

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, System Unit, Load or System Resource concerned.

**2.5.22.1 Operating Characteristics Required to Provide Ancillary Services.** Each Generating Unit, System 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), except that System Resources shall be required to comply only with the requirement for maximum real power;
- (d) minimum output (real and reactive), except that System Resources shall be required to comply only with the requirement for minimum real power;
- (e) AGC capability, control scheme, and range; and
- (f) minimum length of time the resource can be available to provide the relevant Ancillary Service.

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

**2.5.22.2 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 be capable of receiving Dispatch instructions electronically and they must provide the ISO with a telephone number, or fax number through which Dispatch instructions for each Generating Unit, System Unit, Load and System Resource may be given if necessary. The ISO will determine which method of communication is

appropriate; provided that the ISO will consult with the Scheduling Coordinator, if time permits, and will consider the method of communication then utilized by such Scheduling Coordinator; provided further, that the ISO shall make the final determination as to the additional communication methods. Participating Generators, owners or operators of Loads and operators of System Units or System Resources whose resources are scheduled, bid in or under contract, shall ensure that there is a 24 hour personal point of contact with the ISO for the Generating Unit, System Unit, Load or System Resource. Participating Generators and operators of System Units providing Regulation shall also provide communication links meeting ISO standards for direct digital control. Operators of System Resources providing Regulation shall provide communications links meeting ISO standards for external imports of Regulation. If any communication system becomes unavailable, the relevant Participating Generators, operators of System Units, 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, System 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 Units or System Resources which a Scheduling Coordinator wishes to schedule or bid to provide Ancillary Services shall have the metering infrastructure for the Generating Units, System Units, Loads or System Resources concerned which complies with requirements to be established by the 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.

**2.5.22.3 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.

**2.5.23 Methodology For Procurement of Ancillary Services Upon Commencement of ISO Operations.**

**2.5.23.1 [Not Used]**

**2.5.23.2 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.

**2.5.23.3 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

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:

$\text{Max}\{0, \text{Zonal BEEP Interval Ex Post Price} - \text{Generating Unit bid price}\} \times \text{reduction in Energy output (MW)}$ .

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 and Energy Output.**

As of the ISO Operations Date, the ISO will contract for Black Start capability and Energy with owners of Reliability Must-Run Units and Black Start Generators. Public utilities under the FPA will be paid rates capped at the FERC authorized cost base rates unless and until FERC authorizes different pricing. The ISO shall pay owners of Reliability Must-Run Units for Black Start Energy output through their Scheduling Coordinators. The ISO shall pay Black Start Generators for Black Start Energy output directly.

**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. Any references in this Tariff to the Ancillary Service "Regulation" shall be read as referring to "Regulation Up" or "Regulation Down". The share assigned to each Scheduling Coordinator is described in 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 same

Generating Unit, Curtailable Demand, or System Resource successfully bid in a Day-Ahead Ancillary Service Market is reduced in the Hour-Ahead Market, for any reason (other than the negligence or willful misconduct of the ISO, or a Scheduling Coordinator's involuntary decrease in such sold capacity or scheduled self-provision on the instruction of the ISO). The price for such replaced Ancillary Service shall be the Market Clearing Price in the Hour-Ahead Market for the Ancillary Service for the Settlement Period concerned for the Zone in which the Generating Units or other resources are located. The ISO will purchase the Ancillary Service concerned from another Scheduling Coordinator in the Hour-Ahead Market in accordance with the provisions of the ISO Tariff.

**2.5.22 Rules For Real Time Dispatch of Imbalance Energy 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.

operating hour, whichever is sooner. In dispatching such resources, the ISO makes no further commitment as to the duration of their operation, nor the level of their output or Demand, except to the extent that a Dispatch instruction causes Energy to be delivered in a different BEEP Interval.

