reserve and Replacement Reserve service market must be received by 10:00 am on the day prior to the Trading Day. The bids shall include information for each of the 24 Settlement Periods of the Trading Day. Failure to provide the information within the stated time frame shall result in the bids being declared invalid by the ISO.

2.5.10.2 Hour-Ahead Auction. Bids for the ISO's Hour-Ahead Regulation, Spinning Reserve, Non-Spinning Reserve and Replacement Reserve service market for each Settlement Period must be received at least two hours prior to the commencement of that Settlement Period. The bids shall include information for only the relevant Settlement Period. Failure to provide the information within the stated time frame shall result in the bids being declared invalid by the ISO.

2.5.11 Information To Be Submitted By Bidders.

Bids shall be submitted by Scheduling Coordinators acting on behalf of Participating Generators, and owners or operators of Loads. Bids must be in the format specified by the ISO and include the bid information for each service described in Sections 2.5.14 to 2.5.19 and such other information as the ISO may determine it requires to evaluate bids as published from time to time in ISO Protocols. The ISO will verify and respond to submitted bid data in accordance with Appendix E. Bidders may submit new bids on a daily basis (or hourly basis for the Hour-Ahead market).

2.5.12 Bid Evaluation Rules.

Bid evaluation shall be based on the following principles:

(a) the ISO shall not differentiate between bidders other than through price and capability to provide the service, and the required locational mix of services;

(b) to minimize the costs to users of the ISO Controlled Grid, the ISO shall select the bidders with lowest bids for capacity which meet its technical requirements, including location and operating capability;

(c) for the Day-Ahead Market, the Day-Ahead bids shall be evaluated independently for each of the 24 Settlement Periods of the following Trading Day;

(d) for the Hour-Ahead Market, the ISO shall evaluate bids in the two hours preceding the hour of operation;

(e) the ISO will procure sufficient Ancillary Services in the Day-Ahead Market to meet its technical requirements defined in the ISO Protocols.

2.5.13 Evaluation of Ancillary Services Bids.

When Scheduling Coordinators bid into the Regulation, Spinning Reserve, Non-Spinning Reserve and Replacement Reserve markets, they may bid the same capacity into as many of these markets as desired by providing the appropriate bid information to the ISO. The ISO shall evaluate bids in the markets for Regulation, Spinning Reserve, Non-Spinning Reserve and Replacement Reserve sequentially and separately in the following order: Regulation, Spinning Reserve, Non-Spinning Reserve and Replacement Reserve. Any capacity accepted by the ISO in one of these markets shall not be passed on to another market; any losing bids in one market may be passed onto another market, if the Scheduling Coordinator so indicates to the ISO. A Scheduling Coordinator may specify capacity bid into only the markets it desires. A Scheduling Coordinator shall also have the ability to specify different capacity prices and different Energy prices for the Spinning Reserve, Non-Spinning Reserve, Replacement Reserve and Regulation markets. The bid information, bid evaluation and price determination rules set forth below shall be used in the Day-Ahead, Hour-Ahead and real time procurement of Regulation, Spinning Reserve, Non- Spinning Reserve, and Replacement Reserve.

A Scheduling Coordinator providing one or more Regulation, Spinning Reserve, Non-Spinning Reserve, and Replacement Reserve services may not

change the identification of the Generating Units or Loads offered in the Day-Ahead Market, the Hour-Ahead Market or in real time for such services unless specifically approved by the ISO.

2.5.14 The Regulation Auction.

Bid Information. Each Scheduling Coordinator j shall submit the following information for each Generating Unit i for each Settlement Period t of the following Trading Day:

(a) bidder name/Identification Code;

(b) resource identification (name and Location Code);

(c) the date for which the bid applies;

(d) maximum operating level (MW);

(e) minimum operating level (MW);

(f) ramp rate (MW/Min) $Ramp_{ijt}$;

(g) the upward and downward range of generating capacity over which Generating Unit i from Scheduling Coordinator j is willing to provide Regulation for Settlement Period t ($Cap_{ijt}max$ (MW) where $Cap_{ijt}max \leq 10*$ $Ramp_{ijt)}$. Bidders shall offer upward and downward range for Regulation service;

(h) the bid price of the capacity reservation ($CapRes_{ijt}$ ($/MW));

(i) the bid price of the Energy output from the reserved capacity ($EnBid_{ijt}$($/MWh));

Bid Evaluation. Based on the quantity and location of the system requirements, the ISO shall select Generating Units with the bids which minimize the sum of the total bids of the Generating Units selected subject to two constraints:

(a) the sum of the selected bid capacities must be greater than or equal to the required Regulation capacity; and

(b) each Generating Unit's bid capacity must be less than or equal to that Generating Unit's ramp rate times 10 minutes.

The total bid for each Generating Unit is calculated by multiplying the capacity reservation bid price by the bid capacity.

Thus, subject to any locational requirements, the ISO will accept winning Regulation bids in accordance with the following criteria:

$$\underset{i,j}{Min} \sum TotalBidijt$$

Subject to

$$\sum_{i,j} Cap_{ijt} \geq Requirement_t \; and \; Cap_{ijt} \leq Cap_{ijtmax}$$

Where

$TotalBid_{ijt} = CapRes_{ijt} * Cap_{ijt}$

$Requirement_t$ = Amount of upward and downward movement capacity required

Price Determination. The price payable to Scheduling Coordinators for Regulation capacity made available for upward and downward movement in

accordance with the ISO's Ancillary Services schedules shall, for each Generating Unit concerned, be the zonal market clearing price as follows:

$PAGC_x = MCP_{xt}$

Where:

The zonal market clearing (MCP_{xt}) price is the highest priced winning Regulation capacity bid in Zone X based on the capacity reservation bid price i.e.

$MCP_{xt} = Max\ (CapRes_{ijt})\ in\ zone\ x\ for\ Settlement\ Period\ t$

The ISO's auction does not compensate the Scheduling Coordinator for the minimum Energy output of Generating Units bidding to provide Regulation. Therefore, disposition of any minimum Energy associated with Regulation selected in the ISO's Ancillary Services markets is the responsibility of the Scheduling Coordinator selling the Regulation.

2.5.15 The Spinning Reserve Auction.

Bid Information. Each Scheduling Coordinator j must submit the following information for each Generating Unit i for each Settlement Period t of the following Trading Day:

(a) bidder name/Identification Code;

(b) resource identification (name and Location Code);

(c) the date for which the bid applies;

(d) maximum operating level (MW);

(e) minimum operating level (MW);

(f) ramp rate (MW/min);

(g) MW additional capability synchronized to the system, immediately responsive to system frequency, and available within 10 minutes ($Cap_{ijt}max$) for Generating Unit i, from Scheduling Coordinator j, for Settlement Period t.

(h) bid price of capacity reserved ($CapRes_{ijt}$ ($/MW));

(i) bid price of Energy output from reserved capacity ($EnBid_{ijt}$ ($/MWh)).

Bid Evaluation. Based on the quantity and location of the system requirements, the ISO shall select the Generating Units with the bids which minimize the sum of the total bids of the Generating Units selected subject to two constraints:

(a) the sum of the selected bid capacities must be greater than or equal to the required Spinning Reserve capacity; and

(b) each Generating Unit's bid capacity must be less than or equal to that Generating Unit's ramp rate times 10 minutes.

The total bid for each Generating Unit is calculated by multiplying the capacity reservation bid price by the bid capacity.

Thus, subject to any locational requirements, the ISO will select the winning Spinning Reserve bids in accordance with the following criteria:

$$Min \sum_{i,j} Totalbid_{ijt}$$

Subject to

$$\sum_{i,j} Cap_{ijt} \geq Requirement_t$$

$$Cap_{ijt} \leq Cap_{ijt}max$$

Where

$TotalBid_{ijt} = Cap_{ijt} * CapRes_{ijt}$

$Requirement_t$ = the amount of Spinning Reserve capacity required

Price Determination. The price payable to Scheduling Coordinators for Spinning Reserve capacity made available in accordance with the ISO's Ancillary Services schedules shall, for each Generating Unit concerned be the zonal market clearing price for Spinning Reserve calculated as follows:

$Psp_{xt} = MCP_{xt}$

Where the zonal market clearing price (MCP_{xt}) for Spinning Reserve is the highest priced winning Spinning Reserve capacity bid in Zone X based on the capacity reservation bid price, i.e.:

$MCP_{xt} = Max(CapRes_{ijt})$ in zone x for Settlement Period t

The ISO's auction does not compensate a Scheduling Coordinator for the minimum Energy output of Generating Units bidding to provide Spinning Reserve. Therefore, any minimum Energy output associated with Spinning Reserve selected in the ISO's auction is the responsibility of the Scheduling Coordinator selling the Spinning Reserve.

2.5.16 The Non-Spinning Reserve Auction.

Bid information. If the bid is for the provision of Non-Spinning Reserve from a Generating Unit, each Scheduling Coordinator j must submit the following information for each Generating Unit i for each Settlement Period t of the following Trading Day:

(a) bidder name/Identification Code;

(b) Generating Unit identification (name and Location Code);

(c) the date for which the bid applies;

(d) maximum operating level (MW);

(e) minimum operating level (MW);

(f) ramp rate (MW/Min);

(g) the MW capability available within 10 minutes ($Cap_{ijt}max$);

(h) the bid price of the capacity reserved ($CapRes_{ijt}$($/MW));

(i) time to synchronization following notification (min);

(j) the bid price of the Energy output from the reserved capacity ($EnBid_{ijt}$($/MWh)).

If the bid is for the provision of Non-Spinning Reserve from a Load located within the ISO Control Area, each Scheduling Coordinator j must submit the following information for each Load i for each Settlement Period t of the following Trading Day:

(a) bidder name/Identification Code;

(b) Load identification name and Location Code;

(c) the date for which the bid applies;

(d) the Demand reduction available within 10 minutes ($Cap_{ijt}max$);

(e) time to interruption following notification (min);

(f) maximum allowable curtailment duration (hr);

(g) the bid price of the capacity reserved ($CapRes_{ijt}$($/MW));

(h) the bid price for Demand reduction from the reserved capacity ($EnBid_{ijt}$($/MWh)).

Bid Evaluation. Based on the quantity and location of the system requirements, the ISO shall select the Generating Units and Loads with the bids which minimize the sum of the total bids of the Generating Units and Loads selected subject to two constraints:

(a) the sum of the selected bid capacities must be greater than or equal to the required Non-Spinning Reserve capacity; and

(b) each Generating Unit's or Load's bid capacity must be less than or equal to that Generating Unit's or Load's ramp rate (or time to interruption in the case of a Load offering Demand reduction) times 10 minutes.

The total bid for each Generating Unit or Load is calculated by multiplying the capacity reservation bid by the bid capacity.

Thus subject to any locational requirements, the ISO will accept the winning Non-Spinning Reserve bids in accordance with the following criteria:

$$Min \sum_{i,j} Totalbid_{ijt}$$

Subject to

$$\sum_{i,j} Cap_{ijt} \geq Requirement_t$$

$$Cap_{ijt} \leq Cap_{ijt}max$$

Where

$TotalBid_{ijt} = Cap_{ijt} * CapRes_{ijt}$

$Requirement_t$ = the amount of Non-Spinning Reserve capacity required

Price Determination. The price payable to Scheduling Coordinators for Non-Spinning Reserve capacity made available in accordance with the ISO's Ancillary Services schedules shall for each Generating Unit or Load concerned be the zonal market clearing price for Non-Spinning Reserve calculated as follows:

$Pnonsp_{xt} = MCP_{xt}$

Where the zonal market clearing price (MCP_{xt}) for Non-Spinning Reserve is the highest priced winning Non-Spinning Reserve bid in Zone X based on the capacity reservation bid price, i.e.:

$MCP_{xt} = Max(CapRes_{ijt})$ in zone x for Settlement Period t.

2.5.17 The Replacement Reserve Auction.

Bid Information. If the bid is for the provision of Replacement Reserve from a Generating Unit, each Scheduling Coordinator j must submit the following information for each Generating Unit i for each Settlement Period t of the following Trading Day:

(a) bidder name/Identification Code;

(b) Generating Unit identification (name and Location Code);

(c) the date for which the bid applies;

(d) maximum operating level (MW);

(e) minimum operating level (MW);

(f) ramp rate (MW/Min);

(g) the MW capacity available within 60 minutes ($Cap_{ijt}max$);

(h) the bid price of the capacity reserved ($CapRes_{ijt}$ ($/MW)$);

(i) time to synchronize following notification (min);

(j) the bid price of the Energy output from the reserved capacity ($EnBid_{ijt}$ ($/MWh)).

If the bid is for the provision of Replacement Reserve from a Load located within the ISO Control Area, each Scheduling Coordinator j must submit the following information for each Load i for each Settlement Period t of the following Trading Day:

(a) bidder name/Identification Code;

(b) Load identification (name and Location Code);

(c) the date for which the bid applies;

(d) the Demand reduction available within 60 minutes (Cap_{ijt} (MW));

(e) time to interruption following notification (min);

(f) maximum allowable curtailment duration (hr);

(g) the bid price of the capacity reserved ($CapRes_{ijt}$ ($/MW));

(h) the bid price of the Demand reduction from the reserved capacity ($EnBid_{ijt}$ ($/MWh)).

Bid Evaluation. Based on the quantity and location of the system requirements, the ISO shall select the Generating Units or Loads with the bids which minimize the sum of the total bids of the Generating Units or Loads selected subject to two constraints:

(a) the sum of the selected bid capacities must be greater than or equal to the required Replacement Reserve capacity; and

(b) each Generating Unit's or Load's bid capacity must be less than or equal to that Generating Unit's or Load's ramp rate (or time to interruption in the case of a Load offering Demand reduction) times 60 minutes.

The total bid for each Generating Unit or Load is calculated by multiplying the capacity reservation bid price by the bid capacity.

Thus, subject to any locational requirements, the ISO will select the winning Replacement Reserve bids in accordance with the following criteria:

$$Min \sum_{i,j} Totalbid_{ijt}$$

Subject to

$$\sum_{i,j} Cap_{ijt} \geq Requirement_t$$

$$Cap_{ijt} \leq Cap_{ijt}max$$

Where

$TotalBid_{ijt} = Cap_{ijt} * CapRes_{ijt}$

$Requirement_t$ = the amount of Replacement Reserve capacity

Price Determination. The price payable to Scheduling Coordinators for Replacement Reserve capacity made available in accordance with the ISO's Ancillary Services schedules shall, for each Generating Unit or Load be the zonal market clearing price for Replacement Reserve calculated as follows:

$PRepRes_{xt} = MCP_{xt}$

Where the zonal market clearing price (MCP_{xt}) for Replacement Reserve is the highest priced winning Replacement Reserve bid in Zone X based on the capacity reservation bid price, i.e.:

$MCP_{xt} = Max(CapRes_{ijt})$ in zone x for Settlement Period t

2.5.18 Voltage Support.

As of the ISO Operations Date, the ISO will contract for Voltage Support service with the owners of Reliability Must-Run Units. Payments for public utilities under the FPA shall be capped at the FERC authorized cost based rates unless and until FERC authorizes different pricing.

In addition, any Participating Generator who is producing Energy shall, upon the ISO's specific request, provide reactive energy output outside the Participating Generator's Voltage Support obligation defined in Section 2.5.3.4.

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

The ISO shall pay to the Scheduling Coordinator for that Participating Generator the opportunity cost of reducing Energy output to enable reactive energy production. This opportunity cost shall be:

Max{0, Zonal Hourly Ex Post Price - Generating Unit bid price}.

If necessary, the ISO shall develop a regulatory cost based determination of marginal operating cost to be used in place of the Generating Unit bid price.

2.5.19 Black Start Capability.

As of the ISO Operations Date, the ISO will contract for Black Start capability with owners of Reliability Must-Run Units and other Generating Units. Public utilities under the FPA will be paid rates capped at the FERC authorized cost base rates unless and until FERC authorizes different pricing.