**2.5.22.3 Ancillary Services Dispatch.** The ISO may dispatch Generating Units, Loads, System Units 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, System Unit 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 Dispatch of Competitively Procured and Self-Provided Ancillary Services.**

Generating Units and Loads selected in the ISO competitive auction or self-provided shall be dispatched based on their Energy bid prices as described in their Ancillary Service schedule.

**2.5.22.3.2 Dispatch of 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, System Units or System Resources as the providers of the additional Operating Reserve concerned, the ISO shall Dispatch only the designated Generating Units, Loads, System Units 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 Energy Bid shall be used to determine the position of the Generating Unit, Load, System Unit or System Resource in the merit order for real time Dispatch.

**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 forty-five (45) 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 forty-five (45) minutes prior to the Settlement Period, except that a bid from a System Resource may specify that any portion of the bid that is not called prior to the beginning of the Settlement Period shall not be called after the beginning of 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;

**2.5.22.10 Dispatch Instructions.**

All Dispatch instructions except those for the Dispatch of Regulation (which will be communicated by direct digital control signals to Generating Units and, for System Resources, through dedicated communication links which satisfy the ISO's standards for external imports of Regulation) will be communicated electronically, except that, at the ISO's discretion, Dispatch instructions may be communicated by telephone, or fax. 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, System 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, System Unit, external import of System Resources or Load concerned. The ISO may, with the prior permission of the Scheduling Coordinator concerned,

communicate with and give Dispatch instructions to the operators of Generating Units, System Units, external imports of System Resources and Loads directly without having to communicate through their appointed Scheduling Coordinator. The recipient of a Dispatch instruction shall confirm the Dispatch instruction. The ISO shall record the communications between the ISO and Scheduling Coordinators relating to Dispatch instructions in a manner that permits

auditing of the Dispatch instructions, and of the response of Generating Units, System Units, external imports or System Resources and Loads to Dispatch instructions.

The ISO Protocols govern 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 Curtailable Demands 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, and to be available and capable of doing so, for the full duration of the Settlement Period. If a Generating Unit, Curtailable Demand or System Resource is unavailable or incapable of responding to a Dispatch instruction, or fails to respond to a Dispatch instruction in accordance with its terms, the Generating Unit, Curtailable Demand or System Resource:

- (a) shall be declared and labeled as non-conforming to the ISO's instructions;
- (b) cannot set the BEEP Interval Post Price; and

the Scheduling Coordinator for the Participating Generator, owner or operator of the Curtailable Demand or System Resource concerned shall pay to the ISO the difference between the Generating Unit's, Curtailable Demand's or System Resource's instructed and

actual output (or Demand) at the BEEP Interval Ex Post Price in accordance with Section  
11.2.4.1. This applies whether the Ancillary Services concerned are contracted or self provided.

The ISO will develop additional mechanisms to deter Generating Units, Curtailable  
Demand 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, Curtailable Demand or System Resource concerned.

**2.5.23 Pricing Imbalance Energy.**

**2.5.23.1 General Principles.** Instructed and Uninstructed Imbalance Energy shall be priced using the BEEP Interval Ex Post Prices. The BEEP Interval Ex Post Prices shall be based on the bid of the marginal Generating Units, System Units, Loads and System Resources dispatched by the ISO to increase or reduce Demand or Energy output in each BEEP Interval as provided in Section 2.5.23.2.1.

The marginal Generating Unit, System Unit, Load or System Resource provides

- (a) Incremental Energy if Generation output is increased, or Demand reduced; or
- (b) Decremental Energy if Generation output is decreased, or Demand increased.

For Incremental Energy, the marginal bid is the Generating Unit, System Unit, Load or System Resource with the highest bid that is accepted by the ISO's BEEP Software for increased Generation, or reduced Demand. For Decremental Energy, the marginal bid is the Generating Unit, System Unit, Load or System Resource with the lowest bid that is accepted by the ISO's BEEP Software for reduced Generation or increased Demand.

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 Ex Post Prices for the Zones.

The ISO will respond to the Dispatch instructions issued by the BEEP Software to the extent practical in the time available and acting in accordance with Good Utility Practice. The ISO will record the reasons for any variation from the Dispatch instructions issued by the BEEP Software.

**2.5.23.2 Determining Ex Post Prices.**

**2.5.23.2.1 BEEP Interval Ex Post Prices.** For each BEEP Interval, the ISO will compute an updated supply curve, using the Generating Units, System Units, Loads and System Resources dispatched according to the ISO's BEEP Software during that time period to meet Imbalance Energy requirements. The BEEP Interval Ex Post Price is equal to the bid price of the marginal resource accepted by the ISO for Dispatch. For each BEEP Interval of the Settlement Period, BEEP will compute an incremental Ex Post Price and a decremental Ex Post Price. The BEEP Interval Ex Post Price for incremental Energy will be the highest incremental marginal bid selected by the BEEP software in the corresponding BEEP Interval. The BEEP Interval Ex Post Price for decremental Energy will be the lowest price decremental marginal bid selected by the BEEP software in the corresponding BEEP Interval. If only decremental Imbalance Energy is dispatched in a BEEP Interval, then the BEEP Interval Ex Post Price for incremental Energy will be equal to the BEEP Interval Ex Post Price for decremental Energy. If only incremental Imbalance

Energy is dispatched in a BEEP Interval, then the BEEP Interval Ex Post Price for decremental Energy will be equal to the BEEP Interval Ex Post Price for incremental Energy.

In the event of Inter-Zonal Congestion, the ISO will develop a dispatch price curve, and the BEEP Interval Ex Post Prices for each Zone where congestion exists.

**2.5.23.2.2 Hourly Ex Post Price Applicable to Uninstructed Deviations.** The Hourly Ex Post Price in Settlement Period t in each zone will equal the Energy weighted average of the BEEP Interval Charges in each Zone, calculated as follows:

$$P_{HourExPostx} = \frac{(\sum_{ji} |MWh_{jix}| * BIP_{ix})}{\sum_{ji} |MWh_{jix}|}$$

Where:

$P_{HourExPostx}$  = Hourly Ex Post Price in Zone x

$BIP_{ix}$  = BEEP Interval Ex Post Price

J = the number of Scheduling Coordinators with instructed deviations

$MWh_{jix}$  = the Instructed Imbalance Energy for Scheduling Coordinator j for the BEEP Interval i 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,

provided that any such penalty shall be reduced to reflect any adjustment made over the duration of the committed period under Section 2.5.26.2 or 2.5.26.3.

System Units engaged in 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 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.

If payments for capacity for a particular Ancillary Service in a particular Settlement Period would be rescinded under more than one provision of this Section 2.5.26, the total amount to be rescinded for a particular Ancillary Service in a particular Settlement Period shall not exceed the total payment due in that Settlement Period.

**2.5.26.2 Rescission of Payments for Unavailability.** If capacity scheduled into the ISO's Ancillary Services markets from a Generating Unit, Curtailable Demand, System Unit or System Resource is unavailable during the relevant BEEP Interval, then payments will be rescinded as described herein. For self-provided Ancillary Services, the payment obligation shall be equivalent to that which would arise if the Ancillary Services had been bid into each market in which they were scheduled.

**2.5.26.2.1** If the ISO determines that a Scheduling Coordinator has supplied Uninstructed Imbalance Energy to the ISO during a BEEP Interval from the capacity of a Generating Unit, System Unit or System Resource that is obligated to supply Spinning Reserve, Non-Spinning Reserve, or Replacement Reserve to the ISO during such BEEP Interval, payments to the Scheduling Coordinator representing the Generating Unit, System Unit or System Resource for the Ancillary Service capacity used to supply Uninstructed Imbalance Energy and for Energy supplied from such capacity shall be eliminated to the extent of the deficiency, except to the extent (i) the deficiency in the availability of Ancillary Service capacity from the Generating Unit, System Unit or System Resource is attributable to control exercised by the ISO in that BEEP Interval through AGC operation, an RMR Dispatch Notice, or dispatch to avoid an intervention in

Market operations or to prevent a System Emergency; or (ii) a penalty is imposed under Section 2.5.26.1 with respect to the deficiency.