2.5.20 Obligations for and Self Provision of Ancillary Services.

2.5.20.1 Ancillary Service Obligations. Each Scheduling Coordinator shall be assigned a share of the total Regulation, Spinning Reserve, Non-Spinning and Replacement Reserve requirements by the ISO. The share assigned to each Scheduling Coordinator is described in the Section 2.5.20 and in Section 2.5.28 as that Scheduling Coordinator's obligation. Each Scheduling Coordinator's Regulation obligation in each Zone shall be pro rata based upon the ratio between the Scheduling Coordinator's scheduled hourly Demand and the total Demand scheduled to be served in each hour in that Zone. Each Scheduling Coordinator's Operating Reserve obligation in each Zone shall be equal to 5% of its scheduled Demand (except the Demand covered by firm purchases from outside the ISO Control Area) scheduled to be met by Generation from hydroelectric resources plus 7% of its scheduled Demand (except the Demand covered by firm purchases from outside the ISO Control Area) scheduled to be met by Generation from non-hydroelectric resources in that Zone, plus 100% of any Interruptible Imports and on-demand obligations which it schedules. Where the requirement for the ISO to maintain contingency Operating Reserve sufficient to meet the single largest

contingency results in a requirement for a greater quantity of Operating Reserve than that which would result from applying the 5% and 7% criteria, each Scheduling Coordinator's share of the excess shall be calculated pro rata in the same proportion as the Scheduling Coordinator's share of contingency Operating Reserve (exclusive of such excess) calculated on the 5% and 7% basis bears to the total amount of contingency Operating Reserve (exclusive of such excess) calculated on the same basis. Each Scheduling Coordinator's Replacement Reserve obligation in each Zone shall be pro rata based upon the same proportion as the Demand scheduled by the Scheduling Coordinator bears to the total scheduled Demand in the Zone.

2.5.20.2 Right to Self Provide.

Each Scheduling Coordinator may choose to self provide all, or a portion, of its Regulation and Reserve obligation in each Zone. The ISO shall schedule self provided Ancillary Services, Day-Ahead and Hour-Ahead, and Dispatch self provided Ancillary Services in real time. To the extent that a Scheduling Coordinator self provides, the ISO shall correspondingly reduce the quantity of the Ancillary Services concerned which it procures as described in Sections 2.5.14 to 2.5.17. As of the ISO Operations Date, Scheduling Coordinators must self provide the Operating Reserve required to cover Interruptible Imports and on-demand obligations.

2.5.20.3 Literal Self Provision by a Metered Subsystem. A MSS operator must be the Scheduling Coordinator or act through a Scheduling Coordinator and must

submit the Energy, Ancillary Services, and Adjustment Bids for all End Users within the MSS who are not served by other Scheduling Coordinators.

The MSS operator may provide its Regulation Spinning Reserve, Non-Spinning Reserve, and Replacement Reserve requirements through any combination of Literal Self Provision, In-Kind Self Provision, or purchases from the ISO. A MSS may utilize a System Unit to participate in the procurement processes of the ISO for Regulation Spinning Reserve, Non-Spinning Reserve, and Replacement Reserve. A System Unit is defined as one or more resources within a MSS controlled by the MSS operator so as to simulate a single resource for Regulation Spinning Reserve, Non-Spinning Reserve, and Replacement Reserve with specified performance characteristics. A System Unit must consist of resources located within the MSS or resources dynamically scheduled into the MSS. For Regulation, Spinning Reserve, Non-Spinning Reserve, and Replacement Reserve, bid evaluation and price determination, a System Unit shall be deemed for the purposes of this Section 2.5 to be equivalent to a single Generating Unit.

A MSS may self provide all Ancillary Services eligible for self provision or may meet its requirement for such Ancillary Services by purchases from the ISO. A MSS must schedule all its Energy and Ancillary Services for End-Users within the MSS who are not served by other Scheduling Coordinators either as a Scheduling Coordinator or through a Scheduling Coordinator.

The MSS is not a separate Control Area. The ISO maintains the authority and control necessary to fulfill its responsibilities as the ISO Control Area

operator. The ISO shall have the authority to control Ancillary Services provided or self provided by the MSS. The ISO maintains Operational Control of the MSS within the ISO Controlled Grid, and performs Congestion Management within the MSS. The ISO will develop protocols and procedures for the roles, responsibilities and requirements associated with a MSS.

2.5.20.4 Services Which May Be Self Provided. The ISO shall permit Scheduling Coordinators to self provide the following Ancillary Services:

(a) Regulation;

(b) Spinning Reserve;

(c) Non-Spinning Reserve; and

(d) Replacement Reserve.

The ISO may from time to time add other Ancillary Services to this list as it considers appropriate.

2.5.20.5 Time Frame for Informing ISO of Self Provision.

2.5.20.5.1 Day-Ahead Schedule. At the Day-Ahead scheduling process, Scheduling Coordinators shall be required to submit information on self provided Ancillary Services within the time frame stated in Section 2.5.10.1. Failure to submit the required information within the stated time frame for any hour shall lead to the self provision for all Settlement Periods of that relevant Trading Day being declared invalid by the ISO, and under such circumstances the ISO shall purchase sufficient Ancillary Services to meet the Scheduling Coordinator's requirements to match its Day-Ahead Schedule.

2.5.20.5.2 Hour-Ahead Schedule. If a Scheduling Coordinator adjusts its Schedule during the Hour-Ahead the Scheduling Coordinator shall adjust its Ancillary Service requirements in a corresponding manner. In the Hour-Ahead scheduling process, Scheduling Coordinators shall be required to submit information on self provided Ancillary Services within the time frame stated in Section 2.5.10.2. Failure to submit the required adjusted information within the stated time frame shall lead to the self provision being declared invalid by the ISO, and under such circumstances the ISO shall purchase the additional Ancillary Services necessary to meet the requirements for that Scheduling Coordinator.

2.5.20.6 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 Sections 2.5.14 to 2.5.17, excluding the price information. In place of the price information, Scheduling Coordinators self providing Ancillary Services shall submit a Proxy Energy Bid which shall be used by the ISO to position the self provided resources in the merit order for real time Dispatch. The ISO will verify and respond to submitted schedules in accordance with Appendix E.

2.5.20.7 Acceptance of Self Provided Ancillary Service Schedules. The ISO will refuse to accept self provided Ancillary Service schedules only to the extent that they fail to meet requirements contained in this ISO Tariff. In particular, self provided Ancillary Service schedules must satisfy the following conditions:

(a) the Scheduling Coordinator has a current certificate of technical eligibility for the Generating Units, Loads or System Resources selected for the Ancillary Services in question;

(b) to the extent not provided under (a), the Generating Units, Loads and System Resources have the instrumentation, communication and metering equipment necessary to permit the ISO to dispatch the offered Ancillary Services and verify that the services have been provided;

(c) the scheduling information provided by the Scheduling Coordinator is deemed to be valid in accordance with Appendix E; and

(d) the Generating Units, Loads or System Resources meet the ISO's locational requirements for the Ancillary Services.

2.5.21 Scheduling of Units to Provide Ancillary Services.

The ISO shall prepare supplier schedules for Ancillary Services (both self provided and purchased by the ISO) for the Day-Ahead and the Hour-Ahead Markets. The ISO shall notify each Scheduling Coordinator no later than 1:00 p.m. of the day prior to the Trading Day of their Ancillary Services schedules for the Day-Ahead and no later than one hour prior to the operating hour of their Ancillary Services schedules for the Hour-Ahead. The ISO will publish ISO Protocols setting forth the

information which will be included in these schedules. Where long-term contracts are involved, the information may be treated as standing information for the duration of the contract.

Once the ISO has given Scheduling Coordinators notice of the Day-Ahead and Hour-Ahead schedules, these schedules represent binding commitments made in the markets between the ISO and the Scheduling Coordinators concerned. Any minimum energy input and output associated with Regulation and Spinning Reserve services shall be the responsibility of the Scheduling Coordinator, as the ISO's auction does not compensate the Scheduling Coordinator for the minimum energy output of Generating Units bidding to provide these services. Accordingly the Scheduling Coordinators shall adjust their schedules to accommodate the minimum outputs required by the Generating Units included on the Schedules.