**2.5.26.2.2** If the metered Demand of a Curtailable Demand is insufficient to deliver the full amount of the Non-Spinning and Replacement Reserve to which that Curtailable Demand is obligated in that BEEP Interval, then the related capacity payments will be rescinded to the extent of that deficiency as explained in Section 2.5.26.2.4 and 2.5.26.2.5, unless a penalty is imposed on that Curtailable Demand for that BEEP Interval under Section 2.5.26.1.

**2.5.26.2.3** The payment for Energy to be eliminated shall be determined in accordance with Section 11.2.4.1.

**2.5.26.2.4** This Section 2.5.26.2.4 shall not apply to the capacity payment for any particular Ancillary Service if the Zonal Market Clearing Price determined in accordance with Sections 2.5.15, 2.5.16 or 2.5.17 is less than or equal to zero. For those Ancillary Services for which such Zonal Market Clearing Prices are greater than zero, the payment for Ancillary Service capacity otherwise payable under Section 2.5.27.2, 2.5.27.3, and/or 2.5.27.4 shall be reduced by one sixth of the product of the applicable prices and the amount of Ancillary Service capacity from which the Generating Unit, Curtailable Demand, System Unit or System Resource has supplied Uninstructed Imbalance Energy in a BEEP Interval. If a Scheduling Coordinator schedules Ancillary Services through both the Day-Ahead and Hour-Ahead Markets, capacity payments due the Scheduling Coordinator from each market will be rescinded in proportion to the amount of capacity sold to the ISO in each market. The amount of capacity for which payments will be rescinded shall equal the value  $UnavailAncServMW_{ixt}$ , as defined in Section 11.2.4.1, applied to each Generating Unit, System Unit and System Resource supplying the Ancillary Service or the value

**2.5.26.2.5** Payment shall be eliminated first for any Spinning Reserve capacity for which the Generating Unit, Curtailable Demand, System Unit or System Resource would otherwise be entitled to payment. If the amount of Ancillary Service capacity from which the Generating Unit, System Unit or System Resource has supplied Uninstructed Imbalance Energy exceeds the amount of Spinning Reserve capacity for which it would otherwise be entitled to receive payment, payment shall be eliminated for Non-Spinning Reserve capacity, and then for Replacement Reserve capacity, until payment has been withheld for the full amount of Ancillary Service capacity from which the Generating Unit, Curtailable Demand, System Unit or System Resource supplied Uninstructed Imbalance Energy.

**2.5.26.2.6** For each BEEP Interval in which a Generating Unit, Curtailable Demand, System Unit or System Resource fails to supply Energy from Spinning Reserve, Non-Spinning Reserve or Replacement Reserve capacity in accordance with a Dispatch instruction, or supplies only a portion of the Energy specified in the Dispatch Instruction, the capacity payment will be pro-rated to reflect the unavailability in that BEEP Interval of the difference between (1) the total MW of the particular Ancillary Service scheduled in that Settlement Period and (2) the amount of Energy, if any, supplied in response to the Dispatch instruction in that BEEP Interval.

**2.5.26.3 Rescission of Payments When Dispatch Instruction is Not Followed**

If the total metered output of a Generating Unit, Curtailable Demand, System Unit or System Resource is insufficient to deliver the amount of Instructed Imbalance Energy associated with a Dispatch instruction issued in accordance with a bid on Spinning Reserve, Non-Spinning Reserve, or Replacement Reserve in any BEEP Interval, then the capacity payment associated with the difference between total scheduled amount of each Ancillary Service for which Insufficient Energy was delivered, and the actual output attributed to the response to the Dispatch instruction on each Ancillary Service, shall be rescinded. However, no capacity payment shall be rescinded if the shortfall in the metered output of the Generating Unit, Curtailable Demand, System Unit, or System Resource is less than a deadband amount published by ISO on the ISO Home Page at least twenty-four hours prior to the BEEP Interval. For any BEEP Interval with respect to which no deadband amount has been published by the ISO, the deadband amount shall be zero MWH.

If the Generating Unit, Curtailable Demand, System Unit or System Resource is scheduled to provide more than one Ancillary Service in the Settlement Period, then the actual output will be attributed first to Replacement Reserve, then to Non-Spinning Reserve, and finally to Spinning Reserve, and the capacity payments associated with the balance of each Ancillary Service shall be rescinded. If the same Ancillary Service is scheduled in both the Day Ahead and Hour Ahead Markets, then payments shall be rescinded in proportion to the amount of each Ancillary Service scheduled in each market.

**2.5.26.4** Penalties applied pursuant to Section 2.5.26.1, and payments rescinded pursuant to Section 2.5.26.2 and 2.5.26.3 shall be redistributed to Scheduling Coordinators in proportion to ISO Control Area metered Demand and scheduled exports for the same Trading Day.

**2.5.26.5** If the ISO determines that non-compliance of a Load, Generating Unit, or System Resource, with an operating order or Dispatch instruction from the ISO, or with any other applicable technical standard under the ISO Tariff, causes or exacerbates system conditions for which the WSCC imposes a penalty on the ISO, then the Scheduling Coordinator of such Load, Generating Unit, or System Resource shall be assigned that portion of the WSCC penalty which the ISO reasonably determines is attributable to such non-compliance, in addition to any other penalties or sanctions applicable under the ISO Tariff.

**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 calculate a total daily payment for each Scheduling Coordinator for all the Generating Units, System Units, System Resources and Curtailable Demands 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 and deducting any amounts due to the ISO from Scheduling Coordinators who buy back in the Hour-Ahead Market Regulation, Spinning Reserve, Non-Spinning Reserve or Replacement Reserve capacity they sold to the ISO in the Day-Ahead Market.

**2.5.27.1 Regulation.**

Regulation Up and Regulation Down payments shall be calculated separately.

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

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

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

$EnQUnst_{xt}$  = Uninstructed Imbalance Energy increase or decrease in Zone X in real time Dispatch for each BEEP Interval  $b$  of Settlement Period  $t$ , determined in accordance with the ISO Protocols.

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

*Adjustment:* penalty described in Section 2.5.26.1.

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

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

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

$$AGCU_pPay_{xt} = AGCU_pQDA_{xt} * PAGCU_pDA_{xt} - Adjustment$$

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

$$AGCDownPay_{xt} = AGCDownQDA_{xt} * PAGCDownDA_{xt} - Adjustment$$

Scheduling Coordinators for Generating Units shall receive payment for Energy output from Regulation in accordance with settlement for Uninstructed Imbalance Energy under Section 11.2.4.1

$$\sum_i [(EnQUnst_{i,t} * HourlyExPostPriceinZoneX) + REPA_{i,t}]$$

$$[(R_{UP_{i,t}} * C_{UP}) + (R_{DN_{i,t}} * C_{DN})] * \max(\$20/MWh, P_{x,t})$$

REPA<sub>i,t</sub> = the Regulation Energy Payment Adjustment for Generating Unit I in Zone X for Settlement Period t calculated as follows:

Where

R<sub>UP<sub>i,t</sub></sub> = the upward range of generating capacity for the provision of Regulation from Generating Unit i in Zone X included in the bid accepted by the ISO for Generating Unit i for Settlement Period t, weighted in proportion to the ISO's need for upward Regulation. The weighting factors will be specified within a range from 0-100 percent. The weighting factors will be set at the discretion of the ISO based on system conditions, and will be set at a level that will provide sufficient incentive to the market to supply upward Regulation for the ISO's purposes of satisfying WSCC criteria and NERC control performance standards. The ISO shall post the weighting factors consistent with the ISO Weighting Procedure, posted on the ISO website.