2.5.22 Rules For Real Time Dispatch of Ancillary Service Resources.

2.5.22.1 Overview. During real time, the ISO shall dispatch Generating Units, Loads and System Resources to procure Imbalance Energy. In addition, the ISO may also need to purchase additional Ancillary Services if the services arranged in advance are used to provide Imbalance Energy, and such depletion needs to be recovered to meet reliability contingency requirements.

2.5.22.2 General Principles. The ISO shall base real time dispatch of Generating Units, Loads and System Resources on the following principles:

(a) the ISO shall dispatch Generating Units providing Regulation Service to meet NERC and WSCC Area Control Error (ACE) performance requirements;

(b) once ACE has returned to zero, the ISO shall determine whether the Regulation Generating Units are operating at a point away from their Set Point. The ISO shall then adjust the output of Generating Units available (either providing Spinning Reserve, Non-Spinning Reserve or offering Supplemental Energy) to return the Regulation Generating Units to their Set Points to restore their full regulating margin;

(c) the ISO shall dispatch Generating Units, Loads and System Resources only to meet its Imbalance Energy requirements. The ISO shall not dispatch such resources in real time for economic trades either between Scheduling Coordinators or within a Scheduling Coordinator portfolio;

(d) subject to Section 2.5.22.3.2, the ISO shall select the Generating Units, Loads and System Resources to be dispatched to meet its Imbalance Energy requirements based on a merit order of Energy bid prices;

(e) subject to Section 2.5.22.3.2, the ISO shall not discriminate between Generating Units, Loads and System Resources other than based on price, and the effectiveness (location and ramp rate) of the resource concerned to respond to the fluctuation in Demand or Generation;

(f) Generating Units, Loads and System Resources shall be dispatched during the operating hour only until the next variation in Demand or the end of the operating hour, whichever is sooner. In dispatching such resources, the

ISO is not making any long term commitment as to the duration of their operation, nor the level of their output or Demand.

2.5.22.3 Ancillary Services Dispatch. The ISO may dispatch Generating Units, Loads and System Resources contracted to provide Ancillary Services (either procured through the ISO's competitive market, or self provided by Scheduling Coordinators) to supply Imbalance Energy. If a Generating Unit, Load or System Resource which is supplying Operating Reserve is dispatched to provide Imbalance Energy, the ISO shall replace the Operating Reserve from the same or another resource within the time frame specified in the WSCC guidelines.

2.5.22.3.1 Competitively Procured Ancillary Services. Generating Units and Loads selected in the ISO competitive auction shall be dispatched based on their Energy bid prices as described in their Ancillary Service schedule.

2.5.22.3.2 Self Provided Ancillary Services. Where a Scheduling Coordinator has chosen to self provide the whole of the additional Operating Reserve required to cover any Interruptible Imports which it has scheduled and has identified specific Generating Units, Loads or System Resources as the providers of the additional Operating Reserve concerned, the ISO shall Dispatch only the designated Generating Units, Loads or System Resources in the event of the ISO being notified that the Interruptible Import is being curtailed. For all other Ancillary Services which are being self provided the Proxy Energy Bid shall be used to determine the position of the Generating Unit, Load or System Resource in the merit order for real time Dispatch. If the Proxy Energy Bid is higher than the

highest Energy bid of the competitively procured Generating Units, Loads, or System Resource, the self provided Generating Unit, Load or System Resource shall be deemed to have a Dispatch price equal to the highest competitively bid Generating Unit, Load or System Resource. If the Proxy Energy Bid is lower than the lowest Energy price of a competitively bid Generating Unit, Load or System Resource, the self provided Generating Unit, Load or System Resource shall be deemed to have a Dispatch price equal to the lowest Energy bid price of the competitively procured Generating Unit, Load or System Resource.

2.5.22.4 Supplemental Energy Bids. In addition to the Generating Units, Loads and System Resources which have been scheduled to provide Ancillary Services in the Day-Ahead and Hour-Ahead markets, the ISO may Dispatch Generating Units, Loads or System Resources for which Scheduling Coordinators have submitted Supplemental Energy bids.

2.5.22.4.1 Timing of Supplemental Energy Bids.

Supplemental Energy bids must be submitted to the ISO no later than 30 minutes prior to the operating hour. Bids may also be submitted at any time after the Day-Ahead Market closes. These Supplemental Energy bids cannot be withdrawn after thirty (30) minutes prior to the Settlement Period. The ISO may dispatch the associated resource at any time during the Settlement Period.

2.5.22.4.2 Form of Supplemental Energy Bid Information.

Supplemental Energy bids must include the following:

(a) Bidder name and identification;

(b) Resource name, identification, and location;

(c) the bid price of incremental and decremental changes in Energy (up to eleven ordered pairs of quantity/price representing up to ten steps);

(d) Generating Unit operating limits (high and low MW);

(e) Generating Unit ramp rate (MW/Min); and

(f) Such other information as the ISO may determine it requires to evaluate bids, as published from time to time in ISO Protocols.

2.5.22.5 Information used in the Real Time Dispatch. The ISO shall place all the bid price information (except for Regulation bid prices and Adjustment Bids carried forward from the Day-Ahead and Hour-Ahead Markets) received from available Generating Units, Loads and System Resources (except for those specifically designated by a Scheduling Coordinator as backup capacity for Interruptible Imports and on-demand obligations under Section 2.5.22.3.2) in a database for use in real time Dispatch of Ancillary Services. The database shall indicate:

(a) Generating Unit/Load/ System Resource name;

(b) congestion zone;

(c) quantity bid;

(d) normal ramp rate;

(e) price;

(f) whether the Generating Unit/Load/ System Resource has been contracted to provide any Ancillary Services, and, if so, which ones.

The quantity blocks shall be ordered in a merit order stack of ascending incremental and descending decremental price bids.

2.5.22.6 Real Time Dispatch. Save as provided in Section 2.5.22.3.2, the ISO shall select the least-cost Generating Unit, Load or System Resource to meet Imbalance Energy requirements in real time. The ISO shall determine that additional output is needed if the current output levels of the Regulation Generating Units and System Resources exceed their scheduled Set Points by more than a specified threshold (to be determined by the ISO). The ISO shall determine that less output is needed if the output levels of the Regulation Generating Units and System Resources fall below their scheduled Set Points by more than a specified threshold (to be determined by the ISO). To minimize the cost of providing Imbalance Energy:

(a) if additional Energy output, or Demand reduction, is needed, the ISO shall Dispatch additional output or reduce Demand from Generating Units, Loads or System Resources in ascending order of their incremental Supplemental Energy bid prices (or, for Generating Units, Loads and System Resources providing Ancillary Services, their Energy Bid or Proxy Energy Bid prices).

(b) if the ISO is required to reduce Energy output from Generating Units, or System Resources, the ISO shall dispatch down Generating Units and System Resources in descending order of their decremental Supplemental Energy bid prices (or, for Generating Units and System Resources providing Ancillary Services their Energy Bid prices or Proxy Energy Bid prices).

Once a bid has been accepted by the ISO, the database shall be adjusted to reflect the change in status of the bid. Once a decremental bid has been used by the ISO, it will then be included in the incremental part of the database with an incremental bid equal to its decremental price bid. Once an incremental bid has been used by the ISO it will then be included in the decremental part of the database with a decremental bid equal to its incremental price bid. In the event that the ISO subsequently needs to decrement output, it will initially decrement the Generating Units or System Resources incremented previously, and then continue down the merit order of the decremental bids.

2.5.22.7 Inter-Zonal Congestion. In the event of Inter-Zonal Congestion in real time, the ISO shall procure Imbalance Energy separately for each Zone, as described in Section 2.5.22.6.

2.5.22.8 Intra-Zonal Congestion. In the event of Intra-Zonal Congestion in real time, the ISO shall adjust Generating Units and Loads within the Zone to alleviate the constraint, based on the Adjustment Bids available within the Zone; if there are insufficient Adjustment Bids to relieve Intra-Zonal Congestion, the ISO will use incremental and decremental bids from other resources available in the Zone.

2.5.22.9 Replacement of Operating Reserve. If pre-arranged Operating Reserve is used to meet Imbalance Energy requirements, such Operating Reserve may be replaced by the ISO's dispatch of additional Imbalance Energy through available Supplemental Energy Bids.

Any additional Operating Reserve needs may also be met in the same way. Where the ISO elects to rely upon Supplemental Energy Bids, the ISO shall select the resources with the lowest incremental Energy price bids. Operating Reserve procured from Replacement Reserve shall not require replacement of utilized Replacement Reserve.

2.5.22.10 Dispatch instructions. Dispatch instructions shall include the following information:

(a) name of the Generating Unit, Load or System Resource being dispatched;

(b) specific MW value to which the Generating Unit, Load or System Resource is being dispatched;

(c) operating level and price point to which the Generating Unit, Load or System Resource is being dispatched;

(d) time the Generating Unit, Load or System Resource is required to achieve the dispatch instruction;

(e) time of the dispatch instruction; and

(f) any other information which the ISO considers relevant.

All Dispatch instructions except those for the Dispatch of Regulation (which will be communicated by direct digital control signals) will be communicated by telephone. Except in the case of deteriorating system conditions or emergency, and except for instructions for the Dispatch of Regulation, the ISO will send all Dispatch instructions to the Scheduling Coordinator for the Generating Unit, Load or System Resource which it wishes to Dispatch. The recipient Scheduling

Coordinator shall ensure that the Dispatch instruction is communicated immediately to the operator of the Generating Unit or Load concerned. The recipient Scheduling Coordinator of a Dispatch instruction shall confirm the Dispatch instruction by repeating the Dispatch instruction to the ISO. The ISO shall record on tape all voice conversations which occur on the dispatch instruction communication equipment. These recordings may be used to audit the dispatch instructions, and to verify the response of Generating Units, Loads and System Resources to dispatch instructions.

The dispatch instruction and all information associated with it shall be logged and recorded by the ISO as soon as practical after issuing each instruction. The ISO will develop detailed operational protocols governing the content, issue, receipt, confirmation and recording of dispatch instructions.

2.5.22.11 Failure to Conform to Dispatch Instructions. All Scheduling Coordinators, Participating Generators, owners or operators of Loads and operators of System Resources providing Ancillary Services (whether self provided or procured by the ISO) or whose Supplemental Energy bids have been accepted by the ISO shall be obligated to respond or to secure response to the ISO's dispatch instructions in accordance with their terms. If a Generating Unit, Load or System Resource fails to respond to a dispatch instruction in accordance with its terms, the Generating Unit, Load or System Resource:

(a) shall be declared and labeled as non-conforming to the ISO’s instructions;

(b) cannot set the Hourly Ex Post Price; and

the Scheduling Coordinator for the Participating Generator, owner or operator of the Load or System Resource concerned shall pay to the ISO the difference between the Generating Unit's, Load's or System Resource's instructed and actual output (or Demand) at the Hourly Ex Post Price. This applies whether the Ancillary Services concerned are contracted or self provided.

The ISO will develop additional mechanisms to deter Generating Units, Loads and System Resources from failing to perform according to dispatch instructions, for example reduction in payments to Scheduling Coordinators, or suspension of the Scheduling Coordinator's Ancillary Services certificate for the Generating Unit, Load or System Resource concerned.

2.5.23 Pricing Imbalance Energy.

2.5.23.1 General Principles. Imbalance Energy shall be priced in two time intervals using the Five Minute Ex Post Price and the Hourly Ex Post Price. The Five Minute Ex Post Price shall be based on the bid of the marginal Generating Units, Loads and System Resources dispatched by the ISO to reduce Demand or to increase or decrease Energy output in each five minute period (including resources that provide Imbalance Energy and Ancillary Services resources that increase or decrease Energy output or reduce Demand).

The marginal Generating Unit, Load or System Resource dispatched in the five minute period is

(a) if generation output is increased, or Demand reduced, the Generating Unit, Load or System Resource with the highest bid that is accepted by the ISO for incremental Generation, or Demand reduction; or

(b) if generation output is decreased, the Generating Unit or System Resource with the lowest bid that is accepted by the ISO for decremental Generation.

Where a Scheduling Coordinator has identified specific Generating Units, Loads or System Resources as the providers of the additional Operating Reserve required to cover any Interruptible Imports and on-demand obligations which it has scheduled, the Proxy Energy Bid prices of those resources for the incremental Energy, or decremental Demand, dispatched by the ISO from the Operating Reserve provided by those resources, shall not be taken into account in the determination of the Hourly Ex Post Price.

When an Inter-Zonal Interface is operated at the capacity of the interface (whether due to scheduled uses of the interface, or decreases in the capacity of the interface), the marginal incremental or decremental bid prices in some Zones may differ from one another. In such cases, the ISO will determine separate Hourly Ex Post Prices for the Zones.

2.5.23.2 Determining Five Minute Ex Post Price and Hourly Ex Post Price. For each five minute period, the ISO will compute an updated dispatch price curve, using the Generating Units, Loads and System Resources dispatched during that time period to meet Imbalance Energy requirements. The Five Minute Ex Post

Price for each five minute period will equal the marginal bid of the marginal Generating Unit, Load, or System Resource as described in Section 2.5.23.1.

If the net quantity of Imbalance Energy in the five minute period t is positive then

$P5Min_t = Max(EnBid_i)_t$

Where

$EnBid_i$ = Energy bid prices of the Generating Units, Loads and System Resources providing Ancillary Services, and the Supplemental Energy bids of other Generating Units, Loads and System Resources dispatched by the ISO during the five minute period.

If the net quantity of Imbalance Energy in the five minute period t is negative then

$P5Min_t = Min(EnBid_i)_t$

In the event of Inter-Zonal Congestion, the ISO will develop a dispatch price curve, and an Ex Post Five Minute Price $P5Min_{xt}$, for each Zone where congestion exists.

The Hourly Ex Post Price in each zone will equal the Energy weighted average of the 12 Five Minute Ex Post Prices in each Zone, calculated as follows:

$$PHourExPost_x = \frac{\sum_{t=1}^{12}(P5Min_{xt} * SysDev)_t}{\sum_{t=1}^{12} SysDev_t}$$

Where:

$PHourExPost_x$ = Hourly Ex Post Price in Zone x

$P5Min_{xt}$ = Five minute Ex Post Price in Zone x in period t

$SysDev_t$ = the absolute difference (whether positive or negative) between (the deviation between scheduled and metered Demand) and (the deviation between scheduled and metered Generation) in five minute period t in Zone x.

If the ISO declares a System Emergency, e.g. during times of supply scarcity, and involuntary load shedding occurs during the real time dispatch, the ISO shall set the Hourly Ex Post Price at the Administrative Price.

2.5.24 Verification of Performance of Ancillary Services.

Availability of both contracted and self provided Ancillary Services shall be verified by the ISO by unannounced testing of Generating Units, Loads and System Resources, by auditing of response to ISO Dispatch instructions, and by analysis of the appropriate Meter Data. Participating Generators, owners or operators of Loads and Scheduling Coordinators shall notify the ISO immediately whenever they become aware that an Ancillary Service is not available in any way. All Participating Generators and owners or operators of Loads shall check, monitor and/or test their system and related equipment routinely to assure availability of the committed Ancillary Services. These requirements apply whether the Ancillary Services are contracted or self provided. For a duration specified by the ISO, the ISO may suspend the technical eligibility certificate of a Scheduling Coordinator for a Generating Unit, Load or System Resource which

repeatedly fails to perform. The ISO shall develop measures to discourage repeated non-performance on the part of both bidders and self providers.

The ISO shall monitor the performance of a MSS via a Metered Subsystem Regulation Error (MSRE). The MSRE is obtained by comparing the sum of the metered power flows at the MSS interface points to the sum of the MSS's power scheduled or instructed at these same interface points. The ISO may bias the MSRE for purposes of testing or control of Ancillary Services provided by the MSS. The MSRE shall incorporate this bias.

The MSRE shall be reported to the ISO on a real time basis, and checked at five minute intervals to determine whether the MSS meets specified performance criteria.

The ISO has authority to suspend MSS control and direct, via communications with the MSS operator, the operation of units within the MSS if such control is necessary to maintain ISO Controlled Grid reliability.

If the MSS operator does not conform with Good Utility Practice, the ISO may suspend MSS control until the MSS operator demonstrates the ability and willingness to conform with Good Utility Practice.

2.5.25 Periodic Testing of Units.

The ISO may test Generating 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

scheduled. Failure to meet requirements shall lead to the penalties described in Section 2.5.26.

2.5.25.1 Regulation. The ISO shall continuously monitor the response of a Generating Unit to the ISO's Regulation instructions in order to determine compliance with Dispatch instructions.

2.5.25.2 Spinning Reserve. The ISO shall test the Spinning Reserve capability of a Generating Unit or System Resource by issuing unannounced Dispatch instructions requiring the Generating Unit resource or System Resource to ramp up to its ten minute capability. The ISO shall measure the response of the Generating Unit or System Resource to determine compliance with requirements. The Scheduling Coordinator for the Generating Unit or System Resource shall be paid the Energy bid or Proxy Energy Bid price of the Generating Unit for the output under the Spinning Reserve test.

2.5.25.3 Non-Spinning Reserve. The ISO may test the Non-Spinning Reserve capability of a Generating Unit, Load or System Resource by issuing unannounced Dispatch instructions requiring the Generating Unit, Load or System Resource to come on line and ramp up or to reduce Demand to its ten minute capability. The ISO shall measure the response of the Generating Unit, System Resource or Load to determine compliance with requirements. The Scheduling Coordinator for the Generating Unit, Load or System Resource shall be paid the Energy (or Demand reduction) bid or Proxy Energy Bid price of the Generating

Unit, Load or System Resource for its output or reduction, under the Non-Spinning Reserve test.

2.5.25.4 Replacement Reserve. The ISO may test the Replacement Reserve capability of a Generating Unit, Load or System Resource by issuing unannounced Dispatch instructions requiring the Generating Unit, Load or System Resource to come on line and ramp up or reduce Demand to its sixty minute capability. The ISO shall measure the response of the Generating Unit, Load or System Resource to determine compliance with requirements. The Scheduling Coordinator for the Generating Unit, Load or System Resource shall be paid the Energy or Demand reduction bid or Proxy Energy Bid price of the Generating Unit, Load or System Resource for the output, or reduction, of the Generating Unit, Load or System Resource under the Replacement Reserve test.

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

2.5.25.6 Black Start. The ISO 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 ISO shall measure the response of the Generating Unit to determine compliance with the terms of the Black Start contract. The Scheduling Coordinator for the Generating Unit shall be paid the Generating Unit's Energy price for the output under the Black Start test.

2.5.26 Penalties for Failure to Pass Tests.

A Generating Unit, Load or System Resource that fails an availability test, as determined under criteria to be established by the ISO, shall be deemed not to have been available to provide the Ancillary Service concerned or the relevant portion of that Service for the entire period the Generating Unit, Load 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 ISO. The "committed period" is defined as the total of all the hours/days Generating Unit, Load or System Resource was scheduled by the ISO to provide the Ancillary Service beginning from: (i) the last successful availability test; or (ii) the last time the Generating Unit, Load or System Resource actually 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 or Load that fails an availability test shall not be entitled to 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.

System Units engaged in Literal Self Provision of Ancillary Services, In-Kind Self-Provision of Ancillary Services, or providing Ancillary Services to the ISO are subject to the same testing, compensation, and penalties as are applied to individual Generating Units engaged in In-Kind Self Provision or provision of

Ancillary Services. To perform testing, the ISO will bias the MSS's MSRE to test the responsiveness of the System Unit.

2.5.27 Settlements For Contracted Ancillary Services.

Based on the prices and quantities determined in accordance with this Section, the ISO shall operate a daily Settlement function for Ancillary Services it contracts for with Scheduling Coordinators.

The ISO shall calculate imbalances between scheduled, instructed and actual quantities of Energy provided based upon Meter Data obtained pursuant to Section 10. Schedules between Control Areas shall be deemed as being delivered in accordance with Good Utility Practice. The difference between actual and scheduled interchange shall then be addressed in accordance with the WSCC and NERC inadvertent interchange practices and procedures. Following this practice, all dynamic schedules for Ancillary Services provided to the ISO by other Control Areas shall be deemed delivered to the ISO. The difference between the Energy requested by the ISO and that actually delivered by the other Control Area shall then be accounted for and addressed through the WSCC and NERC inadvertent interchange practices and procedures.

Separate payments shall be calculated for each Settlement Period t for each Generating Unit and Load. The ISO shall then calculate a total daily payment for each Scheduling Coordinator for all the Generating Units and Load that it represents for each Settlement Period t.

The settlements for the Hour-Ahead markets shall be calculated by substituting Hour-Ahead prices in the relevant formulae.

2.5.27.1 Regulation.

Quantities. The following quantity definitions shall be used for each Scheduling Coordinator in the settlement process:

$AGCQDA_{xt}$ = the Scheduling Coordinator's total quantity of Regulation capacity in Zone X sold through the ISO auction, and scheduled Day-Ahead j for Settlement Period t.

$EnQInst_{xt}$ = instructed Energy increase or decrease in Zone X in real time Dispatch for Settlement Period t, determined in accordance with the ISO Protocols.

Prices. The prices in the Settlement process for Regulation shall be those determined in Section 2.5.14.

Penalty: penalty described in Section 2.5.26.

$PAGCDA_{xt}$ = the market clearing price, PAGC, in Zone X for Regulation capacity in the Day-Ahead market for Settlement Period t.

Payments. Scheduling Coordinators for Generating Units providing Regulation capacity through the ISO auction shall receive the following payments for Regulation:

$AGCPay_{xt} = AGCQDA_{xt} * PAGCDA_{xt} - Penalty$

Scheduling Coordinators for Generating Units shall receive the following payment for Energy output from Regulation:

$EnQInst_{xt}$ * Hourly Ex Post Price in Zone X

2.5.27.2 Spinning Reserve.

Quantities. The following quantity definitions shall be used for each Scheduling Coordinator in the Settlement process:

$SpinQDA_{xt}$ = the Scheduling Coordinator's total quantity of Spinning Reserve capacity in Zone X sold through the ISO auction, and scheduled Day-Ahead for Settlement Period t.

$EnQInst_{xt}$ = instructed Energy output in Zone X in real time Dispatch for Settlement Period t, determined in accordance with the ISO protocols.

Prices. The prices in the Settlement process for Spinning Reserve shall be those determined in Section 2.5.15.

$Penalty$ = penalty described in Section 2.5.26.

$PspDA_{xt}$ = market clearing price, Psp, in Zone X for Spinning Reserve capacity in the Day-Ahead Market for Settlement Period t.

Payments. Scheduling Coordinators for Generating Units providing Spinning Reserve capacity through the ISO auction shall receive the following payments for Spinning Reserve capacity:

$$SpinPay_{xt} = SpinQDA_{xt} * PspDA_{xt}$$

Scheduling Coordinators for Generating Units shall receive the following payments for Energy output from Spinning Reserve capacity:

$$EnQInst_{xt} * Hourly\ Ex\ Post\ Price_{xt}$$

2.5.27.3 Non-spinning Reserve.

Quantities. The following quantity definitions shall be used for each Scheduling Coordinator in the settlement process:

$NonSpinQDA_{xt}$ = the Scheduling Coordinator's total Quantity of Non-Spinning Reserve capacity in Zone X sold through the ISO's auction and scheduled Day-Ahead for Settlement Period t

$EnQInst_{xt}$ = instructed Energy output or Demand reduction in Zone X in real time Dispatch for Settlement Period t, determined in accordance with the ISO protocols.

Prices. The prices in the Settlement process for Non-Spinning Reserve shall be those determined in Section 2.5.16.

$Penalty$ = penalty described in section 2.5.26.

$PnonspDA_{xt}$ = market clearing price, Pnonsp, in Zone X for Non-Spinning Reserve capacity in the Day-Ahead Market for Settlement Period t.

Payments. Scheduling Coordinators for Generating Units or Loads supplying Non-Spinning Reserve capacity through the ISO auction shall be paid the following for the Non-Spinning Reserve capacity:

$$NonspPay_{xt} = NonSpinQDA_{xt} * PnonspDAxt - penalty$$

Scheduling Coordinators for Generating Units or Loads shall receive the following payments for Energy output from Non-Spinning Reserve capacity:

$$EnQInst_{xt} * Hourly\ Ex\ Post\ Price_{xt}$$

2.5.27.4 Replacement Reserve.

Quantities. The following quantity definitions shall be used for each Scheduling Coordinator in the settlement process:

$RepResQDA_{xt}$ = the Scheduling Coordinator's total quantity of Replacement Reserve capacity in Zone X sold through the ISO auction, and scheduled Day-Ahead for Settlement Period t.

$EnQInst_{xt}$ = instructed Energy output or Demand reduction in Zone X in real time Dispatch for Settlement Period t, determined in accordance with the ISO protocols.

Prices. The prices in the settlement process for Replacement Reserve shall be those determined in section 2.5.17.

$Penalty$ = penalty described in section 2.5.26.

$PRepResDA_{xt}$ = market clearing price, PRepRes, in Zone X for Replacement Reserve capacity in the Day-Ahead Market for Settlement Period t.

Payments. Scheduling Coordinators for Generating Units or Loads providing Replacement Reserve capacity through the ISO auction shall receive the following payments for the Replacement Reserve capacity:

$$RepResPay_{ijt} = (RepResQDA_{xt} -) * PRepResDA_{xt}$$

The payments for Energy output from Replacement Reserve capacity are calculated as follows:

$$EnQInst_{ijt} * Hourly\ Ex\ Post\ Price_{xt}$$

2.5.27.5 Voltage Support. The total payments for each Scheduling Coordinator shall be the sum of the short-term procurement payments, based on opportunity cost, as described in Section 2.5.18, and the payments under long term contracts.

2.5.27.6 Black Start.

Quantities. The following quantities shall be used in the Settlement process:

$BSCap_{ijt}$ = Black Start capability of Generating Unit i from Scheduling Coordinator j for Settlement Period t.

$EnQBS_{ijt}$ = Energy output from Black Start capability of Generating Unit i from Scheduling Coordinator j for Settlement Period t, pursuant to the ISO's order to produce.

Prices. The prices used in the Settlement process are those described in the contracts referred to in section 2.5.19.

$Penalty$ = penalty described in section 2.5.26.

Payments. Scheduling Coordinators for Generating Units shall receive the following payments from the ISO for Black Start capability sold through the ISO auction:

$$BSPay_{ijt} = BSCap_{ijt} * BlackstartFee_{ijt} - Penalty$$

Scheduling Coordinators shall receive the following payments for Energy output from Black Start facilities:

$$EnQBS_{ijt} * EnBid_{ijt}$$

2.5.28 Settlement for User Charges for Ancillary Services.

The ISO shall determine a separate hourly user rate for Regulation, Spinning Reserve, Non-Spinning Reserve and Replacement Reserve for each Settlement Period purchased in the Day-Ahead market, and in the Hour-Ahead Market. Each rate will be charged to Scheduling Coordinators on a volumetric basis applied to each Scheduling Coordinator's obligation for the Ancillary Service concerned which it has not self provided.

Each Scheduling Coordinator's obligation for Regulation, Spinning Reserve, Non-Spinning Reserve and Replacement Reserve for each Zone shall be calculated in accordance with Section 2.5.20.1.

The cost of Voltage Support and Black Start shall be allocated to Scheduling Coordinators as described in Sections 2.5.28.

Except for Replacement Reserve (as to which see Section 2.5.28.4), quantities and rates for the Hour-Ahead markets shall be calculated by substituting the Hour-Ahead quantities and prices in the relevant formulae including self provided quantities of the Ancillary Service.

Separate rates shall be calculated for each Service as follows:

2.5.28.1 Regulation. The user rate per unit of purchased Regulation service for each Settlement Period in the Day-Ahead Market for each Zone shall be calculated by dividing the total Regulation capacity payments by the ISO's total requirement for Regulation for that Settlement Period for that Zone in the Day-Ahead Market

which has not been self provided by Scheduling Coordinators. The ISO will calculate the user rate for Regulation in each Zone for each Settlement Period as:

$$RegRateDA\ (\$/MWh) = AGCPayDA\ /AGCObligTotalDA$$

where:

$AGCPayDA$ = Total Regulation payments for the Settlement Period in the Market for the Zone Day-Ahead.

$AGCObligTotalDA$ = the total ISO Regulation requirement for the Settlement Period in the Day-Ahead Market for the Zone less that which has been self provided by Scheduling Coordinators.

For each Settlement Period, each Scheduling Coordinator shall pay to the ISO a sum calculated as follows for each Zone:

$$RegRateDA * AGCObligDA$$

where $AGCObligDA$ is the Scheduling Coordinator's obligation for Regulation in the Zone in the Settlement Period in the Day-Ahead Market for which it has not self provided.

2.5.28.2 Spinning Reserve. The user rate per unit of purchased Spinning Reserve for each Settlement Period in the Day-Ahead Market for each Zone shall be calculated by dividing the total capacity payments for Spinning Reserve by the ISO's total requirement for Spinning Reserve for that Settlement Period for that Zone in the Day-Ahead Market which has not been self provided by Scheduling Coordinators. The ISO will calculate the user rate for Spinning Reserve in each Zone for each Settlement Period as:

$$SpRateDA\ (\$/MWh) = \frac{SpinPayDA}{SpinObligTotalDA}$$

where:

SpinPayDA = Total Spinning Reserve payments for the Settlement Period in the Market for the Zone Day-Ahead.

SpinObligTotalDA = the total ISO Spinning Reserve requirement for the Settlement Period in the Day-Ahead Market for the Zone less that which has been self provided by Scheduling Coordinators.

For each Settlement Period, each Scheduling Coordinator shall pay to the ISO a sum calculated as follows for each Zone:

*SPRateDA * SpinObligDA*

where *SpinObligDa* is the Scheduling Coordinator's obligation for Spinning Reserve in the Zone in the Settlement Period in the Day-Ahead Market for which it has not self-provided.

2.5.28.3 Non-Spinning Reserve. The user rate per unit of purchased Non-Spinning Reserve for each Settlement Period in the Day-Ahead Market for each Zone shall be calculated by dividing the total capacity payments for Non-Spinning Reserve by the ISO's total requirements for Non-Spinning Reserve for that Settlement Period for that Zone in the Day-Ahead Market which has not been self provided by Scheduling Coordinators. The ISO will calculate the user rate for Non-Spinning Reserve in each Zone for each Settlement Period as:

$$NonSpRateDA\ (\$/Mwh) = \frac{NonSpinPayDa}{NonSpinObligTotalDA}$$

$$\frac{NonSpinPayDa}{\sum QCh\arg eNonSpinDA}$$

where:

$NonSpinPayDA$ = Total Non-Spinning Reserve payments for the Settlement Period in the Day-Ahead Market for the Zone.

$NonSpinObligTotalDA$ = the total ISO Non-Spinning Reserve requirement for the Settlement Period in the Day-Ahead for the Zone less that which has been self provided by Scheduling Coordinators.

For each Settlement Period, each Scheduling Coordinator shall pay to the ISO a sum calculated as follows for each Zone:

$NonSpRateDA * NonSpinObligDA$

where $NonSpinObligDA$ is the Scheduling Coordinator's obligation for Non-Spinning Reserve in the Zone in the Settlement Period in the Day-Ahead Market for which it has not self provided.

2.5.28.4 Replacement Reserve. The user rate per unit of purchased Replacement Reserve for each Settlement Period in the Day-Ahead Market and Hour-Ahead Markets for each Zone shall be calculated as shown below. Dispatched Replacement Reserve capacity charges are recovered by an augmentation to the Imbalance Energy Charge to allocate costs associated with the dispatch of Replacement Reserve to those Scheduling Coordinators who contributed to the Imbalance Energy requiring such dispatch. The calculation of this augmentation is set forth in Section 11.2.4.1 of this ISO Tariff. For undispatched Replacement

Reserve the user rate shall be calculated by dividing the total cost to ISO of purchasing undispatched Replacement Reserve capacity within the Zone, for the Settlement Period by the ISO's total Replacement Reserve requirement for the Settlement Period in the Day-Ahead and Hour-Ahead Markets less that which has been self provided by Scheduling Coordinators within the Zone. The total cost to the ISO to purchase undispatched Replacement Reserve capacity is equal to the total cost to the ISO to purchase Replacement Reserve less the cost for the Replacement Reserve which was Dispatched. The undispatched Replacement Reserve user rate for each Settlement Period shall be calculated as follows for each Zone.:

$$UnDispReplRate = \frac{ReplPayTotal - RRC}{ReplObligTotal}$$

where

$UnDispReplRate$ = the undispatched Replacement Reserve user rate

$ReplPayTotal$ = the total payments for Replacement Reserve capacity in the Day-Ahead and Hour-Ahead Markets

RRC = the cost of Replacement Reserve capacity dispatched in real time

$ReplOblig\ Total$ = the ISO's total Replacement Reserve requirement in the Day-Ahead and Hour-Ahead Markets less that which has been self provided by Scheduling Coordinators.

The cost of Replacement Reserve capacity which is dispatched in real time in each Settlement Period in each Zone shall be calculated by multiplying the

quantity of Replacement Reserve capacity Dispatched in the Settlement Period in the Zone by the average price paid for Replacement Reserve capacity scheduled in the Day-Ahead Market for the same Zone and Settlement Period calculated as follows:

$RRC = PavgRepl * ReplQDisp$

where $ReplQDisp$ is the Replacement Reserve capacity Dispatched in the Zone in the Settlement Period and $PavgRepl$ is calculated as follows:

$$PavgRepl = \frac{ReplPayTotalDA + ReplPayTotalHA}{ReplQDA + ReplQHA}$$

where:

$ReplPayTotalDA$ = the total payments for Replacement Reserve for the Day-Ahead Market.

$ReplPayTotalHA$ = the total payments for Replacement Reserve for the Hour-Ahead Market.

$ReplQDA$ = the total quantity of Replacement Reserve capacity provided in the Day-Ahead Market.

$ReplQHA$ = the total quantity of Replacement Reserve capacity provided in the Hour-Ahead Market.

The undispatched Replacement Reserve capacity charge for each Scheduling Coordinator in the Day-Ahead and Hour-Ahead Markets for each Settlement Period shall be calculated as follows in each Zone:

$ReplOblig * UnDispReplRate$

where *ReplOblig* is the Scheduling Coordinator's obligation for Replacement Reserve in the Settlement Period in the Day-Ahead and Hour-Ahead Markets for which it has not self provided.

2.5.28.5 Voltage Support. The short term market Voltage Support user rate for Settlement Period t shall be calculated as follows:

$$VSSTRate_t = \frac{\sum_{i,j} VSST_{ijt}}{\sum_{j} QChargeVS_{jt}}$$

$VSST_{ijt}$ = Voltage Support payment to Scheduling Coordinator i in respect of Generating Unit i in the short-term market applicable to Settlement Period t.

$QChargeVS_{jt}$ = charging quantity for Voltage Support for Scheduling Coordinator j for Settlement Period t equal to the total Demand scheduled by Scheduling Coordinator j for Settlement Period t in the Day-Ahead Market.

The monthly long term Voltage Support contract user rate for Settlement Period t shall be calculated as follows:

$$VSLTRate_m = \frac{\sum_{i,j} VSLT_{ijm}}{\sum_{jm} QChargeVS_{jt}}$$

where:

$VSLT_{ijm}$ = long term Voltage Support contract payment in respect of resource i to Scheduling Coordinator j for month m.

The short term market Voltage Support charges for Settlement Period t payable by Scheduling Coordinator j will be calculated as follows:

$$VSSTCharge_{jt} = VSSTRate_t * QChargeVS_{jt}$$

where $VSSTCharge_{jt}$ is the amount payable by Scheduling Coordinator j for short term market Voltage Support for Settlement Period t.

$VSSTRate_t$ is the short term market Voltage Support user rate for Settlement Period t.

The monthly long term Voltage Support contract charge for month m payable by Scheduling Coordinator j will be calculated as follows:

$$VSLTCharge_m = VSLTRate_m * \sum_m QChargeVS_{jt}$$

where $VSLTCharge_m$ is the amount payable by Scheduling Coordinator j for long term Voltage Support for month m.

$VSLTRate_m$ is the monthly long term Voltage Support contract user rate charged by the ISO to Scheduling Coordinators for month m.

2.5.28.6 Black Start Capability.

The user rate for Black Start capability for month m shall be:

$$BSRate(\$/MWh)_m = \frac{\sum_{i,j} BSPay_{ijm}}{\sum_j QChargeBlackstart_{jt}}$$

where:

$BSPay_{ijmt}$ = Black Start payment to Participating Generator j in respect of Generating Unit i applicable to month m.

$QChargeBlackstart_{jt}$ = charging quantity for Black Start for Participating Generator j for Settlement Period t equal to the total Demand scheduled by Participating Generator j for Settlement Period t in the Day-Ahead Market.

The Black Start Energy payment user rate for Settlement Period t will be calculated as follows:

$$BSRate_t = \frac{\sum_{i,j} BSEn_{ijt}}{\sum_{j} QChargeBlackstart_{jt}}$$

where $BSEn_{ijt}$ is the ISO payment to Participating Generator j for Generating Unit i providing Black Start Energy in Settlement Period t.

The Black Start capability user charge for month m payable by Participating Generator j will be calculated as follows:

$$BSChargejm = BSRatem * \sum_{m} QChargeBlackStartjt$$

The Black Start Energy user charge for Settlement Period t for Scheduling Coordinator j will be calculated as follows:

$$BSChargejt = BSRatet * QChargeBlackStartjt$$

2.5.29 Public Dissemination of Information: Day-Ahead.

By 3:00 p.m. of the day preceding the Trading Day, the ISO shall make available to all Market Participants the following information on the scheduling of Ancillary Services:

Ancillary Service	Quantity Units	Period	Clearing Prices
Regulation/AGC	MW	Hourly	$/MW
Spinning Reserve	MW	Hourly	$/MW
Non-spinning Reserve	MW	Hourly	$/MW
Replacement Reserve	MW	Hourly	$/MW
Black Start	MW	Annual	$/MW

2.5.30 Communication Protocols.

Communications between the ISO and Scheduling Coordinators shall be as described below:

2.5.30.1 Information Transfer from Scheduling Coordinator to ISO. Unless otherwise agreed by the ISO, Scheduling Coordinators who wish to schedule or bid Ancillary Services to the ISO must submit the information by direct computer link.

2.5.30.2 Submitting Information By Direct Computer Link. For Scheduling Coordinators submitting information by direct computer link, each such Scheduling Coordinator shall establish a network connection with the ISO through the WEnet network. This shall be a permanent link with the ISO. Link initialization procedures shall be necessary to establish the connection for the first time, and to re-establish the connection each time the connection is restored after a system or communication failure. In order to log in, each Scheduling Coordinator shall furnish the ISO with user ID and password.

2.5.30.3 Information Transfer from ISO to Scheduling Coordinator. Unless otherwise agreed between a Scheduling Coordinator and the ISO, the ISO shall furnish scheduling information to Scheduling Coordinators by electronic transfer as described in Sections 6.1 and 6.2. 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 ISO.

2.6 Incorporation of the ISO Market Monitoring & Information Protocol

The ISO shall monitor the markets that it administers in order to identify and, where appropriate, institute corrective action to respond to the exercise of market power or other abuses of such markets in accordance with the ISO Market Monitoring & Information Protocol set forth in Appendix L, "ISO Protocols."