R<sub>DN<sub>i,t</sub></sub> = the downward range of generating capacity for the provision of Regulation for Generating Unit i in Zone X included in the bid accepted by the ISO for Generating

Unit  $i$  for Settlement Period  $t$ , weighted in proportion to the ISO's need for downward Regulation. The weighting factors will be specified within a range from 0-100 percent. The weighting factors will be set at the discretion of the ISO based on system conditions, and will be set at a level that will provide sufficient incentive to the market to supply downward Regulation for the ISO's purposes of satisfying WSCC criteria and NERC control performance standards. The ISO shall post the weighting factors consistent with the ISO Weighting Procedure, posted on the ISO website.

$$C_{UP} = 1$$

$$C_{DN} = 1$$

$$P_{xt} = \text{the Hourly Ex Post Price for Zone X in Settlement Period } t.$$

The ISO may modify the value of the constants  $C_{UP}$  or  $C_{DN}$  within a range of 0-1 either generally in regard to all hours or specifically in regard to particular times of the day, after the ISO Governing Board approves such modification, by a notice issued by the Chief Executive Officer of the ISO and posted on the ISO Internet "Home Page," at <http://www.caiso.com>, or such other Internet address as the ISO may publish from time to time, specifying the date and time from which the modification shall take effect, which shall be not less than seven (7) days after the Notice is issued.

REPA shall not be payable unless the Generating Unit is available and capable of being controlled and monitored by the ISO Energy Management System over the full range of its Scheduled Regulation capacity for the entire Settlement Period at least the ramp rates (increase and decrease in MW/minute) stated in its bid. In addition, the total Energy available ( $R_{UP}$  plus  $R_{DN}$ ) may be adjusted to be only  $R_{UP}$  or only  $R_{DN}$ , a percentage of  $R_{UP}$  or

$R_{DN}$ , or the sum of  $R_{UP}$  and  $R_{DN}$ , depending on the needs of the ISO for each direction of Regulation service.

### **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 Imbalance Energy output in Zone X in real time Dispatch for Settlement Period t, supplied 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.

$Adjustment$  = penalty described in Section 2.5.26.1, or rescinded capacity payments described in Section 2.5.26.2 or 2.5.26.3.

$PspDA_{xt}$  = 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, System Units, or System Resources providing Spinning Reserve capacity through the ISO auction shall receive the following payments for Spinning Reserve capacity:

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

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

$$EnQInst_{xt} * BEEP Interval Ex Post Price_{xt}$$

**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 Imbalance Energy output or Demand reduction in Zone X in real time Dispatch for Settlement Period t, supplied 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.

$Adjustment$  = penalty described in section 2.5.26.1, or rescinded capacity payments described in Section 2.5.26.2 or 2.5.26.3.

$PnonspDA_{xt}$  = 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, System Units, System Resources, or Loads supplying Non-Spinning Reserve capacity through the ISO auction shall be paid the following for the Non-Spinning Reserve capacity:

$$NonspPay_{xt} = NonSpinQDA_{xt} * PnonspDA_{xt} - Adjustment$$

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

$$EnQInst_{xt} * BEEP Interval Ex Post Price_{xt}$$

$RepResQDA_{xt}$  = 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 Imbalance Energy output or Demand reduction in Zone X in real time Dispatch for Settlement Period t, supplied 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.

*Adjustment* = penalty described in section 2.5.26.1, or rescinded capacity payments described in Section 2.5.26.2 or 2.5.26.3.

$PRepResDA_{xt}$  = 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, System Units, System Resources, or Loads providing Replacement Reserve capacity through the ISO auction shall receive the following payments for the Replacement Reserve capacity:

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

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

$$EnQInst_{ijt} * BEEP Interval Ex Post Price_{xt}$$

**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:

