Subject to any locational requirements, the ISO will accept the winning Non-Spinning Reserve bids in accordance with ISO Tariff Appendix K.~~the following criteria~~:

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

subject to

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

and

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

~~where:~~

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

~~*Requirement = Amount of Non-Spinning Reserve required by the ISO.*~~

SP 9.7.2 Non-Spinning Reserves Price Determination

The price payable to SCs for Non-Spinning Reserve made available in accordance with the ISO's Ancillary Services schedules shall, for each Generating Unit, System Unit, Dispatchable Loads~~Curtailable Demand~~ or external import of a System Resource concerned, be the ~~zonal~~regional Market Clearing Price for Non-Spinning Reserve calculated as follows:

$Pnonsp_{ijt}$ = ~~*MCP*~~*ASMP*$_x$

where:

the ~~zonal~~regional ~~Market Clearing Price~~Ancillary Service Marginal Price (~~*MCP*~~*ASMP*$_{xt}$) for Non-Spinning Reserve is the marginal cost of reserving Non-Spinning reserve ~~highest priced winning reservation bid~~ of a Generating Unit, System Unit, ~~Curtailable Demand~~Dispatchable Load or external import of a System Resource ~~serving Demand~~ in that Ancillary Service Region ~~Zone X~~ based on the reservation bid (i.e., ~~*MCP*~~*ASMP*$_{xt}$ = *Max(CapRes$_{ijt}$)* in ~~Zone X~~ for Settlement Period t). In the absence of ~~Inter-Zonal~~Regional Congestion, the ~~zonal~~regional ~~Market Clearing Prices~~ ASMP will be equal.

~~**SP 9.8 Replacement Reserves Bid Evaluation and Pricing**~~

~~**SP 9.8.1 Replacement Reserves Bid Evaluation**~~

~~(a) Based on the quantity and location of the system requirements, the ISO shall select the Generating Units, System Units, Curtailable Demands and external imports of a System Resources with the Replacement Reserve bids which minimize the sum of the total Replacement Reserve bids of the Generating Units, System Units, Curtailable Demands and external imports of System Resources selected subject to two constraints:~~

~~(i) the sum of the selected amounts of Replacement Reserve bid must be greater than or equal to the required amount of Replacement Reserve; and~~

~~(ii) the amount of Replacement Reserve bid for each Generating Unit, System Unit, Curtailable Demand or external import of a System Resource must be less than or equal to that Generating Unit's, System Unit's, Curtailable Demand's or external import's ramp~~

rate (or time to interruption in the case of a Load offering Demand reduction) times the difference between 60 minutes and the time to synchronize in the case of Generating Unit, or to interruption in the case of Load.

(b) The total Replacement Reserve bid for each Generating Unit, System Unit, Curtailable Demand or external import of a System Resource is calculated by multiplying the reserve reservation bid price by the amount of Replacement Reserve bid. 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

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

and

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

where:

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

$Requirement$ = Amount of Replacement Reserve required by the ISO.

SP 9.8.2 Replacement Reserves Price Determination

The price payable to SCs for Replacement Reserve made available in accordance with the ISO's Ancillary Services schedules shall, for each Generating Unit, System Unit, Curtailable Demand or external import of a System Resource concerned, be the zonal Market Clearing Price for Replacement Reserve calculated as follows:

$Prepres_{ijt} = MCP_{xt}$

where:

the zonal Market Clearing Price (MCP_{xt}) for Replacement Reserve is the highest priced winning reservation bid of a Generating Unit, System Unit, Curtailable Demand or external import of a System Resource serving Demand in Zone X based on the reservation bid price (i.e., $MCP_{xt} = Max(CapRes_{ijt})$ in Zone X for Settlement Period t). In the absence of Inter-Zonal Congestion, the zonal Market Clearing Prices will be equal.

SP 9.9 Existing Contracts – Ancillary Services Accountability

Certain Existing Contracts may have requirements for Ancillary Services which differ from the requirements of this SP 9. Each PTO will be responsible for recovering any deficits or crediting any surpluses associated with differences in assignment of Ancillary Services requirements, through its bilateral

arrangements or its Transmission Owner's Tariff. The ISO will not undertake the settlement or billing of any such differences under any Existing Contract.

SP 10 DAY/HOUR-AHEAD INTER-ZONAL CONGESTION MANAGEMENT

SP 10.1 Congestion Management Assumptions

The ~~Inter-Zonal~~ Congestion Management process is based upon the following assumptions:

~~(a)~~ ~~Inter-Zonal Congestion Management will ignore Intra-Zonal Congestion. Intra-Zonal Congestion will be managed in real time;~~

(a~~b~~) ~~Inter-Zonal~~ Congestion Management will be performed as part of the simultaneous Energy and Ancillary Service markets and will make use of an ~~D~~AC optimal power flow (OPF) program that uses linear optimization techniques with active power (MW) controls only; and

(b~~c~~) transmission capacity reserved under Existing Contracts will not be subject to the ISO's Congestion Management procedures.

SP 10.2 Congestion Management Process

(a) ~~Inter-Zonal~~ Congestion Management will involve adjusting Schedules to remove potential transmission security violations and ~~of Inter-Zonal Interface~~Pathway constraints, minimizing the ~~re~~dispatch cost, as determined by the submitted ~~Adjustment~~ Energy Bids that accompany the submitted Schedules. See the SBP for a general description of the use of Energy~~Adjustment~~ Bids to establish priorities.

~~(b) Inter-Zonal Congestion Management will not involve arranging or modifying trades between SCs. Each SC's portfolio will be kept in balance (i.e., its Generation plus external imports, as adjusted for Transmission Losses, and Inter-Scheduling Coordinator Energy Trades (whether purchases or sales) will still match its Demand plus external exports) after the adjustments. Market Participants will have the opportunity to trade with one another and to revise their Schedules during the first Congestion Management iteration in the Day-Ahead Market, and between the Day-Ahead Market and Hour-Ahead Market.~~

~~(c) Inter-Zonal Congestion Management will also not involve the optimization of SC portfolios within Zones (where such apparently non-optimal Schedules are submitted by SCs). Adjustments to individual SC portfolios within a Zone will be either incremental (i.e., an increase in Generation and external imports and a decrease in Demand and external exports) or decremental (i.e., a decrease in Generation and external imports and an increase in Demand and external exports), but not both.~~

(b~~d~~) If Energy ~~Adjustment~~ Bids are exhausted before Congestion is eliminated, the remaining Schedules will be adjusted ~~*pro rata*~~ based on default Energy Bids generated in accordance with Section 31.2.3.2.3.4.5 except for those uses of transmission service under Existing Contracts, which are curtailed in accordance with SP 7.3 and SP 7.4.

SP 10.3 Congestion Management Pricing

(a) The EnergyAdjustment Bids that the SCs submit constitute implicit bids to manage Congestion;for transmission between Zones on either side of a Congested Inter-Zonal Interface. The ISO's Inter-Zonal

~~Congestion Management process will allocate Congested transmission to those users who value it the most and will charge all SCs for their allocated usage of Congested Inter-Zonal Interfaces on a comparable basis. All SCs within a Zone will see the same price for transmitting Energy across a Congested Inter-Zonal Interface, irrespective of the particular locations of their Generators, Demands and external imports/exports.~~

(b) The ISO will determine the prices for the use of Congested ~~Inter-Zonal Interfaces~~Pathways using the ~~Adjustment~~Energy Bids. The ISO will collect ~~Usage Charges~~Congestion Revenue from SCs for their Scheduled use. ~~of Congested Inter-Zonal Interfaces.~~Pathways. If ~~Adjustment~~Energy Bids are exhausted and Schedules are adjusted based on Default energy bids~~*pro rata*~~, ~~the ISO will apply a default Usage Charge calculated in accordance with Section 7.3.1.3 of the ISO Tariff.~~

(c) The ISO will rebate the Congestion Rrevenues collected through ~~the Usage Charges to the PTOs which own the Congested~~to FTR holders. Point-To-Point Right FTR Holders shall be entitled to the difference in the Locational Marginal Prices (LMPs) between the Sink and the Source, multiplied by the awarded quantities at the Sink and Source. These Point-To-Point Rights may include multiple Sources and Sinks that have been aggregated into single Trading Hubs and are represented by a single price and quantity. ~~Inter-Zonal Interface in proportion to their respective ownership rights~~.

SP 11 ~~CREATION OF THE REAL TIME MERIT ORDER STACK~~REAL TIME ECONOMIC DISPATCH

SP 11.1 Sources of Imbalance Energy

The following Energy Bids will be considered in the creation of the real time merit order stack for Imbalance Energy:

(a) unused Energy Bids submitted to the Hour-Ahead Market;~~Supplemental Energy bids submitted in accordance with the SBP~~;

(b) Energy bids associated with awarded Ancillary Services capacity; and ~~Energy bids (except for Regulation) submitted for specific Ancillary Services in accordance with the SBP for those resources which have been selected in the ISO's Ancillary Services auction to supply such specific Ancillary Services; and~~

(c) Energy associated with capacity committed in the Residual Unit Commitment Process.~~Ancillary Services Energy bids (except for Regulation) submitted for specific Ancillary Services in accordance with the SBP for those resources which SCs have elected to use to self-provide such specific Ancillary Services and for which the ISO has accepted such self-provision.~~

SP 11.2 **DispatchingStacking of the Energy Bids**

The sources of Imbalance Energy described in SP 11.1 will be arranged Dispatched in order of increasing Energy bid to minimize the costs of imbalance energy subject to transmission and other resource constraints through the Security Constrained Economic Dispatch (SCED). SCED will also produce Locational Marginal Prices for Energy that reflect the marginal costs of Imbalance Energy at each Location in the ISO Controlled Grid. prices to create a merit order stack for use in accordance with the DP. This merit order stack will be arrangedDispatch of Imbalance Energy will be done without regard to the source of the Energy Bid except that Energy Bids associated with Spinning and Non-Spinning Reserve shall not be Dispatchedincluded in the merit order stack during normal operating conditions if the capacity associated with such bids has been designated as available to supply Imbalance Energy only in the event of the occurrence of an unplanned Outage, a Contingency or an imminent or

actual System Emergency. In the event of an unplanned Outage, a Contingency or threatened or actual System Emergency, all Energy bids associated with Spinning and Non-Spinning Reserve may be Dispatched by~~included in the merit order stack~~ SCED. ~~In the event of Inter-Zonal Congestion, separate merit order stacks will be created for each Zone. The information in the merit order stack shall be provided to the real time dispatcher through the BEEP (Balancing Energy and Ex-Post Pricing) Software.~~

Where, in any ~~BEEP~~ Dispatch Interval, the highest decremental Energy Bid available ~~in the merit order stack~~ is higher than the lowest available incremental Energy Bid, the ~~BEEP~~ SCED Software will eliminate the Price Overlap by actually dispatching for all those incremental and decremental bids which fall within the overlap.

References to incremental Energy Bids include references to Demand reduction bids, and for the purpose of applying this algorithm a reduction in Demand shall be treated as an equivalent increase in Generation.

SP 11.3 **Use of the ~~Merit Order Stack~~Imbalance Energy Bids**

The ~~merit order stack~~Imbalance Energy Bids, as described in SP 11.2, can be used to supply Energy for:

(a) satisfying needs for Imbalance Energy (differences between actual and scheduled Generation, Demand and external imports/exports) in real time;

(b) managing ~~Inter-Zonal~~ Congestion in real time;

(c) supplying Energy necessary to allow resources providing Regulation service to return to the base point of their regulating ranges in real time;

(d) recovering Operating Reserves utilized in real time;

(e) procuring additional Voltage Support required from resources beyond their power factor ranges in real time; and

~~(f) managing Intra-Zonal Congestion in real time after use of available Adjustment Bids.~~

SP 12 **AMENDMENTS TO THE PROTOCOL**

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

SETTLEMENT AND BILLING PROTOCOL

SETTLEMENT AND BILLING PROTOCOL

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SETTLEMENT AND BILLING PROTOCOL (SABP)

SABP 1 OBJECTIVES, DEFINITIONS AND SCOPE

SABP 1.1 Objectives

The objective of this Protocol (and of Annex 1) is to inform Scheduling Coordinators, Participating TOs, Utility Distribution Companies, Metered Subsystems, and Operators of Reliability Must-Run Units of the manner in which the charges referred to in Section 11.1.6 of the ISO Tariff shall be calculated and settled and of the procedures regarding the billing, invoicing and payment of these charges.

SABP 1.2 Definitions

SABP 1.2.1 Master Definitions Supplement

Any word or expression defined in the Master Definitions Supplement to the ISO Tariff shall have the same meaning where used in this Protocol. A reference to a Section is to a Section of the ISO Tariff. References to SABP are to this Protocol or to the stated paragraph of this Protocol. References to Annex 1 are to Annex 1 of this Protocol.

SABP 1.2.2 Special Definitions for this Protocol

In this Protocol, the following words and expressions shall have the meanings set opposite them:

"Black Start Generator" means a Participating Generator in its capacity as party to an Interim Black Start Agreement with the ISO for the provision of Black Start Services, but shall exclude Participating Generators in their capacity as providers of Black Start services under their Reliability Must-Run Contracts.

"Day 0" means the Trading Day to which the Settlement Statement or settlement calculation refers. For example "Day 41" shall mean the 41st day after that Trading Day and similar expressions shall be construed accordingly.

"Fed-Wire" means the Federal Reserve Transfer System for electronic funds transfer.

"Interim Black Start Agreement" means an agreement entered into between the ISO and a Participating Generator (other than a Reliability Must-Run Agreement) for the provision by the Participating Generator of Black Start capability and Black Start Energy on an interim basis until the introduction by the ISO of its Black Start auction (or until terminated earlier by either party in accordance with its terms).

"ISO Surplus Account" means the account established by the ISO pursuant to SABP 6.5.

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

"Security" means the form of security provided by a Scheduling Coordinator pursuant to Section 2.2.3.2 of the ISO Tariff (i.e. letter of credit, guarantee or cash deposit) to secure its trading obligations.

"Trading Interval" means a Settlement Period as defined in the Master Definitions Supplement of the ISO Tariff.

SABP 1.2.3 Rules of Interpretation

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

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

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

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

(e) A reference to a day or Trading Day is to a calendar day unless otherwise specified.

SABP 1.2.4 Time

All references to time are references to prevailing Pacific Time.

SABP 1.2.5 Financial Transaction Conventions

In this Protocol and its Appendices and Annex 1, the following conventions have been adopted in defining sums of money to be remitted to or received by the ISO:

(a) where the ISO is to receive a sum of money under this Protocol, this is defined as a "Charge";

(b) where the ISO is to required to pay a sum of money under this Protocol, this is defined as a "Payment".

SABP 1.2.6 Currency

All financial transactions are denominated in US dollars and cents.

SABP 1.3 Scope

SABP 1.3.1 Scope of Application to Parties

This Protocol (excluding Annex 1) applies to the ISO and to the following entities:

(a) Scheduling Coordinators;

(b) Participating TOs;

(c) Black Start Generators;

(d) Utility Distribution Companies, and

(e) Metered Subsystems.

The settlement, billing and payment process between the ISO, Scheduling Coordinators, Participating TOs, Black Start Generators, Utility Distribution Companies, and Metered Subsystems shall be in accordance with Sections 11.3 to 11.24 inclusive of the ISO Tariff. References in those Sections to Scheduling Coordinators shall also apply to Participating TOs which receive Settlement Statements from the ISO in relation to the transactions referred to in those Settlement Statements but excluding the transactions referred to in Annex 1. Notwithstanding SABP 1.2.3(a), references in Sections 11.3 to 11.24 inclusive of the ISO Tariff to Scheduling Coordinators, ISO Debtors and ISO Creditors shall also apply to Black Start Generators which receive Settlement Statements from the ISO in relation to transactions under their Interim Black Start Agreements.

Annex 1 of this Protocol applies to the ISO, Owners of Reliability Must-Run Units and Participating TOs in relation to the billing and payment of amounts due under Reliability Must-Run Contracts and recovery of such amounts by the ISO from Participating Utilities. The provisions of this Protocol shall not apply to Annex 1 unless otherwise specified.

SABP 1.3.2 Liability of the ISO

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

SABP 2 OVERVIEW OF SETTLEMENT AND BILLING PROCESS

SABP 2.1 Settlement Software

The ISO settlement software shall be audited by an independent firm of auditors competent to carry out audits of such software to determine its consistency with this Protocol and the ISO Tariff. In any dispute regarding Settlement calculations, a certificate of such firm of auditors that the ISO software is consistent with the ISO Tariff shall be prima facie proof that the charges shown in a Settlement Statement have been calculated in a method consistent with the ISO Tariff and this Protocol. Nothing in this section will be deemed to establish the burden of proof with respect to Settlement calculations in any proceeding.

SABP 2.2 ISO Accounts

SABP 2.2.1 Costs Associated with the ISO Trust Accounts

The ISO is authorized to establish and maintain bank accounts held in trust for Market Participants and obtain lines of credit and other banking facilities (not exceeding an aggregate amount set by

the ISO Governing Board) necessary for the operation of its Settlement and billing procedures. Unless otherwise specified in this Protocol the ISO will recover all costs incurred in connection with these ISO banking facilities through the appropriate component of the Grid Management Charge.

SABP 2.2.2 **Location of the ISO Accounts**

The ISO will maintain its bank accounts held on trust at a bank in California approved by the ISO Governing Board.

SABP 2.2.3 **ISO Trust Accounts**

The ISO will open and operate the following accounts which it will hold on trust for Market Participants:

(a) the ISO Clearing Account to and from which payments are made pursuant to Section 11.8.2.1 of the ISO Tariff and SABP 6.3.1;

(b) the ISO Reserve Account from which any debit balances on the ISO Clearing Account at the close of banking business are settled pursuant to Section 11.8.2.2 of the ISO Tariff and SABP 6.4; and

(c) the ISO Surplus Account consistent with Section 11.8.2.3 of the ISO Tariff and SABP 6.5.

The ISO may establish additional trust accounts as necessary to implement the Settlement and billing procedures outlined in this Protocol. It shall notify the Market Participants of the establishment of such accounts through the WEnet.

SABP 2.2.4 **The ISO Clearing Account**

Subject to SABP 6.1.2, ISO Debtors shall make all payments of ISO invoices by Fed-Wire to the ISO Clearing Account by 10:00 am on the due date according to the ISO Payments Calendar.

SABP 2.2.5 **The ISO Reserve Account**

The ISO shall operate the ISO Reserve Account as a trust account as follows:

(a) the proceeds of drawings under any line of credit or other credit facility of the ISO Reserve Account shall be held on trust for ISO Creditors;

(b) if the Reserve Account is replenished as provided for in SABP 6.9, any credits shall be held on trust for all ISO Creditors.

SABP 2.2.6 **Accounts of the SCs and Participating TOs**

Each Scheduling Coordinator and each Participating TO shall establish and maintain a Settlement Account at a commercial bank located in the United States and reasonably acceptable to the ISO which can effect money transfers via Fed-Wire where payments to and from the ISO Clearing Account shall be made in accordance with this Protocol. Scheduling Coordinators may, but will not be required

to, maintain separate accounts for receipts and payments. Each Scheduling Coordinator shall notify the ISO of its account details and of any changes to those details in accordance with the provisions of its SC Agreement. Participating TOs will notify the ISO of their Settlement Account details in accordance with Section 2.2.1 of their Transmission Control Agreement and may notify the ISO from time to time of any changes by giving at least 7 days written notice before the new account becomes operational.

SABP 2.3 ISO Payments Calendar

SABP 2.3.1 Contents of ISO Payments Calendar

In September of each year, the ISO will prepare a draft ISO Payments Calendar for the following calendar year showing for each Trading Day:

(a) The date by which Scheduling Coordinators are required to provide Settlement Quality Meter Data for all their Scheduling Coordinator Metered Entities for each Settlement Period in the Trading Day;

(b) The date on which the ISO will issue Preliminary Settlement Statements and invoices to Scheduling Coordinators, Black Start Generators and Participating TOs for that Trading Day;

(c) The date by which Scheduling Coordinators, Black Start Generators and Participating TOs are required to notify the ISO of any disputes in relation to their Preliminary Settlement Statements pursuant to SABP 4.4.1 and the ISO Tariff;

(d) The date on which the ISO will issue Final Settlement Statements and invoices to Scheduling Coordinators, Black Start Generators and Participating TOs for that Trading Day;

(e) The date and time by which ISO Debtors are required to have made payments into the ISO Clearing Account in payment of invoices for that Trading Day; and

(f) The dates and times on which ISO Creditors will receive payments from the ISO Clearing Account of amounts owing to them for that Trading Day.

(g) In relation to Reliability Must-Run Charges and Payments, the details set out in paragraph 3 of Annex 1.

SABP 2.3.2 Calendar Content and Format

In accordance with SABP 2.3.3, 2.3.4 and 2.3.5 the ISO may change the content or format of the ISO Payments Calendar. The ISO may also produce a summary outline of the Settlement and billing cycles.

SABP 2.3.3 Draft Payments Calendar

In September of each year, the ISO will make a draft of the ISO Payments Calendar available on the ISO Home Page to Scheduling Coordinators, Black Start Generators, Participating TOs and Owners

any of which may submit comments and objections to the ISO within two weeks of the date of posting of the draft on the ISO Home Page.

SABP 2.3.4 Final Payments Calendar

No later than October 31st in each year, the ISO will publish pursuant to Section 11.24.1 of the ISO Tariff the final ISO Payments Calendar for the following calendar year, after considering the comments and objections received from Scheduling Coordinators, Black Start Generators, Participating TOs and Owners. The final ISO Payments Calendar will be posted on the ISO Home Page.

SABP 2.3.5 Update the Final Payments Calendar

If as a result of a tariff amendment approved by FERC the final ISO Payments Calendar developed in accordance with SABP 2.3.3 and 2.3.4 above is rendered inconsistent with the timing set forth in the tariff, the ISO shall update the final ISO Payments Calendar to make it consistent with the tariff as approved by FERC on the date on which the tariff amendment goes into effect. The ISO shall simultaneously send out a notice to market participants that the final ISO Payments Calendar has been revised.

SABP 2.3.6 Final Calendar Binding

The final ISO Payments Calendar shall be binding on the ISO and on Scheduling Coordinators, Black Start Generators, Participating TOs and Owners.

SABP 3 COMPUTATION OF CHARGES

SABP 3.1 Description of Charges to be Settled

The ISO shall, based on Final Day-Ahead and Hour-Ahead schedules, -the Settlement Quality Meter Data it has received, or, if Settlement Quality Meter Data is not available, based on the best available information or estimate it has received, calculate the following:

(a) the amount due from each Scheduling Coordinator or other appropriate party for its share for the relevant month of the three components of the Grid Management Charge in accordance with Appendix A. These Charges shall accrue on a monthly basis.

(b) ~~the amount due from each Scheduling Coordinator for the Grid Operations Charge in accordance with Appendix A. This charge shall accrue on a monthly basis.~~[Not Used]

(c) the amount due from and/or owed to each Scheduling Coordinator for the Charge for each Ancillary Service in accordance with Appendix C, for each of the Settlement Periods of Day 0.

(d) the amount due from and/or owed to each Scheduling Coordinator for Imbalance Energy in accordance with Tariff Section 31.4.3.4.4 and SABP Appendix D, for each of the Settlement Periods of Day 0.

(e) the amount due from and/or owed to each Scheduling Coordinator for ~~Usage Charges~~Day-Ahead and/or Hour-Ahead Energy in accordance with Appendix E, for each of the Settlement Periods of Day 0.

(f) the amount due from each Scheduling Coordinator for Wheeling Out and Wheeling Through Charges and the amount owed to each Participating TO for these charges in accordance with Appendix F, for each of the Settlement Periods of Day 0.

(g) the amounts due from/to Scheduling Coordinators for Voltage Support (supplemental reactive power charges) for each of the Settlement Periods of Day ~~0~~ 0 in accordance with Appendix G.

(h) the monthly charges due from/to Scheduling Coordinators for long term voltage support provided by Owners of Reliability Must-Run Units in accordance with Appendix G.

(i) the amounts due from/to Scheduling Coordinators for the provision of Black Start Energy from Reliability Must-Run Units for each of the Settlement Periods of Day 0~~0~~ in accordance with Appendix G.

(j) the amounts due from/to Black Start Generators for the provision of Black Start Energy for each of the Settlement Periods of Day 0 in accordance with Appendix G.

(k) the amount due from each UDC or MSS, or from a Scheduling Coordinator delivering Energy for the supply of Gross Load not directly connected to the facilities of a UDC or MSS, for the High Voltage Access Charge and Transition Charge in accordance with operating procedures posted on the ISO Home Page. These charges shall accrue on a monthly basis.

(l) the amounts due from Scheduling Coordinators for FERC Annual Charges.

The payments or charges to FTR Holders associated with FTRs;

(n) the amount due to or from Scheduling Coordinators for the unrecovered costs associated with committing resources in the Day-Ahead and Hour-Ahead Energy markets in accordance with Appendix H, for each of the Settlement Periods of Day 0.

(o) the amount due to or from Scheduling Coordinators for the capacity payments and unrecovered costs associated with committing resources in the Day-Ahead and Hour-Ahead Residual Unit Commitment in accordance with Section 31.4.3.4.4 and Appendix H, for each of the Settlement Periods of Day 0.

All of the data, information, and estimates the ISO uses to calculate these amounts shall be subject to the auditing requirements of Section 10.5 of the ISO Tariff.

The ISO shall calculate these amounts using the software referred to in SABP 2.1 except in cases of system breakdown when it shall apply the procedures set out in SABP 9 (Emergency Procedures).

SABP 3.1.1 Additional Charges and Payments

The ISO shall be authorized to levy additional charges or payments as special adjustments in regard to:

(a) amounts required to round up any invoice amount expressed in dollars and cents to the nearest whole dollar amount in order to clear the ISO Clearing Account. These charges will be allocated amongst Scheduling Coordinators over an interval determined by the ISO and pro rata based on metered Demand (including exports) during that interval;

(b) amounts in respect of penalties which may be levied by the ISO in accordance with the ISO Tariff. These charges will be levied on the Market Participants liable for payment of the penalty; and

(c) amounts required to reach an accounting trial balance of zero in the course of the Settlement process in the event that the charges calculated as due from ISO Debtors are lower

than payments calculated as due to the ISO Creditors for the same Trading Day. These charges will be allocated amongst the Scheduling Coordinators who traded on that Trading Day pro rata to their metered Demand (including exports) in MWh of Energy for that Trading Day. In the event that the charges due from ISO Debtors are higher than the payments due to ISO Creditors, the ISO shall allocate a payment to the Scheduling Coordinators who traded on that Trading Day pro rata to their metered Demand (including exports) in MWh of Energy for that Trading Day.

(d) amounts required with respect to payment adjustments for regulating Energy as calculated in accordance with Section 2.5.27.1 of the ISO Tariff. These charges will be allocated amongst the Scheduling Coordinators who traded on that Trading Day pro rata to their metered Demand (including exports) in MWh for that Trading Day.

SABP 3.2 Method of Settlement of Charges

SABP 3.2.1 Settlement of Payments to/from Scheduling Coordinators and Participating TOs

The ISO will calculate for each charge the amounts payable by the relevant Scheduling Coordinator, Black Start Generator or Participating TO for each Settlement Period of the Trading Day, and the amounts payable to that Scheduling Coordinator, Black Start Generator or Participating TO for each charge for each Settlement Period of that Trading Day and shall arrive at a net amount payable for each charge by or to that Scheduling Coordinator, Black Start Generator or Participating TO for each charge for that Trading Day. Each of these amounts will appear in the Preliminary and Final Settlement Statements that the ISO will provide to the relevant Scheduling Coordinator, Black Start Generator or Participating TO as provided in SABP 4.

The three components of the Grid Management Charge will be included in the Preliminary Settlement Statement and Final Settlement Statement with the other types of charges referred to in SABP 3.1, but a separate invoice for the Grid Management Charge, stating the rate, billing determinant volume and total charge for each of its three components, will be issued by the ISO.

SABP 4 SETTLEMENT STATEMENTS

SABP 4.1 Preliminary Settlement Statements

SABP 4.1.1 Timing of Preliminary Settlement Statements

The ISO shall provide to each Scheduling Coordinator, Black Start Generator or Participating TO for validation a Preliminary Settlement Statement for each Trading Day in accordance with the ISO Payments Calendar.

SABP 4.1.2 **Contents of Preliminary Settlement Statements**

Each Preliminary Settlement Statement will include a statement of:

(a) the amount payable or receivable by the Scheduling Coordinator, Black Start Generator or Participating TO for each charge referred to in SABP 3 for each Settlement Period in the relevant Trading Day;

(b) the total amount payable or receivable by that Scheduling Coordinator, Black Start Generator or Participating TO for each charge for all Settlement Periods in that Trading Day after the amounts payable and the amounts receivable under (a) have been netted off pursuant to SABP 3.2.1; and

(c) the components of each charge in each Settlement Period except for information contained in the Imbalance Energy Report referred to in SABP 4.1.3.

SABP 4.1.3 Imbalance Energy Report

Each Preliminary Settlement Statement shall be accompanied by a breakdown of the components of the Imbalance Energy Charge (the "Imbalance Energy Report").

SABP 4.2 Final Settlement Statements

The ISO shall provide to each Scheduling Coordinator, Black Start Generator or Participating TO a Final Settlement Statement in accordance with the ISO Tariff and the ISO Payments Calendar. The Final Settlement Statement shall be in a format similar to that of the Preliminary Settlement Statement and shall include all the information provided in the Preliminary Settlement Statement as amended following the validation procedure set forth in SABP 4.3 and 4.4.

SABP 4.3 Review, Validation, Confirmation of Preliminary Settlement Statements

The provisions for confirmation, review and validation of Preliminary Settlement Statements set forth in Sections 11.6.1.2, 11.7.1, 11.7.2, 11.7.3 and 11.7.4 of the ISO Tariff shall apply to all Scheduling Coordinators, Black Start Generators or Participating TOs (save, in the case of Participating TOs, for charges or rebates referred to in Annex 1) who receive a Preliminary Settlement Statement from the ISO.

SABP 4.4 Resolving Disputes Relating to Preliminary and Final Settlement Statements

SABP 4.4.1 Notice

SABP 4.4.1.1 Notice of an ordinary dispute

If a Scheduling Coordinator, Black Start Generator or Participating TO disputes any item or calculation set forth in its Preliminary or Final Settlement, it shall provide the ISO by electronic means with a notice of dispute within eight (8) Business Days from the date of issue of the Preliminary Settlement Statement or within ten (10) Business Days from the date of issue of the Final Settlement Statement.

SABP 4.4.1.2 Notice of recurring dispute

If a Scheduling Coordinator, Black Start Generator or Participating TO believes a dispute will apply to subsequent Preliminary or Final Settlement Statements, it may request, in a notice provided in accordance with Section SABP 4.4.1.1 above, that the ISO treat the dispute as recurring. A request for recurring treatment may be made for any valid reason provided that subsequent Preliminary and Final Settlement Statements would be affected, including but not limited to, that the disputed calculation will recur, or that a disagreement as to policy will affect calculations in subsequent Preliminary and Final Settlement Statements.

SABP 4.4.2 Contents of Notice

SABP 4.4.2.1 Contents of a notice of dispute

The notice of dispute shall state clearly the Trading Day, the issue date of the Preliminary of Final Settlement Statement, the item disputed, the reasons for the dispute, the amount claimed (if appropriate) and shall be accompanied with all available evidence reasonably required to support the claim.

SABP 4.4.2.2 Contents of a request for treatment as a recurring dispute

If a Scheduling Coordinator, Black Start Generator or Participating TO wishes to request that the ISO treat a dispute as recurring, it shall, in the notice provided in accordance with Section SABP 4.4.2.1 above, clearly indicate that it requests such treatment and set forth in detail the reasons that support such treatment. To the extent possible, the Scheduling Coordinator, Black Start Generator or Participating TO shall state the types of charges and dates to which the dispute will apply, and provide estimates of the amounts that will likely be claimed on each date.

SABP 4.4.3 ISO determination of a recurring dispute

The ISO may deny a request that the ISO treat a dispute as recurring for any valid reason, including because the request is not adequately specific as to the basis for recurring treatment or the subsequent calculations that will be affected.

SABP 4.4.4 Amendment

Regarding a dispute related to a Preliminary Settlement Statement, if the ISO agrees with the amount claimed, it shall incorporate the relevant data into the Final Settlement Statement. Regarding a dispute related to an Incremental Change in a Final Settlement Statement, the ISO shall make a determination on the dispute no later than twenty-five (25) Business Days from the issuance of the Final Settlement Statement, and, if the ISO agrees with the amount claimed, shall incorporate the relevant data into the next available Preliminary Settlement Statement.

SABP 4.4.5 **ISOContact**

If the ISO does not agree with the amount claimed or if it requires additional information, it shall make reasonable efforts (taking into account the time it received the notice of dispute and the complexity of the issue involved) to contact the relevant Scheduling Coordinator, Black Start Generator or Participating TO to resolve the issue before issuing the Final Settlement Statement. If it is not possible to contact the relevant party, the ISO shall issue the Final Settlement Statement without taking into account the dispute notice.

SABP 4.4.6 **Payment Pending Dispute**

Each Scheduling Coordinator, Black Start Generator or Participating TO which receives an invoice shall pay any net debit and shall be entitled to receive any net credit shown in the invoice on the Payment Date, whether or not there is any dispute regarding the amount of the debit or credit. The provisions of Section 13 (Dispute Resolution) of the ISO Tariff shall apply to the disputed amount.

SABP 4.5 **Settlement Statement Re-runs**

SABP 4.5.1 **Notice**

If a Scheduling Coordinator, Black Start Generator or Participating TO, (having made reasonable efforts to resolve with the ISO any dispute relating to a Preliminary Settlement Statement pursuant to SABP 4.4) requires a Settlement Statement re-run, it shall send at any time to the ISO Governing Board a notice in writing.

SABP 4.5.2 **ISO Tariff**

The provisions of Sections 11.6.3, 11.6.3.1, 11.6.3.2 and 11.6.3.3 of the ISO Tariff relating to Settlement Statement re-runs shall apply to all Scheduling Coordinators, Black Start Generators or Participating TOs who require a Settlement re-run in accordance with this SABP 4.5.

SABP 5 **INVOICES**

The ISO shall provide on the day specified in the ISO Payments Calendar an invoice in the format set out in SABP Appendix I showing:

(a) amounts which according to each of the Preliminary and Final Settlement Statements of that Billing Period are to be paid from or to each Scheduling Coordinator, Black Start Generator or Participating TO;

(b) the Payment Date, being the date on which such amounts are to be paid or received and the time for such payment; and

(c) details (including the account number, bank name and Fed-Wire transfer instructions) of the ISO Clearing Account to which any amounts owed by the Scheduling Coordinator, Black Start Generator or Participating TO are to be paid.

A separate invoice for the Grid Management Charge, stating the rate, billing determinant volume and total charge for each of its three components, will be issued by the ISO.

SABP 6 PAYMENT PROCEDURES

SABP 6.1 Time of Payment

SABP 6.1.1 Payment Date

Subject to SABP 6.1.2, payment will be made by the ISO and by each Scheduling Coordinator, Black Start Generator and Participating TO on the Payment Date as set forth in Section 11.3.2.

SABP 6.1.2 Prepayments

(a) A Scheduling Coordinator may choose to pay at an earlier date than the Payment Date specified in the ISO Payments Calendar by way of prepayment provided it notifies the ISO by electronic means before submitting its prepayment.

(b) Prepayment notifications must specify the dollar amount prepaid.

(c) Prepayments must be made by Scheduling Coordinators via Fed-Wire into their ISO prepayment account designated by the ISO. The relevant Scheduling Coordinator shall grant the ISO a security interest on all funds in its ISO prepayment account.

(d) On any Payment Date the ISO shall be entitled to cause funds from the relevant Scheduling Coordinator's ISO prepayment account to be transferred to the ISO Clearing Account in such amounts as may be necessary to discharge in full that Scheduling Coordinator's payment obligation arising in relation to that Payment Date.

(e) Any funds held in the relevant Scheduling Coordinator's ISO prepayment account shall be treated as part of that Scheduling Coordinator's Security.

(f) Interest (or other income) accruing on the relevant Scheduling Coordinator's ISO prepayment account shall inure to the benefit of that Scheduling Coordinator and shall be added to the balance of its ISO prepayment account on a monthly basis.

(g) Funds held in an ISO prepayment account by a Scheduling Coordinator may be recouped, offset or applied by the ISO to any outstanding financial obligations of that Scheduling Coordinator to the ISO or to other Scheduling Coordinators under this Protocol.

SABP 6.2 **Payments to be made by Fed-Wire**

All payments by the ISO to Scheduling Coordinators, Black Start Generators and Participating TOs shall be made by Fed-Wire.

All payments to the ISO by Scheduling Coordinators, Black Start Generators and Participating TOs shall be made by Fed-Wire.

SABP 6.3 **Payment Process**

SABP 6.3.1 **Use of the ISO Clearing Account**

(a) Subject to SABP 6.1.2 each ISO Debtor shall remit to the ISO Clearing Account the amount shown on the invoice as payable by that ISO Debtor for value not later than 10:00 am on the Payment Date.

(b) On the Payment Date the ISO shall be entitled to cause the transfer of such amounts held in a Scheduling Coordinator's ISO prepayment account to the ISO Clearing Account as provided in SABP 6.1.2(c).

SABP 6.3.1.2 **Distribution to ISO Creditors**

The ISO shall calculate the amounts available for distribution to ISO Creditors on the Payment Date and shall give irrevocable instructions to the ISO Bank to remit from the ISO Clearing Account to the relevant Settlement Account maintained by each ISO Creditor for same day value the amounts determined by the ISO to be available for payment to each ISO Creditor. If required, the ISO shall instruct the ISO Bank to transfer amounts from the ISO Reserve Account to enable the ISO Clearing Account to clear by the close of banking business on the Payment Date.

SABP 6.3.1.3 **Grid Management Charge**

The ISO is authorized to instruct the ISO Bank to debit the ISO Clearing Account and transfer to the relevant ISO account sufficient funds to pay in full the Grid Management Charge falling due on any Payment Day with priority over any other payments to be made on that or on subsequent days out of the ISO Clearing Account.

SABP 6.4 **Use of the ISO Reserve Account**

If there are insufficient funds in the ISO Clearing Account to pay ISO Creditors and clear the account on any Payment Date, due to payment default by one or more ISO Debtors, the ISO shall transfer funds from the ISO Reserve Account to the ISO Clearing Account to clear it by close of banking business on that Payment Date pursuant to SABP 6.7.2.

SABP 6.5 **Use of the ISO Surplus Account**

SABP 6.5.1 **Establishment**

The ISO shall establish and maintain a bank account in accordance with this Protocol denominated the "ISO Surplus Account".

SABP 6.5.2 **Other Funds in the ISO Surplus Account.**

(a) Any amounts paid to the ISO in respect of acts or defaults giving rise to default interest referred to in SABP 6.10.5 or penalties referred to in SABP 3.1.1, to the extent that the ISO Tariff does not otherwise provide for the allocation of the proceeds of such penalties, shall be credited to the Surplus Account.

(b) The funds referred to in SABP 6.5.2(a) shall first be applied towards any expenses, loss or costs incurred by the ISO. Any

excess will be credited to the Surplus Account pursuant to SABP 6.5.2(a).

SABP 6.5.3 **Distribution of Funds**

In the event that there are funds in the ISO Surplus Account in excess of an amount to be determined by the ISO Governing Board and noticed by the ISO to Market Participants, the amount of such excess will be distributed to Scheduling Coordinators using the same method of apportioning the refund as the method employed in apportioning the liability for the Grid Management Charge.

SABP 6.5.4 **Trust**

All amounts standing to the credit of the ISO Surplus Account will be held at all times on trust for Market Participants in accordance with this Protocol.

SABP 6.6 **System Failure**

SABP 6.6.1 **At ISO Debtor's Bank**

If any ISO Debtor becomes aware that a payment will not, or is unlikely to be, remitted to the ISO Bank by 10:00 am on the relevant Payment Date for any reason (including failure of the Fed-Wire or any computer system), it shall immediately notify the ISO, giving full details of the payment delay (including the reasons for the payment delay). The ISO Debtor shall make all reasonable efforts to remit payment as soon as possible, by an alternative method if necessary, to ensure that funds are received for value no later than 10:00 am on the Payment Date, or as soon as possible thereafter.

SABP 6.6.2 **At the ISO's Bank**

In the event of failure of any electronic transfer system affecting the ISO Bank, the ISO shall use reasonable efforts to establish alternative methods of remitting funds to the ISO Creditors' Settlement Accounts by close of banking business on that Payment Date, or as soon as possible thereafter. The ISO shall notify the ISO Debtors and the ISO Creditors of occurrence of the system failure and the alternative methods and anticipated time of payment.

SABP 6.7 **Payment Default**

Subject to SABP 6.8, if by 10:00 am on a Payment Date the ISO, in its reasonable opinion, believes that all or any part of any amount due to be remitted to the ISO Clearing Account by any Scheduling Coordinator will not or has not been remitted and there are insufficient funds in the relevant Scheduling Coordinator's ISO prepayment account (the amount of insufficiency being referred to as the "Default Amount"), the ISO shall take the following actions to enable the ISO Clearing Account to clear not later than the close of banking business on the relevant Payment Date:

SABP 6.7.1 **Enforcing the Security of a Defaulting Scheduling Coordinator**

Subject to SABP 6.8 the ISO shall make reasonable endeavors to enforce the defaulting Scheduling Coordinator's Security (if any) to the extent necessary to pay the Default Amount. If it is not practicable to obtain clear funds in time to effect payment to ISO Creditors on the same day the ISO shall proceed in accordance with SABP 6.7.2 or 6.7.4 as applicable.

SABP 6.7.2 **Use of ISO Reserve Account**

If there are funds standing to the credit of the ISO Reserve Account (including the proceeds of drawings under banking facilities described in SABP 2.2.5) the ISO shall debit the ISO Reserve Account with the Default Amount in order to clear the ISO Clearing Account and effect payment to the ISO Creditors.

SABP 6.7.3 **Action against a Defaulting Scheduling Coordinator**

The ISO shall as soon as possible after taking action under SABP 6.7.2 take any steps it deems appropriate against the defaulting Scheduling Coordinator to recover the Default Amount (and any default interest as set out in SABP 6.10.5) including enforcing any Security pursuant to Section 11.14 of the ISO Tariff, exercising its rights of recoupment or set-off pursuant to SABP 6.10.2 and/or bringing proceedings against the defaulting Scheduling Coordinator pursuant to Section 11.20.1 of the ISO Tariff.

SABP 6.7.4 **Reduction of Payments to ISO Creditors**

If there are insufficient funds standing to the credit of the ISO Reserve Account, the ISO shall reduce payments to ISO Creditors on that Payment Date pursuant to Section 11.16.1 of the ISO Tariff to the extent necessary to clear the ISO Clearing Account by the close of banking business on the Payment Date.

SABP 6.8 **Default to be Remedied Promptly**

In the event that the ISO reasonably believes that an outstanding amount which has not been paid by 10:00 am on the relevant Payment Date, is likely to be paid no later than close of banking business on the next Business Day then the ISO may, but shall not be obliged to, delay enforcing that ISO Debtor's Security or taking other measures to recover payment until after the close of banking business on the next Banking Day but default interest shall nonetheless accrue pursuant to SABP 6.10.5.

SABP 6.9 **Replenishing the ISO Reserve Account Following Payment Default**

If the ISO has debited the ISO Reserve Account as provided in SABP 6.7.2 then:

(a) If, after the ISO has debited the ISO Reserve Account on a Payment Date, the ISO Bank receives a remittance from an ISO Debtor which has not been (but should have been, if it

had been received on a timely basis) credited to the ISO Clearing Account by 10:00 am on the Payment Date and which required the debiting of the ISO Reserve Account, such remittance shall be credited to the ISO Reserve Account.

(b) The proceeds of any enforcement of Security referred to in SABP 6.8.2 and/or amounts recovered under proceedings shall be credited to the ISO Reserve Account.

(c) If after taking reasonable action the ISO determines that the Default Amount (or any part) and/or default interest referred to in SABP 6.10.5 cannot be recovered, such amounts shall be deemed to be owing by those Market Participants who were ISO Creditors on the relevant Payment Date pro rata to the net payments they received on that Payment Date and shall be accounted for by way of a charge in the next Settlement Statements of those ISO Creditors. Such charge shall be credited to the Reserve Account.

SABP 6.10 Application of Funds Received

Amounts credited to the ISO Clearing Account in payment of a Default Amount (as set out in SABP 6.9(a)) or as a result of enforcing the defaulting ISO Debtor's Security shall be applied to the ISO Reserve Account pursuant to SABP 6.9 to reduce amounts outstanding under any ISO banking facilities used to fund the ISO Reserve Account on the relevant Payment Date and the balance (if any) shall be applied to reimburse pro rata any ISO Creditors whose payments were reduced pursuant to SABP 6.7.4.

SABP 6.10.1 Termination of SC Agreement and Limitation on Trading

The provisions of Section 2.2.4.5 and 2.2.7.3 of the ISO Tariff shall apply.

SABP 6.10.2 Set-Off

The ISO is authorized to recoup, set off and apply any amount to which any defaulting ISO Debtor is or will be entitled, in or towards the satisfaction of any of that ISO Debtor's debts arising under the ISO Settlement and billing process. Each ISO Creditor and each ISO Debtor expressly acknowledges that the oldest outstanding amounts will be settled first in the order of the creation of such debts.

SABP 6.10.3 Defaulting SCs and Eligible Customers

If the ISO intends to terminate the SC Agreement of a Scheduling Coordinator (the "Defaulting SC") pursuant to Section 2.2.4.5 of the ISO Tariff, the ISO shall give written notice to the UDC or UDCs on whose service territory the customers of that Defaulting SC are located and shall post such notification on the ISO Home Page pursuant to Section 2.2.4.6 of the ISO Tariff.

SABP 6.10.4 **Order of Payments**

The ISO shall apply payments received in respect of amounts owing to ISO Creditors to repay the relevant debts in the order of the creation of such debts.

SABP 6.10.5 **Default Interest**

Unless the ISO is able to enforce the Security (if any) provided by the defaulting ISO Debtor, such ISO Debtor shall pay interest on Default Amount at the ISO Default Interest Rate for the period from the relevant Payment Date to the date in which the payment is received by the ISO together with any related transaction costs incurred by the ISO pursuant to SABP 6.7.2.

SABP 6.10.6 **Interest Accruing while Enforcing the Security**

If the ISO has debited the Reserve Account as provided in SABP 6.7.1, 6.7.2 or 6.8 and it subsequently succeeds in enforcing the Security provided by the defaulting Scheduling Coordinator, the ISO shall be entitled to withdraw from such Security in addition to the Default Amount, all costs incurred and interest accrued to the ISO as a result of debiting the Reserve Account from the date of such debit to the date of enforcement of the said Security.

SABP 7 **PAYMENT ERRORS**

SABP 7.1 **Overpayments**

SABP 7.1.1 **Notification**

If an ISO Creditor receives an overpayment on any Payment Date, it shall notify the ISO of such overpayment in accordance with the provisions of Section 11.18.1 of the ISO Tariff.

SABP 7.1.2 **Overpayment held on Trust**

Until an ISO Creditor refunds the overpayment to the ISO, the ISO Creditor shall be deemed to hold the amount of such overpayment on trust for any ISO Creditor which may have been underpaid in consequence of such overpayment, pro rata to the amount of the underpayment.

SABP 7.1.3 **Interest on Overpayment**

(a) If an overpayment is repaid by an ISO Creditor in accordance with Section 11.18.1 of the ISO Tariff, the ISO shall be entitled to interest on the amount of the overpayment at the prime rate of the bank where the Settlement Account of the overpaid ISO Creditor is located from the date the overpayment was received to the time that the repayment is credited to the relevant ISO Account.

(b) If the overpayment (or any part of it) is not repaid by an ISO Creditor in accordance with Section 11.18.1 of the ISO Tariff, the ISO shall be entitled to interest on the amount of the overpayment at the ISO Default Interest Rate from the expiry of the two day period referred to in that Section until the

repayment is credited to the relevant ISO Account and the ISO will be entitled to treat the overpayment (and any interest accruing thereon) as a Default Amount to which SABP 6.7 will apply.

SABP 7.1.4 **Treatment of Amounts Outstanding as a Result of an Overpayment**

The ISO shall apply the amount of any overpayment repaid (including interest received) to it under SABP 7.1.3 to credit any underpaid ISO Creditors pro rata to the amounts of their underpayments on the same day of receipt, or if not practicable, on the following Business Day.

SABP 8 **COMMUNICATIONS**

SABP 8.1 **Method of Communication**

Preliminary Settlement Statements and Final Settlement Statements will be published by the ISO on the WEnet. Invoices will be issued via EDI. Communications on a Payment Date relating to payment shall be made by the fastest practical means including by telephone. Methods of communication between the ISO and Market Participants may be varied by the ISO giving not less than 10 days notice to Market Participants on the WEnet.

SABP 8.2 **Failure of Communications**

The provisions of Section 11.23 of the ISO Tariff shall apply.

SABP 9 **EMERGENCY PROCEDURES**

SABP 9.1 **Use of Estimated Data**

In the event of an emergency or a failure of any of the ISO software or business systems, the ISO may use estimated Settlement Statements and invoices and may implement any temporary variation of the timing requirements relating to the Settlement and billing process contained in the ISO Tariff or this Protocol. Details of the variation and the method chosen to produce estimated data, Settlement Statements and invoices will be published on the ISO Home Page.

SABP 9.2 **Payment of Estimated Statements and Invoices**

When estimated Settlement Statements and invoices are issued by the ISO, payments between the ISO and Market Participants shall be made on an estimated basis and the necessary corrections shall be made by the ISO as soon as practicable. The corrections will be reflected as soon as practicable in later Settlement Statements and invoices issued by the ISO in the manner set forth in Section 11.5 of the ISO Tariff. Failure to make such estimated payments shall result in the same consequences as a failure to make actual payments under SABP.

SABP 9.3 **Validation and Correction of Estimated Statements and Invoices**

The ISO shall use its best efforts to verify the estimated data used under SABP 9.1 and to make the necessary corrections as soon as practicable. The corrections will be reflected as soon as practicable in later Settlement Statements and invoices issued by the ISO in the manner set forth in Section 11.5 of the ISO Tariff.

SABP 9.4 **Estimated Statements to be Final**

In the event that the ISO is of the opinion that, despite its best efforts, it is not possible for it to verify the estimated data because actual data is not reasonably expected to become available to the ISO in the foreseeable future, the ISO shall consult with the Market Participants in order to develop the most appropriate substitute data including using data provided by Market Participants. Following such determination of substitute data, the ISO shall send to the relevant Market Participants revised Settlement Statements and Invoices. The provisions of SABP 4.4.5 shall apply to payment of revised invoices issued in accordance with this SABP 9.4. Failure to make payments of such revised invoices shall result in the same consequences as a failure to make actual payments under SABP.

SABP 10 **CONFIDENTIAL DATA**

(a) The ISO shall implement and maintain a system of communication with Scheduling Coordinators to ensure compliance with Sections 11.22 and 20.3 of the ISO Tariff regarding access to confidential data and with Participating TOs pursuant to Section 26.3 of the Transmission Control Agreement.

(b) Access within the ISO to such data on ISO's communications systems, including databases and backup files, shall be strictly limited to authorized ISO personnel through the use of passwords and other appropriate means.

SABP 11 **AMENDMENTS TO THE PROTOCOL**

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

APPENDIX B

GRID OPERATIONS CHARGE COMPUTATION

B 1 Purpose of charge

The Grid Operations Charge is a charge which recovers redispatch costs incurred due to Intra-Zonal Congestion pursuant to Section 7.3.2 of the ISO Tariff. The Grid Operations Charge is paid by or charged to Scheduling Coordinators in order for the ISO to recover and properly redistribute the costs of adjusting the Balanced Schedules submitted by Scheduling Coordinators.

B 2 Fundamental formulae

B 2.1 Payments to SCs with incremented schedules

When it becomes necessary for the ISO to increase the output of a Scheduling Coordinator's Generating Unit$_i$ or System Resource$_i$ or reduce a Curtailable Demand$_i$ in order to relieve Congestion within a Zone, the ISO will pay the Scheduling Coordinator. The amount that ISO pays the Scheduling Coordinator$_j$ is the price specified in the Scheduling Coordinator's Day-Ahead or Hour-Ahead Adjustment Bid (or Imbalance Energy bid as appropriate) for the Generating Unit$_i$ or System Resource$_i$ or Curtailable Demand$_i$ multiplied by the quantity of Energy rescheduled. The formula for calculating the payment to Scheduling Coordinator$_j$ for each block$_b$ of Energy of its Adjustment Bid curve in Trading Interval$_t$ is:

$$INC_{bijt} = adjinc_{bijt} * \Delta inc_{bijt}$$

B 2.1.1 Total Payment for Trading Interval

The formula for calculating payment to Scheduling Coordinator$_j$ whose Generating Unit$_i$ or System Resource$_i$ has been increased or Curtailable Demand$_i$ reduced for all the relevant blocks$_b$ of Energy in the Adjustment Bid curve (or Imbalance Energy bid) of that Generating Unit or System Resource or Curtailable Demand in the same Trading Interval$_t$ is:

$$PayTI_{ijt} = \sum_{b} INC_{bijt}$$

B 2.2 Charges to Scheduling Coordinators with decremented schedules

When it becomes necessary for the ISO to decrease the output of a Scheduling Coordinator's Generating Unit$_i$ or System Resource$_i$ in order to relieve Congestion within a Zone, the ISO will make a charge to the Scheduling Coordinator. The amount that the ISO will charge Scheduling Coordinator$_j$ is the price specified in the Scheduling Coordinator's Day-Ahead or Hour-Ahead Adjustment Bid (or Imbalance

~~Energy bid) for the Generating Unit, or System Resource, multiplied by the quantity of Energy rescheduled. The formula for calculating the~~

~~charge to Scheduling Coordinator$_j$ for each block$_b$ of Energy in its Adjustment Bid curve (or Imbalance Energy bid) in Trading Interval$_t$ is:~~

$$DEC_{bijt} = adjdec_{bijt} * \Delta dec_{bijt}$$

~~B 2.2.1 Total Charge for Trading Interval~~

~~The formula for calculating the charge to Scheduling Coordinator$_j$ whose Generating Unit$_i$ or System Resource$_i$ has been decreased for all the relevant blocks$_b$ of Energy in the Adjustment Bid curve (or Imbalance Energy bid) of that Generating Unit or System Resource in the same Trading Interval$_t$ is:~~

$$ChargeTI_{ijt} = \sum_{b} DEC_{bijt}$$

~~B 2.3 Not Used~~

~~B 2.4 Net ISO redispatch costs~~

~~The Trading Interval net redispatch cost encountered by ISO to relieve Intra-Zonal Congestion is the sum of the amounts paid by the ISO to those Scheduling Coordinators whose Generation or System Resource was increased or Curtailable Demand was decreased during the Trading Interval less the sum of the amounts received by the ISO from those Scheduling Coordinators whose Generating Units or System Resource were decreased during the Trading Interval. The fundamental formula for calculating the net redispatch cost is:~~

$$REDISP_{CONGt} = \sum_{j} PayTI_{ijt} - \sum_{j} ChargeTI_{ijt}$$

~~Note that $REDISP_{CONGt}$ can be either positive or negative. This means that it is possible for the ISO to generate either a net cost or a net income, for any given Trading Interval. In the event the ISO does not make use of equal amounts of incremental and decremental dispatched MWHs, then the net redispatch cost becomes the sum of the amounts paid (or charged) by the ISO to those Scheduling Coordinators whose Generation or System Resource was increased (or decreased) or Curtailable Demand was decreased (or increased) during the Trading Interval less the sum of the amounts received by the ISO from Scheduling Coordinators through the Imbalance Energy Market.~~

~~B 2.5 Grid Operations Price~~

~~The grid operations price is the Trading Interval rate used by the ISO to apportion net Trading Interval redispatch costs to Scheduling Coordinators within the Zone with Intra-Zonal Congestion. The grid operations price is calculated using the following formula:~~

$$GOP_t = \frac{REDISP_{CONG_l}}{\sum_j QCharge_{jt} + \sum_j Export_{jt}}$$

B 2.6 Grid Operations Charge

The Grid Operations Charge is the vehicle by which the ISO recovers the net redispatch costs. It is allocated to each Scheduling Coordinator in proportion to the Scheduling Coordinator's Demand in the Zone with Intra-Zonal Congestion and Exports from the Zone with Intra-Zonal Congestion. The formula for calculating the Grid Operations Charge for Scheduling Coordinator$_j$ in Trading Interval$_t$ is:

$$GOC_{jt} = GOP_t * \left(QCharge_{jt} + EXPORT_{jt}\right)$$

B 3 Meaning of terms of formulae

B 3.1 INC_{bijt} - $

The payment from the ISO due to Scheduling Coordinator$_j$ whose Generating Unit$_i$ or System Resource$_i$ is increased or Curtailable Load$_i$ is reduced within a block$_b$ of Energy in its Adjustment Bid curve (or Imbalance Energy bid) in Trading Interval$_t$ in order to relieve Intra-Zonal Congestion.

B 3.2 $adjinc_{bijt}$ - $/MWh

The incremental cost for the rescheduled Generating Unit$_i$ or System Resource$_i$ or Curtailable Load$_i$ taken from the relevant block$_b$ of Energy in the Day-Ahead or Hour-Ahead Adjustment Bid curve (or Imbalance Energy bid) submitted by the Scheduling Coordinator$_j$ for the Trading Interval$_t$.

B 3.3 $\Delta incbijt$ - MW

The amount by which the Generating Unit$_i$ or System Resource$_i$ or Curtailable Load$_i$ of Scheduling Coordinator$_j$ for Trading Interval$_t$ is increased by the ISO within the relevant block$_b$ of Energy in its Adjustment Bid curve (or Imbalance Energy bid).

B 3.4 $PayTI_{jit}$ - $

The Trading Interval payment to Scheduling Coordinator$_j$ whose Generating Unit$_i$ has been increased or System Resource$_i$ or Curtailable Load$_i$ reduced in Trading Interval$_t$ of the Trading Day.

B 3.5 DEC_{bijt} - $

The charge to Scheduling Coordinator$_j$ whose Generating Unit$_i$ or System Resource$_i$ is decreased for Trading Interval$_t$ within a block$_b$ of Energy in its Adjustment Bid curve (or Imbalance Energy resource).

~~B 3.6 $adjdec_{bijt}$ - $/MWh~~

~~The decremental cost for the rescheduled Generating Unit$_i$ or System Resource$_i$ taken from the relevant block$_b$ of Energy of the Day-Ahead or Hour-Ahead Adjustment Bid curve (or Imbalance Energy resource) submitted by Scheduling Coordinator$_j$ for the Trading Interval$_t$.~~

~~B 3.7 Δdec_{bijt} - MW~~

~~The amount by which the Generating Unit$_i$ or System Resource$_i$ of Scheduling Coordinator$_j$ for Trading Interval$_t$ is decreased by ISO within the relevant block$_b$ of Energy of its Adjustment Bid curve (or Imbalance Energy resource).~~

~~B 3.8 $ChargeTI_{ijt}$ - $~~

~~The Trading Interval charge to Scheduling Coordinator$_j$ whose Generating Unit$_i$ or System Resource$_i$ has been decreased in Trading Interval$_t$ of the Trading Day.~~

~~B 3.9 Not Used~~

~~B 3.10 Not Used~~

~~B 3.10.1 Not Used~~

~~B 3.10.2 P_{xt} - $/MWh~~

~~The zonal Hourly Ex Post Price, for Uninstructed Imbalance Energy, for Trading Interval t in Zone x.~~

~~B 3.11 $REDISP_{CONGt}$ - $~~

~~The Trading Interval net cost to ISO to redispatch in order to relieve Intra-Zonal Congestion during Trading Interval$_t$.~~

~~B 3.12 GOP_t - $/MWh~~

~~The Trading Interval grid operations price for Trading Interval$_t$ used by the ISO to recover the costs of redispatch for Intra-Zonal Congestion Management.~~

~~B 3.13 GOC_{jt} - $~~

~~The Trading Interval Grid Operations Charge by the ISO for Trading Interval$_t$ for Scheduling Coordinator$_j$ in the relevant Zone with Intra-Zonal Congestion.~~

~~B 3.14 $QCHARGE_{jt}$ – MWh~~

~~The Trading Interval metered Demand within a Zone for Trading Interval$_t$ for Scheduling Coordinator$_j$ whose Grid Operations Charge is being calculated.~~

~~B 3.15 $EXPORT_{jt}$ – MWh~~

~~The total Energy for Trading Interval$_t$ exported from the Zone to a neighboring Control Area by Scheduling Coordinator$_j$.~~

APPENDIX C. SETTLEMENT OF ANCILLARY SERVICES

C.1. General Information

For each operating hour, the ISO must ensure that there are sufficient Ancillary Services available to maintain the reliability of the ISO Controlled Grid consistent with WSCC and NERC criteria. ISO Ancillary Services include Regulation Up, Regulation Down, Spinning Reserve and Non-Spinning Reserve. Each of these services is settled separately.

C.1.1. Terms

Any reference to the term "Regulation" as used in Appendix C shall be read as referring to "Regulation Up" or "Regulation Down".

The term "Region" or "Regional" as used in Appendix C shall refer to the "Ancillary Service Region" as defined in the Master Definitions Supplement, Appendix A.

The term "Metered Demand" as used in Appendix C shall refer to metered load and real-time exports.

Ancillary Service Self-Provision

Scheduling Coordinators may chose to self-provide Ancillary Services to (i) reduce their own Net Ancillary Service Obligation and (ii) use the Excess Self-Provision to reduce other SC's Net Ancillary Service Obligation if such Excess Self-Provisions are Qualified.

Gross Ancillary Service Obligation

The Gross Ancillary Service Obligation for each service for each hour for each Scheduling Coordinator is the amount of Ancillary Services that it needs to secure either by self-provision or by ISO-provision. Each Scheduling Coordinator's obligation to pay Ancillary Service charges is based on metered demand adjusted for on-demand obligation and Inter-SC Ancillary Services trades.

Gross Ancillary Service Requirement

The Gross Ancillary Service Requirement for each service for each hour in each region in each of the market, i.e. the Day-Ahead Market and the Hour-Ahead Market, is the amount of capacity that needs to be secured by the ISO either through procurement or self-provision.

Net Ancillary Service Obligation

The Net Ancillary Service Obligation for each service for each hour for each Scheduling Coordinator is its Gross Ancillary Service Obligation minus the amount of Self-Provision accepted by the ISO in the Day-Ahead or the Hour-Ahead Market. The Net Ancillary Service Obligation is the basis for billing a given Ancillary Service.

Net Ancillary Service Requirement

The Net Ancillary Service Requirement for each Ancillary Service for each hour in each region in each market is the Gross Ancillary Service Requirement minus Qualified Ancilary Service Self-Provision.

Qualified Ancillary Service Self-Provision

Qualified Ancillary Service Self-Provision is the amount of self-provision that has been used to reduce the ISO's Gross Ancillary Service Requirement. In other words, it has been used to determine the Net Ancillary Service Requirement in either the Day-Ahead Market or the Hour-Ahead Market.

Qualified Excess Ancillary Service Self-Provision

The amount of self-provision that exceeds the Gross Ancillary Service Obligation of the Scheduling Coordinator is referred to as Excess Ancillary Service Self-Provision. Qualified Excess Ancillary Services Self-Provision will be compensed if it is used by the ISO to reduce the Gross Ancillary Service Requirement.

C.1.2. Payments

The ISO will purchase Ancillary Services for each Settlement Period in both the Day-Ahead and Hour-Ahead Markets. Separate payments will be calculated for each service for each Settlement Period and in each market for each resource providing Ancillary Services. The prices used to determine the payments are the Ancillary Service Marginal Prices, as determined by SCUC. The SCUC prices reflect a simultaneous procurement of Energy and Ancillary Services at least cost and take into account the substitutability of services.

C.1.3. Charges

The Ancillary Service Charges allocate the costs of purchasing Ancillary Services in the Day-Ahead and Hour-Ahead Markets to Scheduling Coordinators according to their share of the metered Load (for Regulation) or metered Demand (for Spinning and Non-Spinning Reserves).

Scheduling Coordinators shall be paid for their Qualifiied Excess Ancillary Services Self-Provision.

The user rates that are used in calculating Ancillary Service charges are based on the cost of meeting each Ancillary Service requirement.

C.1.4. Neutrality

Due to the difference between the basis for payment and charge of Ancillary Services, there is a need for a neutrality adjustment. Specifically, payment for the procurement of Ancillary Services is based on the ISO Demand Forecast, whereas the charge methodology is based on Metered Demand. Since the ISO Demand Forecast may be different than Metered Demand, there will be a difference, in total, between the two calculations and a need for a neutrality adjustment. The neutrality imbalance for each Ancillary Service will be allocated to

all Scheduling Coordinators based on Demand (for Regulation) or Demand (for Spinning and Non-Spinning Reserve service.)

C.2. Fundamental formulas

C.2.1. ISO payments to Scheduling Coordinators

C.2.1.1. Day-Ahead Market

C.2.1.1.1. Regulation

When the ISO purchases Regulation in the Day-Ahead Market, Scheduling Coordinators for Generating Units, System Units, and System Resources that provide this capacity will receive payments for each Settlement Period of the Day-Ahead Market. The payment for a given Generating Unit which provides Regulation capacity over a given Settlement Period will be the total quantity of Regulation capacity provided times the applicable Ancillary Service Marginal Pricefor that Settlement Period. in that Ancillary Service Region. The required Regulation capacity is defined in the Ancillary Services Requirements Protocol. Regulation Up and Regulation Down payments shall be calculated separately. The payment for Scheduling Coordinator *j* for providing Regulation Up capacity from resource *i* in Ancillary Service Region *x* for Settlement Period *t* is calculated as follows:

$$AGCUpPayDA_{ijxt} = AGCUpQDA_{ijxt} \times PAGCUpDA_{jxt} - AGCUpCCDA_{ijxt}$$

where $AGCUpCCDA_{ijxt}$ is the Congestion Charge to Scheduling Coordinator *j* for Regulation Up in the Day-Ahead Market from resource *i* at Scheduling Point *x* in Settlement Period *t*, calculated as follows:

$$AGCUpCCDA_{ijxt} = AGCUpQDA_{ijxt} \times PCCDA_{xt}$$

This Congestion Charge is booked as receivable in the FTR balancing account as Congestion Revenue.

The payment for Scheduling Coordinator *j* for providing Regulation Down capacity from resource *i* in Ancillary Service Region *x* for Settlement Period *t* is calculated as follows:

$$AGCDownPayDA_{ijxt} = AGCDownQDA_{ijxt} \times PAGCDownDA_{xt}$$

The total Regulation Up payment to each Scheduling Coordinator for a given Settlement Period in the Day-Ahead Market for all the resources that it represents in a given Ancillary Service Region is calculated by summing all the payments for the resources of the Scheduling Coordinator in the Ancillary Service Region for the Settlement Period. The payment for Scheduling Coordinator j in Ancillary Service Region x for Settlement Period t is calculated as follows:

$$AGCUpPayTotalDA_{jxt} = \sum_{i} AGCUpPayDA_{ijxt}$$

The total Regulation Down payment to each Scheduling Coordinator for a given Settlement Period in the Day-Ahead Market for all the resources that it represents in a given Ancillary Service Region is calculated by

summing all the payments for the resources of the Scheduling Coordinator in the Ancillary Service Region for the Settlement Period. The payment for Scheduling Coordinator *j* in Ancillary Service Region *x* for Settlement Period *t* is calculated as follows:

$$AGCDownPayTotalDA_{jxt} = \sum_{i} AGCDownPayDA_{ijxt}$$

C.2.1.1.2. Spinning Reserve

When ISO purchases Spinning Reserve in the Day-Ahead Market, Scheduling Coordinators for Generating Units, System Units, and System Resources that provide this capacity will receive payments for each Settlement Period of the Day-Ahead Market. The payment for a given Generating Unit or System Resource which provides Spinning Reserve capacity over a given Settlement Period will be the total quantity of Spinning Reserve capacity provided times the applicable Ancillary Service Marginal Price adjusted for Congestion Charges on interties if applicable for that Settlement Period in that Ancillary Service Region. The required Spinning Reserve capacity is defined in the Ancillary Services Requirements Protocol. The payment for Scheduling Coordinator *j* for providing Spinning Reserve from resource *i* in Ancillary Service Region *x* for Settlement Period *t* is calculated as follows:

$$SpinPayDA_{ijxt} = SpinQDA_{ijxt} \times PSpinDA_{xt} - SpinCCDA_{ijxt}$$

where $SpinCCDA_{ijxt}$ is the Congestion Charge to Scheduling Coordinator *j* for Spinning Reserve in the Day-Ahead Market from resource *i* at Scheduling Point *x* in Settlement Period *t*, calculated as follows:

$$SpinCCDA_{xt} = SpinQDA_{ijxt} \times PCCDA_{xt}$$

This Congestion Charge is booked as receivable in the FTR balancing account as Congestion Revenue.

The total Spinning Reserve payment to each Scheduling Coordinator for a given Settlement Period in the Day-Ahead Market for all the resources that it represents in a given Ancillary Service Region is calculated by summing all the payments for the resources of the Scheduling Coordinator in the Ancillary Service Region for the Settlement Period. The payment for Scheduling Coordinator *j* in Ancillary Service Region *x* for Settlement Period *t* is calculated as follows:

$$SpinPayTotalDA_{jxt} = \sum_{i} SpinPayDA_{ijxt}$$

C.2.1.1.3. Non-Spinning Reserve

When the ISO purchases Non-Spinning Reserve in the Day-Ahead Market, Scheduling Coordinators for Generating Units, System Units, Dispatchable Loads, and System Resources that provide this capacity will receive payments for each Settlement Period of the Day-Ahead Market. The payment for a given Generating Unit, Load or System Resource which provides Non-Spinning Reserve capacity over a given

Settlement Period will be the total quantity of Non-Spinning Reserve capacity provided times the applicable Ancillary Service Marginal Price adjusted for Congestion Charges on interties if applicable for that Settlement Period in that Ancillary Service Region. The required Non-Spinning Reserve capacity is defined in the Ancillary Services Requirements Protocol. The payment for Scheduling Coordinator *j* for providing Non-Spinning Reserve capacity from resource *i* in Ancillary Service Region *x* for Settlement Period *t* is calculated as follows:

$$NonSpinPayDA_{ijxt} = NonSpinQDA_{ijxt} \times PNonSpinDA_{xt} - NonSpinCCDA_{ijxt}$$

where $NonSpinCCDA_{ijxt}$ is the Congestion Charge to Scheduling Coordinator *j* for Non-Spinning Reserve in the Day-Ahead Market from resource *i* at Scheduling Point *x* in Settlement Period *t*, calculated as follows:

$$NonSpinCCDA_{ijxt} = NonSpinQDA_{ijxt} \times PCCDA_{xt}$$

This Congestion Charge is booked as a receivable in the FTR Balancing Account as Congestion Revenue.

The total Non-Spinning Reserve payment to each Scheduling Coordinator for a given Settlement Period in the Day-Ahead Market for all the resources that it represents in a given Ancillary Service Region is calculated by summing all the payments for the resources of the Scheduling Coordinator in the Ancillary Service Region for the Settlement Period. The payment for Scheduling Coordinator *j* in Ancillary Service Region *x* for Settlement Period *t* is calculated as follows:

$$NonSpinPayTotalDA_{jxt} = \sum_{i} NonSpinPayDA_{ijxt}$$

C 2.1.2 Hour-Ahead Market

C.2.1.1.4. Regulation

When the ISO purchases Regulation in the Hour-Ahead Market, Scheduling Coordinators for Generating Units, System Units, and System Resources that provide this capacity will receive payment for the Settlement Period of the Hour-Ahead Market. The payment for a given Generating Unit which provides Regulation capacity over the Settlement Period will be the total quantity of Regulation capacity provided times the applicable Ancillary Service Marginal Price for that Settlement Period in that Ancillary Service Region. The required Regulation capacity is defined in the Ancillary Services Requirements Protocol. Regulation Up and Regulation Down payments shall be calculated separately. The payment for Scheduling Coordinator *j* for providing Regulation Up capacity from resource *i* in Ancillary Service Region *x* for Settlement Period *t* is calculated as follows:

$$AGCUpPayHA_{ijxt} = AGCUpQIHA_{ijxt} \times PAGCUpHA_{xt} - AGCUpCCHA_{ijxt}$$

where $AGCUpCCHA_{ijxt}$ is the Congestion Charge to Scheduling Coordinator *j* for Regulation Up in the Hour-Ahead Market from

resource *i* at Scheduling Point *x* in Settlement Period *t*, calculated as follows:

$AGCUpCCHA_{ijxt} = AGCUpQIHA_{ijxt} \times PCCHA_{xt}$

This Congestion Charge is booked as receivable in the FTR balancing account as Congestion Revenue.

The payment for Scheduling Coordinator *j* for providing Regulation Down from resource *i* in Ancillary Service Region *x* for Settlement Period *t* is calculated as follows:

$AGCDownPayHA_{ijxt} = AGCDownQIHA_{ijxt} \times PAGCDownHA_{xt}$

When a Scheduling Coordinator buys back, in the Hour-Ahead Market, Regulation capacity which it sold or self-provided to the ISO in the Day-Ahead Market, the buy-back charge will be the total quantity of Regulation capacity bought back times the greater of the Day-Ahead Ancillary Service Marginal Price and the Hour-Ahead Ancillary Service Marginal Price as applicable for that Settlement Period in that Ancillary Service Region. The payment to the ISO from Scheduling Coordinator *j* to buy back Regulation Up from resource *i* in Ancillary Service Region *x* for Settlement Period *t* is calculated as follows:

$AGCUpReceiveHA_{ijxt} = AGCUpQDHA_{ijxt} \times \max(PAGCUpDA_{xt}, PAGCUpHA_{xt}) - AGCUpCPHA_{ijxt}$

where $AGCUpCPHA_{ijxt}$ is the Congestion Payment to Scheduling Coordinator *j* for Regulation Up in the Hour-Ahead Market from resource *i* at Scheduling Point *x* in Settlement Period *t*, calculated as follows:

$AGCUpCPHA_{ijxt} = AGCUpQDHA_{ijxt} \times PCCHA_{xt}$

This Congestion payment is credited to the FTR Balancing Account as Congestion Revenue.

The payment to the ISO from Scheduling Coordinator *j* to buy back Regulation Down from resource *i* in Ancillary Service Region *x* for Settlement Period *t* is calculated as follows:

$AGCDownReceiveHA_{ijxt} = AGCDownQDHA_{ijxt} \times \max(PAGCDownDA_{xt}, PAGCDownHA_{xt})$

The total Regulation payment for the Settlement Period of the Hour-Ahead Market to each Scheduling Coordinator for all the resources that it represents in a given Ancillary Service Region is calculated by summing all the payments for the resources of the Scheduling Coordinator in the Ancillary Service Region for the Settlement Period and then deducting therefrom any amount payable by the Scheduling Coordinator to the ISO for Regulation bought back by the Scheduling Coordinator from the ISO in the Hour-Ahead Market for the Settlement Period on behalf of resources located in the Ancillary Service Region. The payment for Scheduling Coordinator *j* in Ancillary Service Region *x* for Settlement Period *t* is calculated as follows:

$$AGCUpPayTotalHA_{jxt} = \sum_{i} AGCUpPayHA_{ijxt} - \sum_{i} AGCUp\,\text{Re}\,ceiveHA_{ijxt}$$

$$AGCDownPayTotalHA_{jxt} = \sum_{i} AGCDownPayHA_{ijxt} - \sum_{i} AGCDown\,\text{Re}\,ceiveHA_{ijxt}$$

C.2.1.1.5. Spinning Reserve

When the ISO purchases Spinning Reserve in the Hour-Ahead Market, Scheduling Coordinators for Generating Units, System Units, and System Resources that provide this capacity will receive payments for the Settlement Period of the Hour-Ahead Market. The payment for a given Generating Unit or System Resource which provides Spinning Reserve capacity over the Settlement Period will be the total quantity of Spinning Reserve capacity provided times the applicable Ancillary Service Marginal Price adjusted for Congestion Charges on interties if applicable for that Settlement Period in that Ancillary Service Region. The payment for Scheduling Coordinator *j* for providing Spinning Reserve capacity from resource i in Ancillary Service Region *x* for Settlement Period *t* is calculated as follows:

$SpinPayHA_{ijxt} = SpinQIHA_{ijxt} \times PSpinHA_{xt} - SpinCCHA_{ijxt}$

where $SpinCCHA_{ijxt}$ is the Congestion Charge to Scheduling Coordinator *j* for Spinning Reserve in the Hour-Ahead Market from resource *i* at Scheduling Point *x* in Settlement Period *t*, calculated as follows:

$SpinCCHA_{ijxt} = SpinQIHA_{ijxt} \times PCCHA_{xt}$

This Congestion Charge is booked as a receivable in the FTR Balancing Account as Congestion Revenue.

When a Scheduling Coordinator buys back in the Hour-Ahead Market Spinning Reserve which it sold or self-provided to the ISO in the Day-Ahead Market, the buy-back charge will be the total quantity of Spinning Reserve capacity bought back times the greater of the Regional Day-Ahead Ancillary Service Marginal Price and the Regional Hour-Ahead Ancillary Service Marginal Price as applicable for that Settlement Period in that Ancillary Service Region. The payment to the ISO from Scheduling Coordinator *j* to buy back Spinning Reserve from resource *i* in Ancillary Service Region *x* for Settlement Period *t* is calculated as follows:

$SpinReceiveHA_{ijxt} = SpinQDHA_{ijxt} \times \max(PSpinDA_{xy}, PSpinHA_{xt}) - SpinCPHA_{ijxt}$

where $SpinCPHA_{ijxt}$ is the Congestion Payment to Scheduling Coordinator *j* for Spinning Reserve in the Hour-Ahead Market from resource *i* at Scheduling Point *x* in Settlement Period *t*, calculated as follows:

$SpinCPHA_{ijxt} = SpinQDHA_{ijxt} \times PCCHA_{xt}$

This Congestion payment is credited to the FTR Balancing Account as Congestion Revenue.

The total Spinning Reserve payment to each Scheduling Coordinator for the Settlement Period of the Hour-Ahead Market for all the resources that it represents in a given Ancillary Service Region is calculated by summing all the payments for the resources of the Scheduling Coordinator in the Ancillary Service Region for the Settlement Period and then deducting therefrom any amount payable by the Scheduling Coordinator to the ISO for Spinning Reserve bought back by the Scheduling Coordinator from the ISO in the Hour-Ahead Market for the Settlement Period on behalf of resources located in the Ancillary Service Region. The payment for Scheduling Coordinator *j* in Ancillary Service Region *x* for Settlement Period *t* is calculated as follows:

$$SpinPayTotalHA_{jxt} = \sum_{i} SpinPayHA_{ijxt} - \sum_{i} Spin\,\mathrm{Re}\,ceiveHA_{ijxt}$$

C.2.1.1.6. Non-Spinning Reserve

When the ISO purchases Non-Spinning Reserve in the Hour-Ahead Market, Scheduling Coordinators for Generating Units, System Units, Dispatchable Loads, and System Resources that provide this capacity will receive payment for the Settlement Period of the Hour-Ahead Market. The payment for a given Generating Unit, Load or System Resource which provides Non-Spinning Reserve capacity over the Settlement Period will be the total quantity of Non-Spinning Reserve capacity provided times the applicable Ancillary Service Marginal Price adjusted for Congestion Charges on interties if applicable for that Settlement Period in that Ancillary Service Region. This payment for Scheduling Coordinator *j* for providing Non-Spinning Reserve capacity from a resource *i* in Ancillary Service Region *x* for Settlement Period *t* is calculated as follows:

$NonSpinPayHA_{ijxt} = NonSpinQIHA_{ijxt} \times PNonSpinHA_{xt} - NonSpinCCHA_{ijxt}$

where $NonSpinCCHA_{ijxt}$ is the Congestion Charge to Scheduling Coordinator *j* for providing Non-Spinning Reserve in the Hour-Ahead Market from resource *i* at Scheduling Point *x* in Settlement Period *t*, calculated as follows:

$NonSpinCCHA_{ijxt} = NonSpinQIHA_{ijxt} \times PCCHA_{xt}$

This Congestion Charge is booked as a receivable in the FTR Balancing Account as Congestion Revenue.

When a Scheduling Coordinator buys back in the Hour-Ahead Market Non-Spinning Reserve which it sold or self-provided to the ISO in the Day-Ahead Market, the buy-back charge will be the total quantity of Non-Spinning Reserve capacity bought back times the greater of the Regional Day-Ahead Ancillary Service Marginal Price and the Regional Hour-Ahead Ancillary Service Marginal Price as applicable for that Settlement Period in that Ancillary Service Region.

This payment to the ISO from Scheduling Coordinator *j* to buy back Non-Spinning Reserve from resource *i* in Ancillary Service Region *x* for Settlement Period *t* is calculated as follows:

$NonSpinReceiveHA_{ijxt} = NonSpinQDHA_{ijxt} \times \max(PNonSpinDA_{xy}, PNonSpinHA_{xt}) - NonSpinCPHA_{ijxt}$

where $NonSpinCPHA_{ijxt}$ is the Congestion Payment to Scheduling Coordinator *j* for Non-Spinning Reserve in the Hour-Ahead Market from resource *i* at Scheduling Point *x* in Settlement Period *t*, calculated as follows:

$NonSpinCPHA_{ijxt} = NonSpinQDHA_{ijxt} \times PCCHA_{xt}$

This Congestion payment is credited to the FTR Balancing Account as Congestion Revenue.

The total Non-Spinning Reserve payment to each Scheduling Coordinator for the Settlement Period of the Hour-Ahead Market for all the resources that it represents in a given Ancillary Service Region is calculated by summing all the payments for the resources of the Scheduling Coordinator in the Ancillary Service Region for the Settlement Period and then deducting therefrom any amount payable by the Scheduling Coordinator to the ISO for Non-Spinning Reserve bought back by the Scheduling Coordinator from the ISO in the Hour-Ahead Market for the Settlement Period on behalf of resources located in the Ancillary Service Region. The payment for Scheduling Coordinator *j* in Ancillary Service Region *x* for Settlement Period *t* is calculated as follows:

$$NonSpinPayTotalHA_{jxt} = \sum_{i} NonSpinPayHA_{ijxt} - \sum_{i} NonSpin\,\mathrm{Re}\,ceiveHA_{ijxt}$$

C.2.2. ISO Allocation of Charges toScheduling Coordinators

C.2.2.1. Regulation Up

The ISO will charge the total cost of procuring Regulation in the Day-Ahead and Hour-Ahead Markets, through the application of a charge to each Scheduling Coordinator for each Settlement Period at the ISO Control Area level. This charge will be computed by multiplying the Regulation user rate for the Settlement Period by the Scheduling Coordinator's Net Regulation Obligation for the same period.

The Regulation user rate is calculated by dividing the total procurement cost for the Net Regulation Capacity Requirement in all Ancillary Service Regions, for the Settlement Period, by the total Net Regulation Requirement for the Settlement Period in all Ancillary Service Regions. Regulation Up and Regulation Down payments shall be calculated separately.

The Regulation Up user rate for Settlement Period t is calculated as follows:

$$AGCUpRate_t = \frac{AGCUpPayNetReqDA_t + AGCUpPayNetReqHA_t}{AGCUpNetReqDA_t + AGCUpNetReqHA_t} \quad -$$

where $AGCUpNetReqDA_t$ is the Net Regulation Up Requirement for the Settlement Period t in the Day-Ahead Market for the ISO Control Area. It is the sum of all the Regional Net Regulation Up Requirement in the Day-Ahead Market as follows:

$$AGCUpNetReqDA_t = \sum_y AGCUpNetReqDA_{yt}$$

$AGCUpPayNetReqDA_t$ is the cost of Regulation Up procurement to meet Net Regulation Up Requirement for the Settlement Period t incurred in the Day-Ahead Market in all the Regions. It is calculated as follows:

$$AGCUpPayNetReqDA_t = \sum_y AGCUpPayNetReqDA_{yt}$$

$AGCUpPayNetReqDA_{yt}$ is the cost of Regulation Up procurement to meet Net Regulation Up Requirement for the Settlement Period t incurred in the Day-Ahead Market in Region y. It is calculated as follows:

$$AGCUpPayNetReqDA_{yt} = AGCUpNetReqDA_{yt} \times PAGCUpDA_{yt}$$

where:

$AGCUpNetReqDA_{yt}$ is the Net Regulation Up Requirement for the Settlement Period t in the Day-Ahead Market for Region y.

$PAGCUpDA_{yt}$ is the Ancillary Service Marginal Price for Regulation Up for the Settlement Period t incurred in the Day-Ahead Market for Region y.

$AGCUpNetReqHA_t$ is the Net Regulation Up Requirement for the Settlement Period t in the Hour-Ahead Market for all the Regions. It is the sum of all the Regional Net Regulation Up Requirement as follows:

$$AGCUpNetReqHA_t = \sum_z AGCUpNetReqHA_{zt}$$

$AGCUpPayNetReqHA_t$ is the cost of Regulation Up procurement to meet net Regulation Up Requirement for the Settlement Period t incurred in the Hour-Ahead Market in all the Regions. It is calculated as follows:

$$AGCUpPayNetReqHA_t = \sum_z AGCUpPayNetReqHA_{zt}$$

$AGCUpPayNetReqHA_{zt}$ is the cost of Regulation Up procurement to meet net Regulation Up Requirement for the Settlement Period t incurred in the Hour-Ahead Market in Region z. It is calculated as follows:

$$AGCUpPayNetReqDA_{zt} = AGCUpNetReqHA_{zt} \times PAGCUpHA_{zt} - AGCUpReceiveHA_{zt}$$

where:

$AGCUpNetReqHA_{zt}$ is the total incremental Net Requirement of Regulation Up for the Settlement Period *t* in the Hour-Ahead Market for Region z.

$PAGCUpHA_{zt}$ is the Ancillary Service Marginal Price for Regulation Up for the Settlement Period *t* incurred in the Hour-Ahead Market for Region z.

$AGCUpReceiveHA_{zt}$ is the Total charges for Hour-Ahead Buyback of Regulation Up for the Settlement Period t for Region z.

The Regulation Up charge for Scheduling Coordinator *j* for Settlement Period *t* is calculated as follows:

$$AGCUpChg_{jt} = AGCUpNetOblig_{jt} \times AGCUpRate_{t}$$

$AGCUpNetOblig_{jt}$ is the Net Regulation Up Obligation for Scheduling Coordinator *j* for Settlement Period *t*. The Charge is negative when the Scheduling Coordinator has Excess Qualified Self-Provision of Regulation Up.

$$AGCUpNetOblig_{jt} = AGCUpGrossOblig_{jt} - AGCUpQualifySelf_{jt}$$

where:

$AGCUpGrossOblig_{jt}$ is the gross Regulation Up Obligation for Scheduling Coordinator *j* for Settlement Period *t*.

$AGCUpQualifySelf_{jt}$ is the Qualified Self-Provision of Regulation Up for Scheduling Coordinator *j* for Settlement Period *t*.

$$AGCUpQualifySelf_{jt} = AGCUpQualifySelfDA_{jt} + AGCUpQualifySelfHA_{jt}$$

$AGCUpQualifySelfDA_{jt}$ = The Qualified Day-Ahead Self-Provision of Regulation Up for Scheduling Coordinator *j* for Settlement Period *t*.

$$AGCUpQualifySelfDA_{jt} = \sum_{y} AGCUpQualifySelfDA_{jyt}$$

$AGCUpQualifySelfHA_{jt}$ = The Qualified Hour-Ahead Self-Provision of Regulation Up for Scheduling Coordinator *j* for Settlement Period *t*.

$$AGCUpQualifySelfHA_{jt} = \sum_{z} AGCUpQualifySelfHA_{jzt}$$

where

$AGCUpQualifySelfDA_{jyt}$ is the Qualified Day-Ahead Self-Provision of Regulation Up for Scheduling Coordinator *j* in Region *y* for Settlement Period *t*.

$AGCUpQualifySelfHA_{jzt}$ is the Qualified Hour-Ahead Self-Provision of Regulation Up for Scheduling Coordinator *j* in Region *z* for Settlement Period *t*.

The ISO will charge each Scheduling Coordinator a Regulation Up Neutrality Adjustment Charge for each Settlement Period according to Demand.

$$AGCUpNeutraAdjChg_{jt} = MeteredLoad_{jt} \times AGCUpNeutraAdjRate_{t}$$

where:

$AGCUpNeutraAdjChg_{jt}$ is the Regulation Up Neutrality Adjustment Charge to Scheduling Coordinator *j* for Settlement Period *t*.

$MeteredLoad_{jt}$ is the Demand of Scheduling Coordinator *j* for Settlement Period *t*.

$AGCUpNeutraAdjRate_{t}$ is the Regulation Up Neutrality Adjustment Rate for Settlement Period *t*. The rate is the difference between the total amount of charge and the total amount of payment for the service divided by the total Demand of the ISO control area as follows.

$$AGCUpNeutraAdjRate_{t} = \frac{AGCUpChgTotal_{t} - AGCUpPayTotal_{t} - AGCUpCCTotal_{t}}{MeteredLoadTotal_{t}}$$

where:

$AGCUpChgTotal_{t}$ is the total amount of charges collected by the ISO from Scheduling Coordinators for provision of Regulation Up Service for the Settlement Period *t*.

$$AGCUpChgTotal_{t} = \sum_{j} AGCUpChg_{jt}$$

$AGCUpPayTotal_{t}$ is the total amount of payment from the ISO to Scheduling Coordinators for procuring Regulation Up Service for the Settlement Period *t* in both the Day-Ahead and the Hour-Ahead Markets.

$$AGCUpPayTotal_{t} = \sum_{j}\sum_{x}\left(AGCUpPayTotalDA_{jxt} + AGCUpPayTotalHA_{jxt}\right)$$

$AGCUpCCTotal_{t}$ is the total amount of Congestion charge incurred to the ISO for procuring Regulation Up over Congested interties for Settlement Period *t*. This amount shall be transferred into the FTR Balancing Account to balance the Congestion charge receivables booked in the Day-Ahead Market and the Hour-Ahead Market when Regulation Up is procured.

$$AGCUpCCTotal_{t} = \sum_{j}\sum_{x}\sum_{i} AGCUpCCDA_{ijxt} + \sum_{j}\sum_{x}\sum_{i}\left(AGCUpCCHA_{ijxt} - AGCUpCPHA_{ijxt}\right)$$

C.2.2.2. Regulation Down

The Regulation Down user rate in Ancillary Service Region *x* for Settlement Period *t* is calculated as follows:

$$AGCDownRate_t = \frac{AGCDownPayNetReqDA_t + AGCDownPayNetReqHA_t}{AGCDownNetReqDA_t + AGCDownNetReqHA_t}$$

where:

$AGCUpNetReqDA_t$ is the Net Regulation Down Requirement for the Settlement Period *t* in the Day-Ahead Market. It is the sum of all the Regional Net Regulation Down Requirement as follows:

$$AGCDownNetReqDA_t = \sum_y AGCDownNetReqDA_{yt}$$

$AGCDownPayNetReqDA_t$ is the cost of Regulation Down procurement to meet Net Regulation Down Requirement for the Settlement Period *t* incurred in the Day-Ahead Market. It is calculated as follows:

$$AGCDownPayNetReqDA_t = \sum_y AGCDownPayNetReqDA_{yt}$$

$AGCDownPayNetReqDA_{yt}$ is the cost of Regulation Down procurement to meet Net Regulation Down Requirement for the Settlement Period *t* incurred in the Day-Ahead Market in Region *y*. It is calculated as follows:

$$AGCDownPayNet\,\mathrm{Re}\,qDA_{yt} = AGCDownNet\,\mathrm{Re}\,qDA_{yt} \times PAGCDownDA_{yt}$$

where:

$AGCDownNetReqDA_{yt}$ is the Net Regulation Down Requirement for the Settlement Period *t* in the Day-Ahead Market for Region *y*.

$PAGCDownDA_{yt}$ is the Ancillary Service Marginal Price for Regulation Down for the Settlement Period *t* incurred in the Day-Ahead Market for Region *y*.

$AGCDownNetReqHA_t$ is the Net Regulation Down Requirement for the Settlement Period *t* in the Hour-Ahead Market. It is the sum of all the Regional Net Regulation Down Requirement as follows:

$$AGCDownNetReqHA_t = \sum_z AGCDownNetReqHA_{zt}$$

$AGCDownPayNetReqHA_t$ is the cost of Regulation Down procurement to meet Net Regulation Down Requirement for the Settlement Period *t* incurred in the Hour-Ahead Market. It is calculated as follows:

$$AGCDownPayNetReqHA_t = \sum_z AGCDownPayNetReqHA_{zt}$$

$AGCDownPayNetReqHA_{zt}$ is the cost of Regulation Down procurement to meet Net Regulation Down Requirement for the Settlement Period *t* incurred in the Hour-Ahead Market in Region *z*. It is calculated as follows:

$$AGCDownPayNet\,\mathrm{Re}\,qDA_{zt} = AGCDownNet\,\mathrm{Re}\,qHA_{zt} \times PAGCDownHA_{zt} - AGCDow$$

where:

$AGCDownNetReqHA_{zt}$ is the total incremental Net Requirement of Regulation Down for the Settlement Period *t* in the Hour-Ahead Market for Region *z*.

$PAGCDownHA_{zt}$ is the Ancillary Service Marginal Price for Regulation Down for the Settlement Period *t* incurred in the Hour-Ahead Market for Region *z*.

$AGCDownReceiveHA_{zt}$ is the total charges for Hour-Ahead Buyback of Regulation Down for the Settlement Period *t* for Region *z*.

The Regulation Down capacity charge for Scheduling Coordinator *j* for Settlement Period *t* is calculated as follows:

$$AGCDownChg_{jt} = AGCDownNetOblig_{jt} \times AGCDownRate_{t}$$

$AGCDownNetOblig_{jt}$ is the The Net Regulation Down Obligation for Scheduling Coordinator j for Settlement Period *t*. The Charge is negative when the Scheduling Coordinator has Excess Qualified Self-Provision of Regulation Down.

$$AGCDownNetOblig_{jt} = AGCDownGrossOblig_{jt} - AGCDownQualifySelf_{jt}$$

where:

$AGCDownGrossOblig_{jt}$ is the The Gross Regulation Down Obligation for Scheduling Coordinator *j* for Settlement Period *t*.

$AGCDownQualifySelf_{jt}$ is the The Qualified Self-Provision of Regulation Down for Scheduling Coordinator *j* for Settlement Period *t*.

$$AGCDownQualifySelf_{jt} = AGCDownQualifySelfDA_{jt} + AGCDownQualifySelfHA_{jt}$$

$AGCDownQualifySelfDA_{jt}$ is the The Qualified Day-Ahead Self-Provision of Regulation Down for Scheduling Coordinator *j* for Settlement Period *t*.

$$AGCDownQualifySelfDA_{jt} = \sum_{y} AGCDownQualifySelfDA_{jyt}$$

$AGCDownQualifySelfHA_{jt}$ is the The Qualified Hour-Ahead Self-Provision of Regulation Down for Scheduling Coordinator *j* for Settlement Period *t*.

$$AGCDownQualifySelfHA_{jt} = \sum_{z} AGCDownQualifySelfHA_{jzt}$$

where:

$AGCDownQualifySelfDA_{jyt}$ is the The Qualified Day-Ahead Self-Provision of Regulation Down for Scheduling Coordinator j in Region y for Settlement Period t.

$AGCDownQualifySelfHA_{jzt}$ is the Qualified Hour-Ahead Self-Provision of Regulation Down for Scheduling Coordinator j in Region z for Settlement Period t.

The ISO will charge each Scheduling Coordinator a Regulation Down Neutrality Adjustment Charge for each Settlement Period according to Demand.

$$AGCDownNeutraAdjChg_{jt} = MeteredLoad_{jt} \times AGCDownNeutraAdjRate_{t}$$

where:

$AGCDownNeutraAdjChg_{jt}$ is the Regulation Down Neutrality Adjustment Charge to Scheduling Coordinator j for Settlement Period t.

$MeteredLoad_{jt}$ is the Demand of Scheduling Coordinator j for Settlement Period t.

$AGCDownNeutraAdjRate_{t}$ is the Regulation Down Neutrality Adjustment Rate for Settlement Period t. The rate is the difference between the total amount of charge and the total amount of payment for the service divided by the total Demand of the ISO control area as follows.

$$AGCDownNeutraAdjRate_{t} = \frac{AGCDownChgTotal_{t} - AGCDownPayTotal_{t}}{MeteredLoadTotal_{t}}$$

where:

$AGCDownChgTotal_{t}$ is the total amount of charges collected by the ISO from Scheduling Coordinators for provision of Regulation Down Service for the Settlement Period t.

$$AGCDownChgTotal_{t} = \sum_{j} AGCDownChg_{jt}$$

$AGCDownPayTotal_{t}$ is the total amount of payment from the ISO to Scheduling Coordinators for procuring Regulation Down Service for the Settlement Period t in both the Day-Ahead and the Hour-Ahead Markets.

$$AGCDownPayTotal_{t} = \sum_{j} \sum_{x} \left(AGCDownPayTotalDA_{jxt} + AGCDownPayTotalHA_{jxt} \right)$$

C.2.2.3. Spinning Reserve

The ISO will charge the cost of procuring Spinning Reserve in the Day-Ahead and Hour-Ahead Markets, through the application of a charge to each Scheduling Coordinator for each Settlement Period at the ISO Control Area level. This charge will be computed by multiplying the Spinning Reserve user rate for the Settlement Period by the Scheduling Coordinator's Net Spinning Reserve Obligation for the same period.

The Spinning Reserve user rate is calculated by dividing the total cost to the ISO for purchasing the Net Spinning Reserve Requirement, for the Settlement Period, by the Net Spinning Reserve Requirement for the Settlement Period.

The Spinning Reserve user rate for Settlement Period t is calculated as follows:

$$SpinRate_t = \frac{SpinPayNetReqDA_t + SpinPayNetReqHA_t}{SpinNetReqDA_t + SpinNetReqHA_t} \quad -$$

where:

$SpinNetReqDA_t$ is the Net Spinning Reserve Requirement for the Settlement Period *t* in the Day-Ahead Market. It is the sum of all the Regional Net Spinning Reserve Requirement as follows:

$$SpinNetReqDA_t = \sum_y SpinNetReqDA_{yt}$$

$SpinPayNetReqDA_t$ is the cost of Spinning Reserve procurement to meet Net Spinning Reserve Requirement for the Settlement Period *t* incurred in the Day-Ahead Market. It is calculated as follows:

$$SpinPayNetReqDA_t = \sum_y SpinPayNetReqDA_{yt}$$

$SpinPayNetReqDA_{yt}$ is the cost of Spinning Reserve procurement to meet Net Spinning Reserve Requirement for the Settlement Period *t* in the Day-Ahead Market in Region *y*. It is calculated as follows:

$$SpinPayNetReqDA_{yt} = SpinNetReqDA_{yt} \times AvgPSpinDA_{yt}$$

where:

$SpinNetReqDA_{yt}$ is the Net Spinning Reserve Requirement for the Settlement Period *t* in the Day-Ahead Market for Region *y*.

$AvgPSpinDA_{yt}$ is the average price for Spinning Reserve for the Settlement Period *t* in the Day-Ahead Market for Region *y*.

$$AvgPSpinDA_{yt} = \frac{\sum_{k \in I_y} SpinQDA_{kt} \times PSpinDA_{kt}}{\sum_{k \in I_y} SpinQDA_{kt}}$$

$SpinQDA_{kt}$ is the quantity of procurement for the Settlement Period t in the Day-Ahead Market in Region y or at Scheduling Point *k* which is connected directly to Region *y*.

$PSpinDA_{kt}$ is the Ancillary Service Marginal Price of Spin for the Settlement Period *t* in the Day-Ahead Market in Region y or at Scheduling Point k which is connected directly to Region *y*.

I_y is the set of Ancillary Service Regions that consist of Region y itself and the Scheduling Points that are connected directly to Region *y*.

$SpinNetReqHA_t$ is the Net Spinning Reserve Requirement for the Settlement Period *t* in the Hour-Ahead Market. It is the sum of all the Regional Net Spinning Reserve Requirement as follows:

$$SpinNetReqHA_t = \sum_z SpinNetReqHA_{zt}$$

$SpinPayNetReqHA_t$ is the cost of Spinning Reserve procurement to meet Net Spinning Reserve Requirement for the Settlement Period *t* incurred in the Hour-Ahead Market. It is calculated as follows:

$$SpinPayNetReqHA_t = \sum_z SpinPayNetReqHA_{zt}$$

$SpinPayNetReqHA_{zt}$ is the cost of Spinning Reserve procurement to meet Net Spinning Reserve Requirement for the Settlement Period *t* incurred in the Hour-Ahead Market in Region *z*. It is calculated as follows:

$$SpinPayNet\ \mathrm{Re}\ qDA_{zt} = SpinNet\ \mathrm{Re}\ qHA_{yt} \times AvgPSpinHA_{kt}$$

where:

$SpinNetReqHA_{zt}$ is the Net Spinning Reserve Requirement for the Settlement Period *t* in the Hour-Ahead Market for Region *z*.

$AvgPSpinHA_{zt}$ is the average price for Spinning Reserve for the Settlement Period *t* in the Hour-Ahead Market for Region *z*.

$$AvgPSpinHA_{zt} = \frac{\sum_{k \in I_z} \left(SpinQIHA_{kt} \times PSpinHA_{kt} - SpinReceiveHA_{kt} \right)}{\sum_{k \in I_z} \left(SpinQIHA_{kt} - SpinQDHA_{kt} \right)}$$

$SpinQIHA_{kt}$ is the quantity of Incremental Procurement for the Settlement Period t in the Hour-Ahead Market in Region *z* or at Scheduling Point k which is connected directly to Region *z*.

$PSpinHA_{kt}$ is the Ancillary Service Marginal Price of Spin for the Settlement Period t in the Hour-Ahead Market in Region *z* or at Scheduling Point *k* which is connected directly to Region *z*.

$SpinReceiveHA_{kt}$ is the total charges for Hour-Ahead Buyback of Spinning Reserve for the Settlement Period *t* for Region *z* or Scheduling Point k which is connected directly to Region *z*.

I_z is the set of Ancillary Service Regions that consist of Region z itself and the Scheduling Points that are connected directly to Region z.

The Spinning Reserve capacity charge for Scheduling Coordinator j for Settlement Period t is calculated as follows:

$$SpinChg_{jt} = SpinNetOblig_{jt} \times SpinRate_t$$

$SpinNetOblig_{jt}$ is the Net Spinning Reserve Obligation for Scheduling Coordinator j for Settlement Period t. The Charge is negative when the Scheduling Coordinator has Excess Qualified Self-Provision of Spinning Reserve.

$$SpinNetOblig_{jt} = SpinGrossOblig_{jt} - SpinQualifySelf_{jt}$$

where:

$SpinGrossOblig_{jt}$ is the gross Spinning Reserve Obligation for Scheduling Coordinator j for Settlement Period t.

$SpinQualifySelf_{jt}$ is the Qualified Self-Provision of Spinning Reserve for Scheduling Coordinator j for Settlement Period t.

$$SpinQualifySelf_{jt} = SpinQualifySelfDA_{jt} + SpinQualifySelfHA_{jt}$$

$SpinQualifySelfDA_{jt}$ is the Qualified Day-Ahead Self-Provision of Spinning Reserve for Scheduling Coordinator j for Settlement Period t.

$$SpinQualifySelfDA_{jt} = \sum_{y} SpinQualifySelfDA_{jyt}$$

$SpinQualifySelfHA_{jt}$ is the Qualified Hour-Ahead Self-Provision of Spinning Reserve for Scheduling Coordinator j for Settlement Period t.

$$SpinQualifySelfHA_{jt} = \sum_{z} SpinQualifySelfHA_{jzt}$$

where:

$SpinQualifySelfDA_{jyt}$ is the Qualified Day-Ahead Self-Provision of Spinning Reserve for Scheduling Coordinator j in Region y for Settlement Period t.

$SpinQualifySelfHA_{jzt}$ is the Qualified Hour-Ahead Self-Provision of Spinning Reserve for Scheduling Coordinator j in Region z for Settlement Period t.

The ISO will charge each Scheduling Coordinator a Spinning Reserve Neutrality Adjustment Charge for each Settlement Period according to Metered Demand.

$$SpinNeutraAdjChg_{jt} = MeteredDemand_{jt} \times SpinNeutraAdjRate_t$$

where:

$SpinNeutraAdjChg_{jt}$ is the Spinning Reserve Neutrality Adjustment Charge to Scheduling Coordinator j for Settlement Period t.

$MeteredDemand_{jt}$ is the metered demand of Scheduling Coordinator *j* for Settlement Period *t*.

$SpinNeutraAdjRate_t$ is the Spinning Reserve Neutrality Adjustment Rate for Settlement Period *t*. The rate is the difference between the total amount of charge and the total amount of payment adjusted by the total congestion charge for the service divided by the total Metered Demand of the control area as follows.

$$SpinNeutraAdjRate_t = \frac{SpinChgTotal_t - SpinPayTotal_t - SpinCCTotal_t}{MeteredDemandTotal_t}$$

where:

$SpinChgTotal_t$ is the total amount of charges collected by the ISO from Scheduling Coordinators for provision of Spinning Reserve Service for the Settlement Period *t*.

$$SpinChgTotal_t = \sum_j SpinChg_{jt}$$

$SpinPayTotal_t$ is the total amount of payment from the ISO to Scheduling Coordinators for procuring Spinning Reserve Service for the Settlement Period *t* in both the Day-Ahead and the Hour-Ahead Markets.

$$SpinPayTotal_t = \sum_j \sum_x \left(SpinPayTotalDA_{jxt} + SpinPayTotalHA_{jxt}\right)$$

$SpinCCTotal_t$ is the total amount of Congestion Charge incurred to the ISO for procuring Spinning Reserve over Congested interties for the Settlement Period t. This amount should be transferred into the FTR Balancing Account to balance the Congestion Charge receivables booked in the Day-Ahead Market and the Hour-Ahead Market when the Spinning Reserves are procured.

$$SpinCCTotal_t = \sum_j \sum_x \sum_i SpinCCDA_{ijxt} + \sum_j \sum_x \sum_i \left(SpinCCHA_{ijxt} - SpinCPHA_{ijxt}\right)$$

C.2.2.4. Non-Spinning Reserve

The ISO will charge the cost of procuring Non-Spinning Reserve in the Day-Ahead and Hour-Ahead Markets, through the application of a charge to each Scheduling Coordinator for each Settlement Period at the ISO Control Area level. This charge will be computed by multiplying the Non-Spinning Reserve user rate for the Settlement Period by the Scheduling Coordinator's Net Non-Spinning Reserve Obligation for the same period.

The Non-Spinning Reserve user rate is calculated by dividing the total cost to the ISO for purchasing the Net Non-Spinning Reserve Requirement, for the Settlement Period, by the Net Non-Spinning Reserve Requirement for the Settlement Period.

The Non-Spinning Reserve user rate for Settlement Period *t* is calculated as follows:

$$NonSpinRate_t = \frac{NonSpinPayNetReqDA_t + NonSpinPayNetReqHA_t}{NonSpinNetReqDA_t + NonSpinNetReqHA_t}$$

where:

$NonSpinNetReqDA_t$ is the Net Non-Spinning Reserve Requirement for the Settlement Period *t* in the Day-Ahead Market. It is the sum of all the Regional Net Non-Spinning Reserve Requirement as follows:

$$NonSpinNetReqDA_t = \sum_y NonSpinNetReqDA_{yt}$$

$NonSpinPayNetReqDA_t$ is the cost of Non-Spinning Reserve procurement to meet Net Non-Spinning Reserve Requirement for the Settlement Period *t* incurred in the Day-Ahead Market. It is calculated as follows:

$$NonSpinPayNetReqDA_t = \sum_y NonSpinPayNetReqDA_{yt}$$

$NonSpinPayNetReqDA_{yt}$ is the cost of Non-Spinning Reserve procurement to meet Net Non-Spinning Reserve Requirement for the Settlement Period *t* in the Day-Ahead Market in Region *y*. It is calculated as follows:

$$NonSpinPayNet\,\mathrm{Re}\,qDA_{yt} = NonSpinNet\,\mathrm{Re}\,qDA_{yt} \times AvgPNonSpinDA_{yt}$$

where:

$NonSpinNetReqDA_{yt}$ is the Net Non-Spinning Reserve Requirement for the Settlement Period *t* in the Day-Ahead Market for Region *y*.

$AvgPNonSpinDA_{yt}$ is the average price for Non-Spinning Reserve for the Settlement Period *t* in the Day-Ahead Market for Region *y*.

$$AvgPNonSpinDA_{yt} = \frac{\sum_{k \in I_y} NonSpinQDA_{kt} \times PNonSpinDA_{kt}}{\sum_{k \in I_y} NonSpinQDA_{kt}}$$

$NonSpinQDA_{kt}$ is the quantity of procurement for the Settlement Period t in the Day-Ahead Market in Region *y* or at Scheduling Point *k* which is connected directly to Region *y*.

$PNonSpinDA_{kt}$ is the Ancillary Service Marginal Price of Non-Spinning Reserve for the Settlement Period t in the Day-Ahead Market in Region y or at Scheduling Point *k* which is connected directly to Region *y*.

I_y = The set of Ancillary Service Regions that consist of Region y itself and the Scheduling Points that are connected directly to Region *y*.

$NonSpinNetReqHA_t$ is the Net Non-Spinning Reserve Requirement for the Settlement Period t in the Hour-Ahead Market. It is the sum of all the Regional Net Non-Spinning Reserve Requirement as follows:

$$NonSpinNetReqHA_t = \sum_z NonSpinNetReqHA_{zt}$$

$NonSpinPayNetReqHA_t$ is the cost of Non-Spinning Reserve procurement to meet Net Non-Spinning Reserve Requirement for the Settlement Period t incurred in the Hour-Ahead Market. It is calculated as follows:

$$NonSpinPayNetReqHA_t = \sum_z NonSpinPayNetReqHA_{zt}$$

$NonSpinPayNetReqHA_{zt}$ is the cost of Non-Spinning Reserve procurement to meet Net Non-Spinning Reserve Requirement for the Settlement Period t incurred in the Hour-Ahead Market in Region z. It is calculated as follows:

$$NonSpinPayNet\,\mathrm{Re}\,qDA_{zt} = NonSpinNet\,\mathrm{Re}\,qHA_{zt} \times AvgPNonSpinHA_{zt}$$

where:

$NonSpinNetReqHA_{zt}$ is the Net Non-Spinning Reserve Requirement for the Settlement Period t in the Hour-Ahead Market for Region z.

$AvgPNonSpinHA_{zt}$ is the average Pprice for Non-Spinning Reserve for the Settlement Period t in the Hour-Ahead Market for Region z.

$$AvgPNonSpinHA_{zt} = \frac{\sum_{k \in l_z} \left(NonSpinQIHA_{kt} \times PNonSpinHA_{kt} - NonSpin\,\mathrm{Re}\,ceiveHA_{kt}\right)}{\sum_{k \in l_z} \left(NonSpinQIHA_{kt} - NonSpinQDHA_{kt}\right)}$$

$NonSpinQIHA_{kt}$ is the quantity of incremental procurement for the Settlement Period t in the Hour-Ahead Market in Region z or at Scheduling Point k which is connected directly to Region z.

$PNonSpinHA_{kt}$ is the Ancillary Service Marginal Price of Non-Spinning Reserve for the Settlement Period t in the Hour-Ahead Market in Region z or at Scheduling Point k which is connected directly to Region z.

$NonSpinReceiveHA_{kt}$ is the total charges for Hour-Ahead Buyback of Non-Spinning Reserve for the Settlement Period t for Region z or Scheduling Point k which is connected directly to Region z.

I_z is the set of Ancillary Service Regions that consist of Region z itself and the Scheduling Points that are connected directly to Region z.

The Non-Spinning Reserve capacity charge for Scheduling Coordinator j for Settlement Period t is calculated as follows:

$$NonSpinChg_{jt} = NonSpinNetOblig_{jt} \times NonSpinRate_{t}$$

NonSpinNetOblig$_{jt}$ is the Net Non-Spinning Reserve Obligation for Scheduling Coordinator *j* in Ancillary Service Region *x* for Settlement Period *t*. The Charge is negative when the Scheduling Coordinator has Excess Qualified Self-Provision of Non-Spinning Reserve.

$$NonSpinNetOblig_{jt} = NonSpinGrossOblig_{jt} - NonSpinQualifySelf_{jt}$$

where:

NonSpinGrossOblig$_{jt}$ is the gross Non-Spinning Reserve Obligation for Scheduling Coordinator *j* for Settlement Period *t*.

NonSpinQualifySelf$_{jt}$ is the Qualified Self-Provision of Non-Spinning Reserve for Scheduling Coordinator *j* for Settlement Period *t*.

$$NonSpinQualifySelf_{jt} = NonSpinQualifySelfDA_{jt} + NonSpinQualifySelfHA_{jt}$$

NonSpinQualifySelfDA$_{jt}$ is the Qualified Day-Ahead Self-Provision of Non-Spinning Reserve for Scheduling Coordinator *j* for Settlement Period *t*.

$$NonSpinQualifySelfDA_{jxt} = NonSpinQualifySelfDA_{jyt} \times \frac{NonSpinGrossOblig_{jxt}}{NonSpinGrossOblig_{jyt}}$$

NonSpinQualifySelfHA$_{jt}$ is the Qualified Hour-Ahead Self-Provision of Non-Spinning Reserve for Scheduling Coordinator *j* for Settlement Period *t*.

$$NonSpinQualifySelfHA_{jt} = \sum_{z} NonSpinQualifySelfHA_{jzt}$$

where:

NonSpinQualifySelfDA$_{jyt}$ = The Qualified Day-Ahead Self-Provision of Non-Spinning Reserve for Scheduling Coordinator j in Region y for Settlement Period t.

NonSpinQualifySelfHA$_{jzt}$ = The Qualified Hour-Ahead Self-Provision of Non-Spinning Reserve for Scheduling Coordinator j in Region z for Settlement Period t.

The ISO will charge each Scheduling Coordinator a Non-Spinning Reserve Neutrality Adjustment Charge for each Settlement Period according to Metered Demand.

$$NonSpinNeutraAdjChg_{jt} = MeteredDemand_{jt} * NonSpinNeutraAdjRate_{t}$$

where

NonSpinNeutraAdjChg$_{jt}$ = Non-Spinning Reserve Neutrality Adjustment Charge to Scheduling Coordinator j for Settlement Period t.

MeteredDemand$_{jt}$ = the metered demand of Scheduling Coordinator j for Settlement Period t.

NonSpinNeutraAdjRate$_t$ = the Non-Spinning Reserve Neutrality Adjustment Rate for Settlement Period t. The rate is the difference between the total amount of charge and the total amount of payment adjusted by the total congestion charge for the service divided by the total Metered Demand of the control area as follows.

$$NonSpinNeutraAdjRate_t = \frac{NonSpinChgTotal_t - NonSpinPayTotal_t - NonSpinCCTotal_t}{MeteredDemandTotal_t}$$

where

NonSpinChgTotal$_t$ = Total amount of charges collected by the ISO from Scheduling Coordinators for provision of Non-Spinning Reserve Service for the Settlement Period t.

$$NonSpinChgTotal_t = \sum_j NonSpinChg_{jt}$$

NonSpinPayTotal$_t$ = Total amount of payment from the ISO to Scheduling Coordinators for procuring Non-Spinning Reserve Service for the Settlement Period t in both the Day-Ahead and the Hour-Ahead Markets.

$$NonSpinPayTotal_t = \sum_j \sum_x \left(NonSpinPayTotalDA_{jxt} + NonSpinPayTotalHA_{jxt} \right)$$

NonSpinCCTotal$_t$ is the total amount of Congestion Charge incurred to the ISO for procuring Non-Spinning Reserve over Congested interties for the Settlement Period *t*. This amount should be transferred into the FTR Balancing Account to balance the Congestion Charge receivables booked in the Day-Ahead Market and the Hour-Ahead Market when the Non-Spinning Reserves are procured.

$$NonSpinCCTotal_t = \sum_j \sum_x \sum_i NonSpinCCDA_{ijxt} + \sum_j \sum_x \sum_i \left(NonSpinCCHA_{ijxt} - NonSpinCPHA_{ijxt} \right)$$

C.2.3. C 2.3 Default User Rate

If, in any Settlement Period, no quantity of Regulation, Spinning Reserve, or Non-Spinning Reserve is purchased in the Day-Ahead or Hour-Ahead Markets due to excess self-provision in all Ancillary Service Regions, then in lieu of the user rate determined in accordance with this Appendix C the user rate for the affected Ancillary Service for that Settlement Period in the region shall be determined to be zero.

C.3. Meaning of Terms in Formulae

C.3.1. $AGCUpPayDA_{ijxt}$ - $

The payment for Scheduling Coordinator j for providing Regulation Up capacity in the Day-Ahead Market from a resource i in Ancillary Service Region x for Settlement Period t.

C.3.2. $AGCDownPayDA_{ijxt}$ - $

The payment for Scheduling Coordinator j for providing Regulation Down capacity in the Day-Ahead Market from a resource i in Ancillary Service Region x for Settlement Period t.

C.3.3. $AGCUpQDA_{ijxt}$ – MW

The total quantity of Regulation Up capacity provided in the ISO Day-Ahead Market from resource i by Scheduling Coordinator j in Ancillary Service Region x for Settlement Period t, not including self-provided quantities..

C.3.4. $AGCDownQDA_{ijxt}$ – MW

The total quantity of Regulation Down capacity provided in the ISO Day-Ahead Market from resource i by Scheduling Coordinator j in Ancillary Service Region x for Settlement Period t, not including self-provided quantities.

C.3.5. $PAGCUpDA_{xt}$ - $/MW

In the case of Capacity made available in accordance with the ISO's Final Day-Ahead Schedules, the Ancillary Service Marginal Price for units exempt from FERC Ancillary Service rate caps or the bid price for those Units subject to the cap for Regulation Up Capacity in the Day-Ahead Market for Settlement Period t in Ancillary Service Region x. In the case of Capacity not included in the ISO's Final Day-Ahead Schedules but made available in accordance with amended Ancillary Services supplier schedules issued in accordance with Section 2.5.21, the bid price for the unit for Regulation Up Capacity in Ancillary Service Region x for Settlement Period t.

C.3.6. $PAGCDownDA_{xt}$ - $/MW

In the case of Capacity made available in accordance with the ISO's Final Day-Ahead Schedules, the Ancillary Service Marginal Price for units exempt from FERC Ancillary Service rate caps or the bid price for those Units subject to the cap for Regulation Down Capacity in the Day-Ahead Market for Settlement Period t in Ancillary Service Region x. In the case of Capacity not included in the ISO's Final Day-Ahead Schedules but made available in accordance with amended Ancillary Services supplier schedules issued in accordance with Section 2.5.21, the bid price for the unit for Regulation Down Capacity in Ancillary Service Region x for Settlement Period t.

C.3.7. **AGCUpPayTotalDA$_{jxt}$ - $**

The total payment for Regulation Up capacity to Scheduling Coordinator j in the Day-Ahead Market in Ancillary Service Region x for Settlement Period t.

AGCDownPayTotalDA$_{jxt}$ - $

The total payment for Regulation Down capacity to Scheduling Coordinator j in the Day-Ahead Market in Ancillary Service Region x for Settlement Period t.

C.3.8. **AGCUpPayHA$_{ijxt}$ - $**

The payment for Scheduling Coordinator j for providing incremental (additional to Day-Ahead) Regulation Up capacity in the Hour-Ahead Market from a resource i in Ancillary Service Region x for Settlement Period t.

AGCDownPayHA$_{ijxt}$ - $

The payment for Scheduling Coordinator j for providing incremental (additional to Day-Ahead) Regulation Down capacity in the Hour-Ahead Market from a resource i in Ancillary Service Region x for Settlement Period t.

C.3.9. **AGCUpReceiveHA$_{ijxt}$ - $**

The payment from Scheduling Coordinator j for buying back from the ISO in the Hour-Ahead Regulation Up capacity which the ISO had purchased from Scheduling Coordinator j in the Day-Ahead Market from a resource i in Ancillary Service Region x for Settlement Period t.

C.3.10. **AGCDownReceiveHA$_{ijxt}$ - $**

The payment from Scheduling Coordinator j for buying back from the ISO in the Hour-Ahead Regulation Down capacity which the ISO hadpurchased from Scheduling Coordinator j in the Day-Ahead Market from a resource i in Ancillary Service Region x for Settlement Period t.

C.3.11. **AGCUpQIHA$_{ijxt}$ – MW**

The total quantity of incremental (additional to Day-Ahead) Regulation Up capacity provided in the ISO Hour-Ahead Market from resource i by Scheduling Coordinator j in Ancillary Service Region x for Settlement Period t, not including self-provided quantities.

C.3.12. **AGCDownQIHA$_{ijxt}$ – MW**

The total quantity of incremental (additional to Day-Ahead) Regulation Down capacity provided in the ISO Hour-Ahead Market from resource i by Scheduling Coordinator j in Ancillary Service Region x for Settlement Period t, not including self-provided quantities.

C.3.13. $AGCUpQDHA_{ijxt}$ – MW

The total quantity of decremental (less than Day-Ahead) Regulation Up capacity provided in the ISO Hour-Ahead Market from resource i by Scheduling Coordinator j in Ancillary Service Region x for Settlement Period t, not including self-provided quantities..

C.3.14. $AGCDownQDHA_{ijxt}$ – MW

The total quantity of decremental (less than Day-Ahead) Regulation Down capacity provided in the ISO Hour-Ahead Market from resource i by Scheduling Coordinator j in Ancillary Service Region x for Settlement Period t, not including self-provided quantities..

C.3.15. $PAGCUpHA_{xt}$ - $/MW

The Ancillary Service Marginal Price for units exempt from FERC Ancillary Service rate caps or the bid price for those units subject to the cap for incremental (additional to Day-Ahead) Regulation Up capacity in the Hour-Ahead Market for Settlement Period t in Ancillary Service Region x. On buyback condition, MCP applies.

C.3.16. $PAGCDownHA_{xt}$ - $/MW

The Ancillary Service Marginal Price for units exempt from FERC Ancillary Service rate caps or the bid price for those units subject to the cap for incremental (additional to Day-Ahead) Regulation Down capacity in the Hour-Ahead Market for Settlement Period t in Ancillary Service Region x. On buyback condition, MCP applies.

C.3.17. $AGCUpPayTotalHA_{jxt}$ - $

The total payment for incremental (additional to Day-Ahead) Regulation Up capacity to Scheduling Coordinator j in the Hour-Ahead Market in Ancillary Service Region x for Settlement Period t, after deduction of payments from Scheduling Coordinator j for buying back from the ISO in the Hour-Ahead, Regulation Up capacity which the ISO had purchased from Scheduling Coordinator j in the Day-Ahead Market in Ancillary Service Region x for Settlement Period t.

C.3.18. $AGCDownPayTotalHA_{jxt}$ - $

The total payment for incremental (additional to Day-Ahead) Regulation Down capacity to Scheduling Coordinator j in the Hour-Ahead Market in Ancillary Service Region x for Settlement Period t, after deduction of payments from Scheduling Coordinator j for buying back from the ISO in the Hour-Ahead, Regulation Down capacity which the ISO had purchased from Scheduling Coordinator j in the Day-Ahead Market in Ancillary Service Region x for Settlement Period t.

C.3.19. $SpinPayDA_{ijxt}$ - $

The payment for Scheduling Coordinator j for providing Spinning Reserve capacity in the Day-Ahead Market from a resource i in Ancillary Service Region x for Settlement Period t.

C.3.20. $SpinQDA_{ijxt}$ – MW

The total quantity of Spinning Reserve capacity provided in the Day-Ahead Market by resource i represented by Scheduling Coordinator j in Ancillary Service Region x for Settlement Period t, not including self-provided quantities..

C.3.21. $PSpinDA_{xt}$ -$/MW

In the case of Capacity made available in accordance with the ISO's Final Day-Ahead Schedules, the Day-Ahead Ancillary Service Marginal Price for units exempt from FERC Ancillary Service rate caps or the bid price for those units subject to the cap for Spinning Reserve Capacity in Ancillary Service Region x for Settlement Period t. In the case of Capacity not included in the ISO's Final Day-Ahead Schedules but made available in accordance with amended Ancillary Services supplier schedules issued in accordance with Section 2.5.21, the bid price for the unit for Spinning Reserve Capacity in Ancillary Service Region x for Settlement Period t.

C.3.22. $SpinPayTotalDA_{jxt}$ - $

The total payment to Scheduling Coordinator j for Spinning Reserve capacity in the Day-Ahead Market in Ancillary Service Region x for Settlement Period t.

C.3.23. $SpinPayHA_{ijxt}$ - $

The payment for Scheduling Coordinator j for providing incremental (additional to Day-Ahead) Spinning Reserve capacity in the Hour-Ahead Market from a resource i in Ancillary Service Region x for Settlement Period t.

C.3.24. $SpinReceiveHA_{ijxt}$ - $

The payment from Scheduling Coordinator j for buying back from the ISO in the Hour-Ahead, Spinning Reserve capacity which the ISO had purchased from Scheduling Coordinator j in the Day-Ahead Market from a resource i in Ancillary Service Region x for Settlement Period t.

C.3.25. $SpinQIHA_{ijxt}$ – MW

The total quantity of incremental (additional to Day-Ahead) Spinning Reserve capacity provided in the Hour-Ahead Market by resource i represented by Scheduling Coordinator j in Ancillary Service Region x for Settlement Period t, not including self-provided quantities..

C.3.26. $SpinQDHA_{ijxt}$ – MW

The total quantity of decremental (less than Day-Ahead) Spinning Reserve capacity provided in the ISO Hour-Ahead Market from resource i by Scheduling Coordinator j in Ancillary Service Region x for Settlement Period t, not including self-provided quantities..

C.3.27. $PSpinHA_{xt}$ -$/MW

The Hour-Ahead Ancillary Service Marginal Price for units exempt from FERC Ancillary Service rate caps or the bid price for those units subject to the cap for incremental (additional to Day-Ahead) Spinning Reserve capacity in Ancillary Service Region x for Settlement Period t. On Buyback condition, MCP applies charge for HA.

C.3.28. $SpinPayTotalHA_{jxt}$ - $

The total payment to Scheduling Coordinator j for incremental (additional to Day-Ahead) Spinning Reserve capacity in the Hour-Ahead Market in Ancillary Service Region x for Settlement Period t, after deduction of payments from Scheduling Coordinator j for buying back from the ISO in the Hour-Ahead, Spinning Reserve capacity which the ISO had purchased from Scheduling Coordinator j in the Day-Ahead Market in Ancillary Service Region x for Settlement Period t.

C.3.29. $NonSpinPayDA_{ijxt}$ - $

The payment for Scheduling Coordinator j for providing Non-Spinning Reserve capacity in the Day-Ahead Market from a resource i in Ancillary Service Region x for Settlement Period t.

C.3.30. $NonSpinQDA_{ijxt}$ – MW

The total quantity of Non-Spinning Reserve capacity provided from resource i in the Day-Ahead Market by Scheduling Coordinator j in Ancillary Service Region x for Settlement Period t, not including self-provided quantities..

C.3.31. $PNonSpinDA_{xt}$ - $/MW

In the case of Capacity made available in accordance with the ISO's Final Day-Ahead Schedules, the Day-Ahead Ancillary Service Marginal Price for units exempt from FERC Ancillary Service rate caps or the bid price for those units subject to the cap for Non-Spinning Reserve Capacity for Settlement Period t in Ancillary Service Region x. In the case of Capacity not included in the ISO's Final Day-Ahead Schedules but made available in accordance with amended Ancillary Services supplier schedules issued in accordance with Section 2.5.21, the bid price for the unit for Non-Spinning Reserve Capacity in Ancillary Service Region x for Settlement Period t.

C.3.32. NonSpinPayTotalDA$_{jxt}$ - $

The total payment to Scheduling Coordinator j for providing Non-Spinning Reserve capacity in the Day-Ahead Market in Ancillary Service Region x for Settlement Period t.

C.3.33. NonSpinPayHA$_{ijxt}$ - $

The payment for Scheduling Coordinator j for providing incremental (additional to Day-Ahead) Non-Spinning Reserve capacity in the Hour-Ahead Market from a resource i in Ancillary Service Region x for Settlement Period t.

C.3.34. NonSpinReceiveHA$_{ijxt}$ - $

The payment from Scheduling Coordinator j for buying back from the ISO in the Hour-Ahead, Non-Spinning Reserve capacity which the ISO had purchased from Scheduling Coordinator j in the Day-Ahead Market from a resource i in Ancillary Service Region x for Settlement Period t.

C.3.35. NonSpinQlHA$_{ijxt}$ – MW

The total quantity of incremental (additional to Day-Ahead) Non-Spinning Reserve capacity provided from resource i in the Hour-Ahead Market by Scheduling Coordinator j in Ancillary Service Region x for Settlement Period t, not including self-provided quantities..

C.3.36. NonSpinQDHA$_{ijxt}$ – MW

The total quantity of decremental (less than Day-Ahead) Non-Spinning Reserve capacity provided in the ISO Hour-Ahead Market from resource i by Scheduling Coordinator j in Ancillary Service Region x for Settlement Period t, not including self-provided quantities..

C.3.37. PNonSpinHA$_{xt}$ - $/MW

The Hour-Ahead zonal Ancillary Service Marginal Price for units exempt from FERC Ancillary Service rate caps or the bid price for those units subject to the cap for incremental (additional to Day-Ahead) Non-Spinning Reserve capacity for Settlement Period t in Ancillary Service Region x. On Buyback condition, MCP applies.

C.3.38. NonSpinPayTotalHA$_{jxt}$ - $

The total payment to Scheduling Coordinator j for providing incremental (additional to Day-Ahead) Non-Spinning Reserve capacity in the Hour-Ahead Market in Ancillary Service Region x for Settlement Period t, after deduction of payments from Scheduling Coordinator j for buying back from the ISO in the Hour-Ahead, Non-Spinning Reserve capacity which the ISO had purchased from Scheduling Coordinator j in the Day-Ahead Market in Ancillary Service Region x for Settlement Period t.

C.3.39. **$PCCDA_{xt}$ - $/MW**

Price of Congestion Charge in the Day-Ahead Market at Scheduling Point x for Settlement Period t.

C.3.40. **$PCCHA_{xt}$ - $/MW**

Price of Congestion Charge in the Hour-Ahead Market at Scheduling Point x for Settlement Period t.

C.3.41. **AGCUpRatet - $/MW**

The Regulation Up user rate for Settlement Period t.

C.3.42. **$AGCUpNetReqDA_t$ – MW**

Net Regulation Up Requirement for the Settlement Period t in the Day-Ahead Market. It is the sum of all the Regional Net Regulation Up Requirement.

C.3.43. **$AGCUpPayNetReqDA_t$ - $**

Cost of Regulation Up procurement to meet Net Regulation Up Requirement for the Settlement Period t incurred in the Day-Ahead Market.

C.3.44. **$AGCUpPayNetReqDA_{yt}$ - $**

Cost of Regulation Up procurement to meet Net Regulation Up Requirement for the Settlement Period t incurred in the Day-Ahead Market in Region y.

C.3.45. **$AGCUpNetReqDA_{yt}$ – MW**

Net Regulation Up Requirement for the Settlement Period t in the Day-Ahead Market for Region y .

C.3.46. **$PAGCUpDA_{yt}$ - $/MW**

Ancillary Service Marginal Price for Regulation Up for the Settlement Period t incurred in the Day-Ahead Market for Region y.

C.3.47. **$AGCUpNetReqHA_t$ – MW**

Net Regulation Up Requirement for the Settlement Period t in the Hour-Ahead Market. It is the sum of all the Regional Net Regulation Up Requirement

C.3.48. **$AGCUpPayNetReqHA_t$ - MW**

Cost of Regulation Up procurement to meet Net Regulation Up Requirement for the Settlement Period t incurred in the Hour-Ahead Market.

C.3.49. $AGCUpPayNetReqHA_{zt}$ - $

Cost of Regulation Up procurement to meet Net Regulation Up Requirement for the Settlement Period t incurred in the Hour-Ahead Market in Region z.

C.3.50. $AGCUpNetReqHA_{yt}$ – MW

Total incremental Net Requirement of Regulation Up for the Settlement Period t in the Hour-Ahead Market for Region z.

C.3.51. $PAGCUpHA_{yt}$ - $/MW

Ancillary Service Marginal Price for Regulation Up for the Settlement Period t incurred in the Hour-Ahead Market for Region z.

C.3.52. $AGCUpReceiveHA_{yt}$ - $

Total charges for Hour-Ahead Buyback of Regulation Up for the Settlement Period t for Region z.

C.3.53. $AGCUpNetOblig_{jt}$ – MW

The Net Regulation Up Obligation for Scheduling Coordinator j for Settlement Period t. The Charge is negative when the Scheduling Coordinator has Excess Qualified Self-Provision of Regulation Up.

C.3.54. $AGCUpGrossOblig_{jt}$ – MW

The Gross Regulation Up Obligation for Scheduling Coordinator j for Settlement Period t.

C.3.55. $AGCUpQualifySelf_{jt}$ – MW

The Qualified Self-Provision of Regulation Up for Scheduling Coordinator j for Settlement Period t.

C.3.56. $AGCUpQualifySelfDA_{jt}$ – MW

The Qualified Day-Ahead Self-Provision of Regulation Up for Scheduling Coordinator j for Settlement Period t.

C.3.57. $AGCUpQualifySelfHA_{jt}$ – MW

The Qualified Hour-Ahead Self-Provision of Regulation Up for Scheduling Coordinator j for Settlement Period t.

C.3.58. $AGCUpQualifySelfDA_{jyt}$ – MW

The Qualified Day-Ahead Self-Provision of Regulation Up for Scheduling Coordinator j in Region y for Settlement Period t.

C.3.59. AGCUpQualifySelfHA$_{jzt}$ – MW

The Qualified Hour-Ahead Self-Provision of Regulation Up for Scheduling Coordinator j in Region z for Settlement Period t.

C.3.60. AGCUpGrossOblig$_{jyt}$ – MW

The Gross Regulation Up Obligation for Scheduling Coordinator j in Region y (defined in Day-Ahead) for Settlement Period t.

C.3.61. AGCUpGrossOblig$_{jzt}$ – MW

The Gross Regulation Up Obligation for Scheduling Coordinator j in Region z (defined in Hour-Ahead) for Settlement Period t.

C.3.62. Regulation Up Neutrality Adjustment Rate – $/MW

The ISO will charge each Scheduling Coordinator a Regulation Up Neutrality Adjustment Charge in proportion to Demand. The rate for this charge is the difference between the total amount that the ISO pays out and the total amount that the ISO collects divided by the total Demandof the ISO Control Area.

C.3.63. AGCDownRate$_t$ - $/MW

Regulation Down user rate for Settlement Period t is calculated.

C.3.64. AGCUpNetReqDA$_t$ – MW

Net Regulation Down Requirement for the Settlement Period t in the Day-Ahead Market. It is the sum of all the Regional Net Regulation Down Requirement.

C.3.65. AGCDownPayNetReqDA$_t$ - $

Cost of Regulation Down procurement to meet Net Regulation Down Requirement for the Settlement Period t incurred in the Day-Ahead Market.

C.3.66. AGCDownPayNetReqDA$_{yt}$ - $

Cost of Regulation Down procurement to meet Net Regulation Down Requirement for the Settlement Period t incurred in the Day-Ahead Market in Region y.

C.3.67. AGCDownNetReqDA$_{yt}$ – MW

Net Regulation Down Requirement for the Settlement Period t in the Day-Ahead Market for Region y.

C.3.68. PAGCDownDA$_{yt}$ - $/MW

Ancillary Service Marginal Price for Regulation Down for the Settlement Period t incurred in the Day-Ahead Market for Region y.

C.3.69. AGCDownNetReqHA$_t$ – MW

Net Regulation Down Requirement for the Settlement Period t in the Hour-Ahead Market. It is the sum of all the Regional Net Regulation Down Requirement.

C.3.70. AGCDownPayNetReqHA$_t$ - $

Cost of Regulation Down procurement to meet Net Regulation Down Requirement for the Settlement Period t incurred in the Hour-Ahead Market.

C.3.71. AGCDownPayNetReqHA$_{zt}$ - $

Cost of Regulation Down procurement to meet Net Regulation Down Requirement for the Settlement Period t incurred in the Hour-Ahead Market in Region z.

C.3.72. AGCDownNetReqHA$_{zt}$ – MW

Total incremental Net Requirement of Regulation Down for the Settlement Period t in the Hour-Ahead Market for Region z.

C.3.73. PAGCDownHA$_{zt}$ - $/MW

Ancillary Service Marginal Price for Regulation Down for the Settlement Period t incurred in the Hour-Ahead Market for Region z.

C.3.74. AGCDownReceiveHA$_{zt}$ - $

Total charges for Hour-Ahead buy-back of Regulation Down for the Settlement Period t for Region z.

C.3.75. AGCDownNetOblig$_{jt}$ – MW

The Net Regulation Down Obligation for Scheduling Coordinator j for Settlement Period t. The Charge is negative when the Scheduling Coordinator has Excess Qualified Self-Provision of Regulation Down.

C.3.76. AGCDownGrossOblig$_{jt}$ – MW

The Gross Regulation Down Obligation for Scheduling Coordinator j for Settlement Period t.

C.3.77. AGCDownQualifySelf$_{jt}$ – MW

The Qualified Self-Provision of Regulation Down for Scheduling Coordinator j for Settlement Period t.

C.3.78. AGCDownQualifySelfDA$_{jt}$ – MW

The Qualified Day-Ahead Self-Provision of Regulation Down for Scheduling Coordinator j for Settlement Period t.

C.3.79. $AGCDownQualifySelfHA_{jt}$ – MW

The Qualified Hour-Ahead Self-Provision of Regulation Down for Scheduling Coordinator j for Settlement Period t.

C.3.80. $AGCDownQualifySelfDA_{jyt}$ – MW

The Qualified Day-Ahead Self-Provision of Regulation Down for Scheduling Coordinator j in Region y for Settlement Period t.

C.3.81. $AGCDownQualifySelfHA_{jzt}$ – MW

The Qualified Hour-Ahead Self-Provision of Regulation Down for Scheduling Coordinator j in Region z for Settlement Period t.

C.3.82. $AGCDownGrossOblig_{jyt}$ – MW

The Gross Regulation Down Obligation for Scheduling Coordinator j in Region y (defined in Day-Ahead) for Settlement Period t.

C.3.83. $AGCDownGrossOblig_{jzt}$ – MW

The Gross Regulation Down Obligation for Scheduling Coordinator j in Region z (defined in Hour-Ahead) for Settlement Period t.

C.3.84. AGCDownNeutraAdjRate - $/MW

The ISO will charge each Scheduling Coordinator a Regulation Down Neutrality Adjustment Charge in proportion to Demand. The rate for this charge is the difference between the total amount that the ISO pays out and the total amount that the ISO collects divided by the total Demand of the ISO Control Area.

C.3.85. $SpinRate_t$ - $/MW

The Spinning Reserve user rate for Settlement Period t.

C.3.86. $SpinNetReqDA_t$ – MW

Net Spinning Reserve Requirement for the Settlement Period t in the Day-Ahead Market. It is the sum of all the Regional Net Spinning Reserve Requirement.

C.3.87. $SpinPayNetReqDA_t$ - $

Cost of Spinning Reserve procurement to meet Net Spinning Reserve Requirement for the Settlement Period t incurred in the Day-Ahead Market.

C.3.88. $SpinPayNetReqDA_{yt}$ - $

Cost of Spinning Reserve procurement to meet Net Spinning Reserve Requirement for the Settlement Period t in the Day-Ahead Market in Region y.

C.3.89. $SpinNetReqDA_{yt}$ – MW

Net Spinning Reserve Requirement for the Settlement Period t in the Day-Ahead Market for Region y.

C.3.90. $AvgPSpinDA_{yt}$ - $/MW

Average Price for Spinning Reserve for the Settlement Period t in the Day-Ahead Market for Region y.

C.3.91. $SpinQDA_{kt}$ – MW

Quantity of procurement for the Settlement Period t in the Day-Ahead Market in Region y or at Scheduling Point k which is connected directly to Region y.

C.3.92. $PSpinDA_{kt}$ - $/MW

Ancillary Service Marginal Price of Spin for the Settlement Period t in the Day-Ahead Market in Region y or at Scheduling Point k which is connected directly to Region y.

C.3.93. $PCCDA_{kt}$ – $/MW

Price of Congestion Charge for the Settlement Period t in the Day-Ahead Market at Scheduling Point k which is connected directly to Region y.

C.3.94. $SpinNetReqHA_t$ – MW

Net Spinning Reserve Requirement for the Settlement Period t in the Hour-Ahead Market. It is the sum of all the Regional Net Spinning Reserve Requirement.

C.3.95. $SpinPayNetReqHA_t$ - $

Cost of Spinning Reserve procurement to meet Net Spinning Reserve Requirement for the Settlement Period t incurred in the Hour-Ahead Market.

C.3.96. $SpinPayNetReqHA_{zt}$ - $

Cost of Spinning Reserve procurement to meet Net Spinning Reserve Requirement for the Settlement Period t incurred in the Hour-Ahead Market in Region z.

C.3.97. $SpinNetReqHA_{zt}$ – MW

Net Spinning Reserve Requirement for the Settlement Period t in the Hour-Ahead Market for Region z.

C.3.98. $AvgPSpinHA_{zt}$ - $/MW

Average Price for Spinning Reserve for the Settlement Period t in the Hour-Ahead Market for Region z.

C.3.99. $SpinQIHA_{kt}$ – MW

Quantity of Incremental Procurement for the Settlement Period t in the Hour-Ahead Market in Region z or at Scheduling Point k which is connected directly to Region z.

C.3.100. $PSpinHA_{kt}$ - $/MW

Ancillary Service Marginal Price of Spinning Reserve for the Settlement Period t in the Hour-Ahead Market in Region z or at Scheduling Point k which is connected directly to Region z.

C.3.101. $PCCHA_{kt}$ – $/MW

Price of Congestion Charge for the Settlement Period t in the Hour-Ahead Market at Scheduling Point k which is connected directly to Region z.

C.3.102. $SpinReceiveHA_{kt}$ - $

Total charges for Hour-Ahead buyback of Spinning Reserve for the Settlement Period t for Region z or Scheduling Point k which is connected directly to Region z.

C.3.103. $SpinNetOblig_{jt}$ – MW

The Net Spinning Reserve Obligation for Scheduling Coordinator j for Settlement Period t. The Charge is negative when the Scheduling Coordinator has Excess Qualified Self-Provision of Spinning Reserve .

C.3.104. $SpinGrossOblig_{jt}$ – MW

The Gross Spinning Reserve Obligation for Scheduling Coordinator j for Settlement Period t.

C.3.105. $SpinQualifySelf_{jt}$ – MW

The Qualified Self-Provision of Spinning Reserve for Scheduling Coordinator j for Settlement Period t.

C.3.106. $SpinQualifySelfDA_{jt}$ – MW

The Qualified Day-Ahead Self-Provision of Spinning Reserve for Scheduling Coordinator j for Settlement Period t.

C.3.107. $SpinQualifySelfHA_{jt}$ – MW

The Qualified Hour-Ahead Self-Provision of Spinning Reserve for Scheduling Coordinator j for Settlement Period t.

C.3.108. $SpinQualifySelfDA_{jyt}$ – MW

The Qualified Day-Ahead Self-Provision of Spinning Reserve for Scheduling Coordinator j in Region y for Settlement Period t.

C.3.109. SpinQualifySelfHA$_{izt}$ – MW

The Qualified Hour-Ahead Self-Provision of Spinning Reserve for Scheduling Coordinator j in Region z for Settlement Period t.

C.3.110. SpinGrossOblig$_{iyt}$ – MW

The Gross Spinning Reserve Obligation for Scheduling Coordinator j in Region y (defined in Day-Ahead) for Settlement Period t.

C.3.111. SpinGrossOblig$_{izt}$ – MW

The Gross Spinning Reserve Obligation for Scheduling Coordinator j in Region z (defined in Hour-Ahead) for Settlement Period t.

C.3.112. SpinNeutraAdjRate - $/MW

The ISO will charge each Scheduling Coordinator a Spinning Reserve Neutrality Adjustment Charge according to Metered Demand. The rate for this charge is the difference between the total amount that the ISO pays out and the total amount that the ISO collects divided by the total Metered Demand of the control area.

C.3.113. NonSpinRate – $/MW

The Non-Spinning Reserve user rate for Settlement Period t.

C.3.114. NonSpinNetReqDA$_t$ – MW

Net Non-Spinning Reserve Requirement for the Settlement Period t in the Day-Ahead Market. It is the sum of all the Regional Net Non-Spinning Reserve Requirement.

C.3.115. NonSpinPayNetReqDA$_t$ - $

Cost of Non-Spinning Reserve procurement to meet Net Non-Spinning Reserve Requirement for the Settlement Period t incurred in the Day-Ahead Market.

C.3.116. NonSpinPayNetReqDA$_{yt}$ - $

Cost of Non-Spinning Reserve procurement to meet Net Non-Spinning Reserve Requirement for the Settlement Period t in the Day-Ahead Market in Region y.

C.3.117. NonSpinNetReqDA$_{yt}$ – MW

Net Non-Spinning Reserve Requirement for the Settlement Period t in the Day-Ahead Market for Region y.

C.3.118. AvgPNonSpinDA$_{yt}$ - $/MW

Average Price for Non-Spinning Reserve for the Settlement Period t in the Day-Ahead Market for Region y.

C.3.119. $NonSpinQDA_{kt}$ – MW

Quantity of procurement for the Settlement Period t in the Day-Ahead Market in Region y or at Scheduling Point k which is connected directly to Region y.

C.3.120. $PNonSpinDA_{kt}$ - $/MW

Ancillary Service Marginal Price of Non-Spinning Reserve for the Settlement Period t in the Day-Ahead Market in Region y or at Scheduling Point k which is connected directly to Region y.

C.3.121. $NonSpinNetReqHA_t$ – MW

Net Non-Spinning Reserve Requirement for the Settlement Period t in the Hour-Ahead Market. It is the sum of all the Regional Net Non-Spinning Reserve Requirement.

C.3.122. $NonSpinPayNetReqHA_t$ - $

Cost of Non-Spinning Reserve procurement to meet Net Non-Spinning Reserve Requirement for the Settlement Period t incurred in the Hour-Ahead Market.

C.3.123. $NonSpinPayNetReqHA_{zt}$ - $

Cost of Non-Spinning Reserve procurement to meet Net Non-Spinning Reserve Requirement for the Settlement Period t incurred in the Hour-Ahead Market in Region z.

C.3.124. $NonSpinNetReqHA_{zt}$ – MW

Net Non-Spinning Reserve Requirement for the Settlement Period t in the Hour-Ahead Market for Region z.

C.3.125. $AvgPNonSpinHA_{zt}$ - $/MW

Average Price for Non-Spinning Reserve for the Settlement Period t in the Hour-Ahead Market for Region z.

C.3.126. $NonSpinQIHA_{kt}$ – MW

Quantity of Incremental Procurement for the Settlement Period t in the Hour-Ahead Market in Region z or at Scheduling Point k which is connected directly to Region z.

C.3.127. $PNonSpinHA_{kt}$ – $/MW

Ancillary Service Marginal Price of Non-Spinning Reserve for the Settlement Period t in the Hour-Ahead Market in Region z or at Scheduling Point k which is connected directly to Region z.

C.3.128. NonSpinReceiveHA$_{kt}$ - $

Total charges for Hour-Ahead Buyback of Non-Spinning Reserve for the Settlement Period t for Region z or Scheduling Point k which is connected directly to Region z.

C.3.129. NonSpinNetOblig$_{jt}$ – MW

The Net Non-Spinning Reserve Obligation for Scheduling Coordinator j for Settlement Period t. The Charge is negative when the Scheduling Coordinator has Excess Qualified Self-Provision of Non-Spinning Reserve .

C.3.130. NonSpinGrossOblig$_{jt}$ – MW

The Gross Non-Spinning Reserve Obligation for Scheduling Coordinator j for Settlement Period t.

C.3.131. NonSpinQualifySelf$_{jt}$ – MW

The Qualified Self-Provision of Non-Spinning Reserve for Scheduling Coordinator j for Settlement Period t.

C.3.132. NonSpinQualifySelfDA$_{jt}$ – MW

The Qualified Day-Ahead Self-Provision of Non-Spinning Reserve for Scheduling Coordinator j for Settlement Period t.

C.3.133. NonSpinQualifySelfHA$_{jt}$ – MW

The Qualified Hour-Ahead Self-Provision of Non-Spinning Reserve for Scheduling Coordinator j for Settlement Period t.

C.3.134. NonSpinQualifySelfDA$_{jyt}$ – MW

The Qualified Day-Ahead Self-Provision of Non-Spinning Reserve for Scheduling Coordinator j in Region y for Settlement Period t.

C.3.135. NonSpinQualifySelfHA$_{jzt}$ – MW

The Qualified Hour-Ahead Self-Provision of Non-Spinning Reserve for Scheduling Coordinator j in Region z for Settlement Period t.

C.3.136. NonSpinGrossOblig$_{jyt}$ – MW

The Gross Non-Spinning Reserve Obligation for Scheduling Coordinator j in Region y (defined in Day-Ahead) for Settlement Period t.

C.3.137. NonSpinGrossOblig$_{jzt}$ – MW

The Gross Non-Spinning Reserve Obligation for Scheduling Coordinator j in Region z (defined in Hour-Ahead) for Settlement Period t.

C.3.138. NonSpinNeutraAdjRate - $/MW

The ISO will charge each Scheduling Coordinator a Non-Spinning Reserve Neutrality Adjustment Charge according to Metered Demand. The rate for this charge is the difference between the total amount that the ISO pays out and the total amount that the ISO collects divided by the total Metered Demand of the control area.

C.3.139. $SpinCCDA_{ijxt}$ - $

Congestion charge to Scheduling Coordinator j for providing Spinning Reserve capacity in the Day-Ahead Market from resource i at Scheduling Point x in Settlement Period t.

C.3.140. $NonSpinCCDA_{ijxt}$ - $

Congestion charge to Scheduling Coordinator j for providing Non-Spinning Reserve capacity in the Day-Ahead Market from resource i at Scheduling Point x in Settlement Period t.

C.3.141. $SpinCCHA_{ijxt}$ - $

Congestion charge to Scheduling Coordinator j for providing Spinning Reserve capacity in the Hour-Ahead Market from resource i at Scheduling Point x in Settlement Period t.

C.3.142. $SpinCPHA_{ijxt}$ - $

Congestion payment to Scheduling Coordinator j for providing Spinning Reserve capacity in the Hour-Ahead Market from resource i at Scheduling Point x in Settlement Period t.

C.3.143. $NonSpinCCHA_{ijxt}$ - $

Congestion charge to Scheduling Coordinator j for providing Non-Spinning Reserve capacity in the Hour-Ahead Market from resource i at Scheduling Point x in Settlement Period t.

C.3.144. $NonSpinCPHA_{ijxt}$ - $

Congestion payment to Scheduling Coordinator j for providing Non-Spinning Reserve capacity in the Hour-Ahead Market from resource i at Scheduling Point x in Settlement Period t.

C.3.145. $AGCUpNeutraAdjChg_{jt}$ - $

Regulation Up Neutrality Adjustment Charge to Scheduling Coordinator j for Settlement Period t.

C.3.146. $MeteredLoad_{jt}$ - MW

The Demand of Scheduling Coordinator j for Settlement Period t.

C.3.147. $AGCUpNeutraAdjRate_t$ - $/MW

The Regulation Up Neutrality Adjustment Rate for Settlement Period t. The rate is the difference between the total amount of charge and the total amount of payment for the service divided by the total Demand in the ISO Control Area.

C.3.148. $AGCUpChgTotal_t$ - $

Total amount of charges collected by the ISO from Scheduling Coordinators for provision of Regulation Up Service for the Settlement Period t.

C.3.149. $AGCUpPayTotal_t$ - $

Total amount of payment from the ISO to Scheduling Coordinators for procuring Regulation Up Service for the Settlement Period t in both the Day-Ahead and the Hour-Ahead Markets.

C.3.150. $AGCUpCCDA_{ijxt}$ - $

Congestion charge to Scheduling Coordinator j for providing Regulation Up in the Day-Ahead Market from resource i at Scheduling Point x in Settlement Period t.

C.3.151. $AGCUpCCHA_{ijxt}$ - $

Congestion charge to Scheduling Coordinator j for providing Regulation Up in the Hour-Ahead Market from resource i at Scheduling Point x in Settlement Period t.

C.3.152. $AGCUpCPHA_{ijxt}$ - $

Congestion payment to Scheduling Coordinator j for providing Regulation Up in the Hour-Ahead Market from resource i at Scheduling Point x in Settlement Period t.

C.3.153. $AGCUpCCTotal_t$ - $

Total amount of Congestion charge incurred to the ISO for procuring Regulation Up over Congested interties for the Settlement Period t. This amount should be transferred into the FTR Balancing Account to balance the Congestion charge receivables booked in the Day-Ahead Market and the Hour-Ahead Market when the Regulation Up Services are procured.

C.3.154. $AGCDownNeutraAdjChg_{jt}$ - $

Regulation Down Neutrality Adjustment Charge to Scheduling Coordinator j for Settlement Period t.

C.3.155. AGCDownNeutraAdjRate$_t$ - $/MW

The Regulation Down Neutrality Adjustment Rate for Settlement Period t. The rate is the difference between the total amount of charge and the total amount of payment for the service divided by the total Demand in the ISO Control Area.

C.3.156. AGCDownChgTotal$_t$ - $

Total amount of charges collected by the ISO from Scheduling Coordinators for provision of Regulation Down Service for the Settlement Period t.

C.3.157. AGCDownPayTotal$_t$ - $

Total amount of payment from the ISO to Scheduling Coordinators for procuring Regulation Down service for the Settlement Period t in both the Day-Ahead and the Hour-Ahead Markets.

C.3.158. SpinNeutraAdjChg$_{jt}$ - $

Spinning Reserve Neutrality Adjustment Charge to Scheduling Coordinator j for Settlement Period t.

C.3.159. MeteredDemand$_{jt}$ – MW

The Metered Demand of Scheduling Coordinator j for Settlement Period t.

C.3.160. SpinNeutraAdjRate$_t$ - $/MW

The Spinning Reserve Neutrality Adjustment Rate for Settlement Period t. The rate is the difference between the total amount of charge and the total amount of payment adjusted by the total congestion charge for the service divided by the total Metered Demand in the ISO Control Area.

C.3.161. SpinChgTotal$_t$ - $

Total amount of charges collected by the ISO from Scheduling Coordinators for provision of Spinning Reserve service for the Settlement Period t.

C.3.162. SpinPayTotal$_t$ - $

Total amount of payment from the ISO to Scheduling Coordinators for procuring Spinning Reserve service for the Settlement Period t in both the Day-Ahead and the Hour-Ahead Markets.

C.3.163. SpinCCTotal$_t$ - $

Total amount of Congestion charge incurred to the ISO for procuring Spinning Reserve over Congested interties for the Settlement Period t. This amount should be transferred into the FTR Balancing Account to balance the Congestion charge receivables booked in the Day-Ahead

Market and the Hour-Ahead Market when the Spinning Reserves are procured.

C.3.164. $NonSpinNeutraAdjChg_{jt}$ - $

Non-Spinning Reserve Neutrality Adjustment Charge to Scheduling Coordinator j for Settlement Period t.

C.3.165. $NonSpinNeutraAdjRate_t$ - $/MW

The Non-Spinning Reserve Neutrality Adjustment Rate for Settlement Period t. The rate is the difference between the total amount of charge and the total amount of payment adjusted by the total congestion charge for the service divided by the total Metered Demand of the ISO Control Area.

C.3.166. $NonSpinChgTotal_t$ - $

Total amount of charges collected by the ISO from Scheduling Coordinators for provision of Non-Spinning Reserve service for the Settlement Period t.

C.3.167. $NonSpinPayTotal_t$ - $

Total amount of payment from the ISO to Scheduling Coordinators for procuring Non-Spinning Reserve service for the Settlement Period t in both the Day-Ahead and the Hour-Ahead Markets.

C.3.168. $NonSpinCCTotal_t$ - $

Total amount of Congestion charge incurred to the ISO for procuring Non-Spinning Reserve over Congested interties for the Settlement Period t. This amount should be transferred into the FTR Balancing Account to balance the Congestion charge receivables booked in the Day-Ahead Market and the Hour-Ahead Market when the Non-Spinning Reserves are procured.

APPENDIX C

ANCILLARY SERVICES CHARGES COMPUTATION

C.1 Purpose of charges

The Ancillary Services Charges reimburse the ISO for the costs of purchasing Ancillary Services in the Day-Ahead and Hour-Ahead Markets. Each Scheduling Coordinator that does not self provide Ancillary Services must purchase these services from the ISO. The ISO will in turn purchase these Ancillary Services from Scheduling Coordinators in the markets. Ancillary Services purchased and resold by the ISO includes Regulation, Spinning Reserve, Non-Spinning Reserve, and Replacement Reserve. Any references in this Appendix C to the Ancillary Service "Regulation" shall be read as referring to "Regulation Up" or "Regulation Down".

This Appendix C also addresses the payments by ISO to Scheduling Coordinators for the Dispatch of energy from Dispatched Ancillary Services Units and for the Dispatch of Supplemental Energy in the Real Time Market. The ISO recovers the costs of Real Time Dispatch of such energy through the Imbalance Energy charges described in Appendix D of this Protocol.

The reference to a Scheduling Coordinator by Zone refers to the Demand of that Scheduling Coordinator which is located in the Zone. A Generation Unit, Load, or System Resource located in another Control Area is considered to be located in the Zone in which its contract path enters the ISO Controlled Grid.

The ISO will purchase Ancillary Services for each Trading Interval in both the Day-Ahead and Hour-Ahead Markets. Separate payments will be calculated for each service for each Trading Interval and in each market for each Generating Unit, Load and System Resource. The ISO will then calculate a total payment for each Scheduling Coordinator for each Trading Interval for each service for each Zone in each market for all the Generating Units, Loads and System Resources that the Scheduling Coordinator represents. The ISO will charge Scheduling Coordinators for Ancillary Services, other than for energy, which they purchase from the ISO by calculating and applying charges to each Scheduling Coordinator for each Trading Interval for each service in each Zone in each market.

The ISO will allocate the Ancillary Services capacity charges, for both the Day-Ahead Market and the Hour-Ahead Market, on a Zonal basis if the Day-Ahead Ancillary Services Market is procured on a Zonal basis. The ISO will allocate the Ancillary Services capacity charges, for both the Day-Ahead Market and the Hour-Ahead Market, on an ISO Control Area wide basis if the Day-Ahead Ancillary Services Market is defined on an ISO Control Area wide basis.

~~C 2 Fundamental formulas~~

~~C 2.1 ISO payments to Scheduling Coordinators~~

~~C 2.1.1 Day-Ahead Market~~

~~C.3.168.1.1. (a) Regulation. When the ISO purchases Regulation capacity in the Day-Ahead Market, Scheduling Coordinators for Generating Units that provide this capacity will receive payments for each Trading Interval of the Day-Ahead Market. The payment for a given Generating Unit which provides Regulation capacity over a given Trading Interval will be the total quantity of Regulation capacity provided times the zonal Market Clearing Price for that Trading Interval in that Zone. The required Regulation capacity is defined in the Ancillary Services Requirements Protocol. Regulation Up and Regulation Down payments shall be calculated separately. This payment for Scheduling Coordinator j for providing Regulation Up capacity from a resource i in Zone x for Trading Interval t is calculated as follows:~~

~~$AGCUpPayDA_{ijxt} = AGCUpQDA_{ijxt} * PAGCUpDA_{xt}$~~

~~C.3.168.1.2. This payment for Scheduling Coordinator j for providing Regulation Down capacity from a resource i in Zone x for Trading Interval t is calculated as follows:~~

~~$AGCDownPayDA_{ijxt} = AGCDownQDA_{ijxt} * PAGCDownDA_{xt}$~~

~~The total Regulation Up payment to each Scheduling Coordinator for a given Trading Interval in the Day-Ahead Market for all the resources that it represents in a given Zone is calculated by summing all the payments for the resources of the Scheduling Coordinator in the Zone for the Trading Interval. This payment for Scheduling Coordinator j in Zone x for Trading Interval t is calculated as follows:~~

$$AGCUpPayTotalDA_{jxt} = \sum_{i} AGCUpPayDA_{ijxt}$$

~~The total Regulation Down payment to each Scheduling Coordinator for a given Trading Interval in the Day-Ahead Market for all the resources that it represents in a given Zone is calculated by summing all the payments for the resources of the Scheduling Coordinator in the Zone for the Trading Interval. This payment for Scheduling Coordinator j in Zone x for Trading Interval t is calculated as follows:~~

$$AGCDownPayTotalDA_{jxt} = \sum_{i} AGCDownPayDA_{ijxt}$$

(b) Spinning Reserve. When ISO purchases Spinning Reserve capacity in the Day-Ahead Market. Scheduling Coordinators for Generating Units and System Resources that provide this capacity will receive payments for each Trading Interval of the Day-Ahead Market. The payment for a given Generating Unit or System Resource which provides Spinning Reserve capacity over a given Trading Interval will be the total quantity of Spinning Reserve capacity provided times the zonal Market Clearing Price for that Trading Interval in that Zone. The required Spinning Reserve capacity is defined in the Ancillary Services Requirements Protocol. This payment for Scheduling Coordinator j for providing Spinning Reserve capacity from a resource i in Zone x for Trading Interval t is calculated as follows:

$$SpinPayDA_{ijxt} = SpinQDA_{ijxt} * PSpinDA_{xt}$$

The total Spinning Reserve payment to each Scheduling Coordinator for a given Trading Interval in the Day-Ahead Market for all the resources that it represents in a given Zone is calculated by summing all the payments for the resources of the Scheduling Coordinator in the Zone for the Trading Interval. This payment for Scheduling Coordinator j in Zone x for Trading Interval t is calculated as follows:

$$SpinPayTotalDA_{jxt} = \sum_{i} SpinPayDA_{ixt}$$

C.3.168.1.3. (c) Non-Spinning Reserve. When the ISO purchases Non-Spinning Reserve capacity in the Day-Ahead Market, Scheduling Coordinators for Generating Units, Loads and System Resources that provide this capacity will receive payments for each Trading Interval of the Day-Ahead Market. The payment for a given Generating Unit, Load or System Resource which provides Non-Spinning Reserve capacity over a given Trading Interval will be the total quantity of Non-Spinning Reserve capacity provided times the zonal Market Clearing Price for that Trading Interval in that Zone. The required Non-Spinning Reserve capacity is defined in the Ancillary Services Requirements Protocol. This payment for Scheduling Coordinator j for providing Non-Spinning Reserve capacity from a resource i in Zone x for Trading Interval t is calculated as follows:

~~$NonSpinPayDA_{ijxt} = NonSpinQDA_{ijxt} * PNonSpinDA_{xt}$~~

~~The total Non-Spinning Reserve payment to each Scheduling Coordinator for a given Trading Interval in the Day-Ahead Market for all the resources that it represents in a given Zone is calculated by summing all the payments for the resources of the Scheduling Coordinator in the Zone for the Trading Interval. This payment for Scheduling Coordinator j in Zone x for Trading Interval t is calculated as follows:~~

~~$NonSpinPayTotalDA_{jxt} = \sum_{i} NonSpinPayDA_{ijxt}$~~

~~C.3.168.1.4. (d) Replacement Reserve. When the ISO purchases Replacement Reserve capacity in the Day-Ahead Market, Scheduling Coordinators for Generating Units, Loads and System Resources that provide this capacity will receive payments for each Trading Interval of the Day-Ahead Market. The payment for a given Generating Unit, Load or System Resource which provides Replacement Reserve capacity over a given Trading Interval will be the total quantity of Replacement Reserve capacity provided times the zonal Market Clearing Price for thatTrading Interval in that Zone. The required Replacement Reserve capacity is defined in the Ancillary Services Requirements Protocol. This payment for Scheduling Coordinator j for providing Replacement Reserve capacity from a resource i in Zone x for Trading Interval t is calculated as follows:~~

~~$ReplPayDA_{ijxt} = ReplQDA_{ijxt} * PReplDA_{xt}$~~

~~The total Replacement Reserve payment to each Scheduling Coordinator for a given Trading Interval in the Day-Ahead Market for all the resources that it represents in a given Zone is calculated by summing all the payments for the resources of the Scheduling Coordinator in the Zone for the Trading Interval. This payment for Scheduling Coordinator j in Zone x for Trading Interval t is calculated as follows:~~

~~$ReplPayTotalDA_{jxt} = \sum_{i} ReplPayDA_{ijxt}$~~

~~C 2.1.2 Hour-Ahead Market~~

~~C.3.168.1.5. (a) Regulation. When the ISO purchases Regulation capacity in the Hour-Ahead Market, Scheduling Coordinators for Generating Units that provide this capacity will receive payment for the Trading Interval of the Hour-Ahead Market. The payment for a given Generating Unit which provides Regulation capacity over the Trading Interval will be the total quantity of Regulation capacity provided times the zonal Market Clearing~~

C.3.168.1.6. Price for that Trading Interval in that Zone. The required Regulation capacity is defined in the Ancillary Services Requirements Protocol. Regulation Up and Regulation Down payments shall be calculated separately. This payment for Scheduling Coordinator j for providing Regulation Up capacity from a resource i in Zone x for Trading Interval t is calculated as follows:

$$AGCUpPayHA_{ijxt} = AGCUpQIHA_{ijxt} * PAGCUpHA_{xt}$$

C.3.168.1.7. This payment for Scheduling Coordinator j for providing Regulation Down capacity from a resource i in Zone x for Trading Interval t is calculated as follows:

$$AGCDownPayHA_{ijxt} = AGCDownQIHA_{ijxt} * PAGCDownHA_{xt}$$

When a Scheduling Coordinator buys back, in the Hour-Ahead Market, Regulation capacity which it sold to the ISO in the Day-Ahead Market, the payment which the ISO receives will be the total quantity of Regulation capacity bought back times the zonal Hour-Ahead Market Clearing Price for that Trading Interval in that Zone.

This payment to the ISO from Scheduling Coordinator j to buy back Regulation Up capacity from a resource i in Zone x for Trading Interval t is calculated as follows:

$$AGCUpReceiveHA_{ijxt} = AGCUpQDHA_{ijxt} * PAGCUpHA_{xt}$$

This payment to the ISO from Scheduling Coordinator j to buy back Regulation Down capacity from a resource i in Zone x for Trading Interval t is calculated as follows:

$$AGCDownReceiveHA_{ijxt} = AGCDownQDHA_{ijxt} * PAGCDownHA_{xt}$$

The total Regulation payment for the Trading Interval of the Hour-Ahead Market to each Scheduling Coordinator for all the resources that it represents in a given Zone is calculated by summing all the payments for the resources of the Scheduling Coordinator in the Zone for the Trading Interval and then deducting therefrom any amount payable by the Scheduling Coordinator to the ISO for Regulation bought back by the Scheduling Coordinator from the ISO in the Hour-Ahead Market for the Trading Interval on behalf of resources located in the Zone. This payment for Scheduling Coordinator j in Zone x for Trading Interval t is calculated as follows:

$$AGCUpPayTotalHA_{jxt} = \sum_{i} AGCUpPayHA_{ijxt} - \sum_{i} AGCUpReceiveHA_{ijxt}$$

$$AGCDownPayTotalHAjxt = \sum_{i} AGCDownPayHAijxt - \sum_{i} AGCDownReceiveHAijxt$$

C.3.168.1.8. (b) Spinning Reserve. When the ISO purchases Spinning Reserve capacity in the Hour-Ahead Market, Scheduling Coordinators for Generating Units and System Resources that provide this capacity will receive payments for the Trading Interval of the Hour-Ahead Market. The payment for a given Generating Unit or System Resource which provides Spinning Reserve capacity over the Trading Interval will be the total quantity of Spinning Reserve capacity provided times the zonal Market Clearing Price for that Trading Interval in that Zone. This payment for Scheduling Coordinator j for providing Spinning Reserve capacity from a resource i in Zone x for Trading Interval t is calculated as follows:

$$SpinPayHA_{ijxt} = SpinQIHA_{ijxt} * PSpinHA_{xt}$$

When a Scheduling Coordinator buys back in the Hour-Ahead Market Spinning Reserve capacity which it sold to the ISO in the Day-Ahead Market, the payment which the ISO receives will be the total quantity of Spinning Reserve capacity bought back times the zonal Hour-Ahead Market Clearing Price for that Trading Interval in that Zone.

This payment to the ISO from Scheduling Coordinator j to buy back Spinning Reserve capacity from a resource i in Zone x for Trading Interval t is calculated as follows:

$$SpinReceiveHA_{ijxt} = SpinQDHA_{ijxt} * PSpinHA_{xt}$$

The total Spinning Reserve payment to each Scheduling Coordinator for the Trading Interval of the Hour-Ahead Market for all the resources that it represents in a given Zone is calculated by summing all the payments for the resources of the Scheduling Coordinator in the Zone for the Trading Interval and then deducting therefrom any amount payable by the Scheduling Coordinator to the ISO for Spinning Reserve bought back by the Scheduling Coordinator from the ISO in the Hour-Ahead Market for the Trading Interval on behalf of resources located in the Zone. This payment for Scheduling Coordinator j in Zone x for Trading Interval t is calculated as follows:

$$SpinPayTotalHA_{jxt} = \sum_{i} SpinPayHA_{ijxt} - \sum_{i} SpinReceiveHA_{ijxt}$$

C.3.168.1.9. (c) Non-Spinning Reserve. When the ISO purchases Non-Spinning Reserve capacity in the Hour-Ahead Market, Scheduling Coordinators for Generating Units, Loads and System Resources that provide this capacity will receive payment for the Trading Interval of the Hour-Ahead Market. The payment for a given Generating Unit, Load or System Resource which provides Non-Spinning Reserve capacity over the Trading Interval will be the total quantity of Non-Spinning

C.3.168.1.10. Reserve capacity provided times the zonal Market Clearing Price for that Trading Interval in that Zone. This payment for Scheduling Coordinator j for providing Non-Spinning Reserve capacity from a resource i in Zone x for Trading Interval t is calculated as follows:

$$NonSpinPayHA_{ijxt} = NonSpinQIHA_{ijxt} * PNonSpinHA_{xt}$$

When a Scheduling Coordinator buys back in the Hour-Ahead Market Non-Spinning Reserve capacity which it sold to the ISO in the Day-Ahead Market, the payment which the ISO receives will be the total quantity of Non-Spinning Reserve capacity bought back times the zonal Hour-Ahead Market Clearing Price for that Trading Interval in that Zone.

This payment to the ISO from Scheduling Coordinator j to buy back Non-Spinning Reserve capacity from a resource i in Zone x for Trading Interval t is calculated as follows:

$$NonSpinReceiveHA_{ijxt} = SpinQDHA_{ijxt} * PNonSpinHA_{xt}$$

The total Non-Spinning Reserve payment to each Scheduling Coordinator for the Trading Interval of the Hour-Ahead Market for all the resources that it represents in a given Zone is calculated by summing all the payments for the resources of the Scheduling Coordinator in the Zone for the Trading Interval and then deducting therefrom any amount payable by the Scheduling Coordinator to the ISO for Non-Spinning Reserve bought back by the Scheduling Coordinator from the ISO in the Hour-Ahead Market for the Trading Interval on behalf of resources located in the Zone. This payment for Scheduling Coordinator j in Zone x for Trading Interval t is calculated as follows:

$$NonSpinPayTotalHA_{jxt} = \sum_{i} NonSpinPayHA_{ijxt} - \sum_{i} NonSpinReceiveHA_{ijxt}$$

C.3.168.1.11. (d) Replacement Reserve. When the ISO purchases Replacement Reserve capacity in the Hour-Ahead Market, Scheduling Coordinators for Generating Units, Loads and System Resources that provide this capacity will receive payments for the Trading Interval of the Hour-Ahead Market. The payment for a given Generating Unit, Load or System Resource which provides Replacement Reserve capacity over the Trading Interval will be the total quantity of Replacement Reserve capacity provided times the zonal Market Clearing Price for that Trading Interval in that Zone. This payment for Scheduling Coordinator j for providing Replacement Reserve capacity from a resource i in Zone x for Trading Interval t is calculated as follows:

$$ReplPayHA_{ijxt} = ReplQIHA_{ijxt} * PReplHA_{xt}$$

When a Scheduling Coordinator buys back in the Hour-Ahead Market Replacement Reserve capacity which it sold to the ISO in the Day-Ahead Market, the payment which the ISO receives will be the total quantity of Replacement Reserve capacity bought back times the zonal Hour-Ahead Market Clearing Price for that Trading Interval in that Zone.

This payment to the ISO from Scheduling Coordinator j to buy back Replacement Reserve capacity from a resource i in Zone x for Trading Interval t is calculated as follows:

$ReplReceiveHA_{ijxt} = ReplQDHA_{ijxt} * PReplHA_{xt}$

The total Replacement Reserve payment to each Scheduling Coordinator for the Trading Interval of the Hour-Ahead Market for all the resources that it represents in a given Zone is calculated by summing all the payments for the resources of the Scheduling Coordinator in the Zone for the Trading Interval and then deducting therefrom any amount payable by the Scheduling Coordinator to the ISO for Replacement Reserve bought back by the Scheduling Coordinator from the ISO in the Hour-Ahead Market for the Trading Interval on behalf of resources located in the Zone. This payment for Scheduling Coordinator j in Zone x for Trading Interval t is calculated as follows:

$$ReplPayTotalHA_{jxt} = \sum_{i} ReplPayHA_{ijxt} - \sum_{i} ReplReceiveHA_{ijxt}$$

~~C 2.2 ISO allocation of charges to Scheduling Coordinators~~

~~C 2.2.1 Day-Ahead Market~~

~~C.3.168.1.12. (a) Regulation. The ISO will charge the zonal cost of providing Regulation capacity that is not self provided by Scheduling Coordinators, in the Day-Ahead Market, through the application of a charge to each Scheduling Coordinator for each Trading Interval. This charge will be computed by multiplying the Regulation user rate for the Trading Interval by the Scheduling Coordinator's Regulation obligation, for which it has not self provided, for the same period.~~

~~The zonal Regulation user rate for the Day-Ahead Market is calculated by dividing the total cost to ISO of purchasing Regulation Capacity within the Zone, for the Trading Interval, by the total ISO Regulation MW purchases for the Trading Interval within the Zone. Regulation Up and Regulation Down payments shall be calculated separately.~~

~~The Day-Ahead Regulation Up user rate in Zone x for Trading Interval t is calculated as follows:~~

$$AGCUpRateDA_{xt} = \frac{\sum_{j} AGCUpPayTotalDA_{jxt}}{AGCUpPurchDA_{xt}}$$

~~where,~~

~~$AGCUpPayTotalDA_{jxt}$ = Total Regulation Up payments for the Settlement Period t in the Day-Ahead market for the Zone x.~~

~~The Day-Ahead Regulation Down user rate in Zone x for Trading Interval t is calculated as follows:~~

$$AGCDownRateDAxt = \frac{\sum_{j} AGCDownPayTotalDAjxt}{AGCDownPurchDAxt}$$

~~where,~~

~~$AGCDownPayTotalDA_{jxt}$ = Total Regulation Down payments for the Settlement Period t in the Day-Ahead Market for the Zone x.~~

The Regulation capacity charge for Scheduling Coordinator j in the Day-Ahead Market in Zone x for Trading Interval t is calculated as follows:

$$AGCUpChgDA_{jxt} = AGCUpOblig_{jxt} * AGCUpRateDA_{xt}$$

$$AGCDownChgDA_{jxt} = AGCDownOblig_{jxt} * AGCDownRateDA_{xt}$$

C.3.168.1.13. (b) Spinning Reserve. The ISO will charge the zonal cost of providing Spinning Reserve capacity that is not self provided by Scheduling Coordinators, in the Day-Ahead Market, through the application of a charge to each Scheduling Coordinator for each Trading Interval. This charge will be computed by multiplying the Spinning Reserve capacity user rate for the Trading Interval by the Scheduling Coordinator's Spinning Reserve obligation, for which it has not self provided, for the same period. The zonal Spinning Reserve capacity user rate for the Day-Ahead Market is calculated by dividing the total cost to ISO of purchasing Spinning Reserve capacity within the Zone, for the Trading Interval, by the total ISO Spinning Reserve MW purchases for the Trading Interval within the Zone. The Day-Ahead Spinning Reserve capacity user rate in Zone x for Trading Interval t is calculated as follows:

$$SpinRateDA_{xt} = \frac{\sum_{j} SpinPayTotalDA_{jxt}}{SpinPurchDA_{xt}}$$

The Spinning Reserve capacity charge for Scheduling Coordinator j in the Day-Ahead Market in Zone x for Trading Interval t is calculated as follows:

$$SpinChgDA_{jxt} = SpinOblig_{jxt} * SpinRateDA_{xt}$$

C.3.168.1.14. (c) Non-Spinning Reserve. The ISO will charge the zonal cost of providing Non-Spinning Reserve capacity that is not self provided by Scheduling Coordinators, in the Day-Ahead Market, through the application of a charge to each Scheduling Coordinator for each Trading Interval. This charge will be computed by multiplying the Non-Spinning Reserve capacity user rate for the Trading Interval by the Scheduling Coordinator's Non-Spinning Reserve obligation, for which it has not self provided, for the same period.

The zonal Non-Spinning Reserve capacity user rate for the Day-Ahead Market is calculated by dividing the total cost to ISO of purchasing Non-Spinning Reserve capacity within the Zone, for the Trading Interval, by the total ISO Non-Spinning Reserve MW purchases for the Trading Interval within the Zone. The Day-Ahead Non-Spinning Reserve capacity user rate in Zone x for Trading Interval t is calculated as follows:

$$NonSpinRateDA_{xt} = \frac{\sum_{j} NonSpinPayTotalDA_{jxt}}{NonSpinPurchDA_{xt}}$$

~~The Non-Spinning Reserve capacity charge for Scheduling Coordinator j in the Day-Ahead Market in Zone x for Trading Interval t is calculated as follows:~~

~~$NonSpinChgDA_{jxt} = NonSpinOblig_{jxt} * NonSpinRateDA_{xt}$~~

~~C.2.2.2 Hour-Ahead Market~~

~~C.3.168.1.15. (a) Regulation. The ISO will charge the zonal net cost of providing Regulation capacity that is not self provided by Scheduling Coordinators, in the Hour-Ahead Market through the application of a charge to each Scheduling Coordinator for the Trading Interval concerned. This charge will be computed by multiplying the Regulation user rate for the Trading Interval by the Scheduling Coordinator's Regulation obligation, for which it has not self provided, for the same period.~~

~~The zonal Regulation capacity user rate for the Hour-Ahead Market is calculated by dividing the total cost to the ISO of purchasing Regulation capacity within the Zone less any amounts payable to the ISO by Scheduling Coordinators for Regulation bought back from the ISO in the Hour-Ahead Market on behalf of resources located in the Zone, for the Trading Interval, by the total ISO Regulation capacity MW purchases for the Trading Interval within the Zone. Regulation Up and Down payments shall be calculated separately. The Hour-Ahead Regulation Up capacity user rate in Zone x for Trading Interval t is calculated as follows:~~

$$AGCUpRateHA_{xt} = \frac{\sum_{j} AGCUpPayTotalHA_{jxt}}{AGCUpPurchHA_{xt}}$$

~~where,~~

~~$AGCUpPayTotalHa_{jxt}$ = Totlal Regulation Up payments for the Settlement Period t in the Hour-Ahead Market for Zone x.~~

~~The Hour-Ahead Regulation Down capacity user rate in Zone x for Trading Interval t is calculated as follows:~~

$$AGCDownRateHAxt \frac{\sum_{j} AGCDownPayTotalHAjxt}{AGCDownPurchHAxt}$$

~~where,~~

~~$AGCDownPayTotalHA_{xt}$ = Total Regulation Down payments for the Settlement Period t in the Hour-Ahead Market for Zone x.~~

~~The Regulation capacity charge for Scheduling Coordinator j in the Hour-Ahead Market in Zone x for Trading Interval t is calculated as follows:~~

~~$AGCUpChgHA_{jxt} = (AGCUpOblig_{jxt} * AGCUpRateHA_{xt})$~~

~~$AGCDownChgHA_{jxt} = (AGCDownOblig_{jxt} * AGCDownRateHA_{xt})$~~

~~C.3.168.1.16. (b) Spinning Reserve. The ISO will charge the zonal net cost of providing Spinning Reserve capacity that is not self provided by Scheduling Coordinators, in the Hour-Ahead Market, through the application of a charge to each Scheduling Coordinator for the Trading Interval. This charge will be computed by multiplying the Spinning Reserve capacity user rate for the Trading Interval by the Scheduling Coordinator's Spinning Reserve obligation, for which it has not self provided, for the same period. The zonal Spinning Reserve capacity user rate for the Hour-Ahead Market is calculated by dividing the total cost to ISO of purchasing Spinning Reserve capacity within the Zone less any amounts payable to the ISO by Scheduling Coordinators for Spinning Reserve bought back from the ISO in the Hour-Ahead Market on behalf of resources located in the Zone, for the Trading Interval, by the total ISO Spinning Reserve MW purchases for the Trading Interval within the Zone. The Hour-Ahead Spinning Reserve capacity user rate in Zone x for Trading Interval t is calculated as follows:~~

$$SpinRateHA_{xt} = \frac{\sum_{j} SpinPayTotalHA_{jxt}}{SpinPurchHA_{xt}}$$

~~The Spinning Reserve capacity charge for Scheduling Coordinator j in the Hour-Ahead Market in Zone x for Trading Interval t is calculated as follows:~~

~~$SpinChgHA_{jxt} = (SpinOblig_{jxt} * SpinRateHA_{xt})$~~

~~C.3.168.1.17. (c) Non-Spinning Reserve. The ISO will charge the zonal net cost of providing Non-Spinning Reserve capacity that is not self provided by Scheduling Coordinators, in the Hour-Ahead Market, through the application of a charge to each Scheduling Coordinator for the Trading Interval. This charge will be computed by multiplying the Non-Spinning Reserve capacity user rate for the concerned Trading Interval by the Scheduling Coordinator's Non-Spinning Reserve obligation, for which it has not self provided, for the same period. The zonal Non-Spinning Reserve capacity user rate for the Hour-Ahead Market is calculated by dividing the total cost to ISO of purchasing Non-Spinning Reserve capacity within the Zone less any amounts~~

~~C.3.168.1.18. payable to the ISO by Scheduling Coordinators for Non-Spinning Reserve bought back from the ISO in the Hour-Ahead Market on behalf of resources in the Zone, for the Trading Interval, by the total ISO Non-Spinning Reserve MW purchases for the Trading Interval within the Zone. The Hour-Ahead Non-Spinning Reserve capacity user rate in Zone x for Trading Interval t is calculated as follows:~~

$$NonSpinRateHA_{xt} = \frac{\sum_{j} NonSpinPayTotalHA_{jxt}}{NonSpinObligTotal_{xt}}$$

~~The Non-Spinning Reserve capacity charge for Scheduling Coordinator j in the Hour-Ahead Market in Zone x for Trading Interval t is calculated as follows:~~

~~$NonSpinChgHA_{jxt} = (NonSpinOblig_{jxt} * NonSpinRateHA_{xt})$~~

~~C 2.2.3 Replacement Reserve~~

~~The user rate per unit of Replacement Reserve obligation for each Settlement Period t for each Zone x shall be as follows:~~

$$ReplRate_{xt} = \frac{(PRepResDA_{xt} * OrigReplReqDA_{xt}) + (PRepResHA_{xt} * OrigReplReqHA_{xt})}{OrigReplReqDA_{xt} + OrigReplReqHA_{xt}}$$

~~where:~~

~~$OrigReplReqDA_{xt}$ = Replacement Reserve requirement net of self-provision in the Day-Ahead Market before consideration of any substitutions pursuant to Section 2.5.3.6.~~

~~$OrigReplReqHA_{xt}$ = Incremental change in the Replacement Reserve requirement net of self-provision between the Day-Ahead Market and the Hour-Ahead Market before consideration of any substitutions pursuant to Section 2.5.3.~~

~~$PRepResDA_{xt}$ is the Market Clearing Price for Replacement Reserve in the Day-Ahead Market for Zone x in Settlement Period t.~~

~~$PRepResHA_{xt}$ is the Market Clearing Price for Replacement Reserve in the Hour-Ahead Market for Zone x in Settlement Period t.~~

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

~~$ReplRate_{xt} * ReplOblig_{jxt}$~~

~~where~~

~~$ReplOblig_{jxt} = DevReplOblig_{jxt} + RemRepl_{jxt} - SelfProv_{jxt} + NetInterSCTrades_{jxt}$~~

~~$DevReplOblig_{jxt}$ is the Scheduling Coordinator's obligation for deviation Replacement Reserve in Zone x in the Settlement Period t and $RemRepl_{jxt}$ is the Scheduling Coordinator's obligation for remaining Replacement Reserve in Zone x for Settlement Period t.~~

~~$SelfProv_{jxt}$ is Scheduling Coordinator's Replacement Reserve self provision in Zone x for Settlement Period t.~~

~~$NetInterSCTrades_{jxt}$ is the sale of Replacement Reserve less the purchase of Replacement Reserve through Inter-Scheduling Coordinator Trades by Scheduling Coordinator j in Zone x for Settlement Period t.~~

~~Deviation Replacement Reserve for Scheduling Coordinator i in Zone x for Settlement Period t is calculated as follows:~~

~~If $ReplObligTotal_{xt} > TotalDeviations_{xt}$ then:~~

$$DevReplOblig_{xjt} = \left[Max\left(0, \sum_i GenDev_{ijxt}\right) - Min\left(0, \sum_i LoadDev_{ijxt}\right) \right]$$

~~If $ReplObligTotal_{xt} < TotalDeviations_{xt}$ then:~~

$$DevReplOblig_{xjt} = \frac{ReplObligTotal_{xt}}{TotalDeviations_{xt}} * \left[Max\left(0, \sum_i GenDev_{ijxt}\right) - Min\left(0, \sum_i LoadDev_{ijxt}\right) \right]$$

~~where,~~

$$TotalDeviations_{xt} = \sum_j \left[Max\left(0, \sum_i GenDev_{ijxt}\right) - Min\left(0, \sum_i LoadDev_{ijxt}\right) \right]$$

~~$GenDev_{ijxt}$ = The deviation between scheduled and actual Energy generation for Generator i represented by Scheduling Coordinator I in Zone x during Settlement Period t as referenced in Section 11.2.4.1.~~

~~$LoadDev_{ijxt}$ = The deviation between scheduled and actual Load consumption for resource I represented by Scheduling Coordinator iin Zone x during Settlement Period t as referenced in Section 11.2.4.1.~~

~~$DevReplOblig_{xt}$ is total deviation Replacement Reserve in Zone x for Settlement Period t.~~

~~$ReplObligTotal_{xt}$ is total Replacement Reserve Obligation in Zone x for Settlement Period t.~~

~~Remaining Replacement Reserve for Scheduling Coordinator j in Zone x for Settlement Period t is calculated as follows:~~

$$RemRepl_{xjt} = \frac{MeteredDemand_{jxt}}{TotalMeteredDemand_{xt}} * TotalRemRepl_{xt}$$

where:

$MeteredDemand_{jxt}$ is the Scheduling Coordinator's total metered Demand excluding exports in Zone x for Settlement Period t.

$TotalMeteredDemand_{xt}$ is total metered Demand excluding exports in Zone x for Settlement Period t.

$TotalRemRepl_{xt} = Max[0,ReplObligTotal_{xt} - DevReplOblig_{xt}]$

C 2.2.4 Rational Buyer Adjustments

(a) If, in any Settlement Period, no quantity of Regulation, Spinning Reserve, Non-Spinning Reserve or Replacement Reserve is purchased in the Day-Ahead Market or the Hour-Ahead Market due to the operation of Section 2.5.3.6 of the ISO Tariff, then in lieu of the user rate determined in accordance with Section C 2.2.1, C 2.2.2, or C 2.2.3, as applicable, the user rate for the affected Ancillary Service for that Settlement Period shall be determined as follows:

C.3.168.1.19. (i) If the affected market is a Day-Ahead Market, the user rate for the affected Ancillary Service shall be set at the lowest capacity reservation price for an unaccepted qualified capacity bid in a Day-Ahead Market for that Ancillary Service or for another Ancillary Service that meets the requirements for the affected Ancillary Service. If there are no such unaccepted bids, the user rate for the affected Ancillary Service shall be the lowest MarketClearing Price for the same Settlement Period established in the Day-AheadMarket for another Ancillary Service that meets the requirements for the affected Ancillary Service.

(ii) If the affected market is an Hour-Ahead Market, the user rate for the affected Ancillary Service shall be set at the lowest capacity reservation price for an unaccepted qualified capacity bid in the Hour-Ahead Market for the same Settlement Period for that Ancillary Service or for another Ancillary Service that meets the requirements for the affected Ancillary Service. If there are no such unaccepted bids, the user rate for the affected Ancillary Service shall be the user rate for the same Ancillary Service in the Day-Ahead Market in the same Settlement Period.

(b) With respect to each Settlement Period, in addition to the user rates determined in accordance with Sections C 2.2.1 through C 2.2.3, or Section C 2.2.4(a), as applicable, each Scheduling Coordinator shall be charged an additional amount equal to its proportionate share, based on total purchases by Scheduling Coordinators of Regulation, Spinning Reserve, Non-Spinning Reserve and Replacement Reserve of the amount, if any, by which (i) the total payments to Scheduling Coordinators

~~pursuant to Section C 2.1 for the Day-Ahead Market and Hour-Ahead Market and all Zones, exceed (ii) the total amounts charged to Scheduling Coordinators pursuant to Sections C 2.2.1 through C 2.2.3, for the Day-Ahead Market and Hour-Ahead Market and all Zones. If total amounts charged to Scheduling Coordinators exceed the total payments to Scheduling Coordinators, each Scheduling Coordinator will be refunded its proportionate share, based on total purchases by Scheduling Coordinators of Regulation, Spinning Reserve, Non-Spinning Reserve and Replacement Reserve.~~

~~C 2.2.5 Real-Time Market~~

~~(a) The ISO will charge the costs of purchasing Instructed Imbalance Energy output from Dispatched Spinning Reserve, Non-Spinning Reserve, Replacement Reserve and Supplemental Energy resources through the Instructed Imbalance Energy settlement process.~~

~~(b) The ISO will charge the costs of purchasing Uninstructed Imbalance Energy (including incremental and decrmental Energy from Generating Units providing Regulation) through the Uninstructed Imbalance Energy settlement process.~~

~~(c) The ISO will charge the costs of Regulation Energy Payment Adjustments as calculated in accordnace with Section 2.5.27.1 of the ISO Tariff, in accordance with SABP 3.1.1(d)~~

~~C 3 Meaning of terms of formulae~~

~~C 3.1 $AGCUpPayDA_{ijxt}$ – $~~

~~The payment for Scheduling Coordinator j for providing Regulation Up capacity in the Day-Ahead Market from a resource i in Zone x for Trading Interval t.~~

~~$AGCDownPayDA_{ijxt}$ – $~~

~~The payment for Scheduling Coordinator j for providing Regulation Down capacity in the Day-Ahead Market from a resource i in Zone x for Trading Interval t.~~

~~C 3.2 $AGCUpQDA_{ijxt}$ – MW~~

~~The total quantity of Regulation Up capacity provided in the ISO Day-Ahead Market from resource i by Scheduling Coordinator j in Zone x for Trading Interval t.~~

~~$AGCDownQDA_{ijxt}$ – MW~~

~~The total quantity of Regulation Down capacity provided in the ISO Day-Ahead Market from resource i by Scheduling Coordinator j in Zone x for Trading Interval t.~~

C 3.3 $PAGCUpDA_{xt}$ - $/MW

In the case of Capacity made available in accordance with the ISO's Final Day-Ahead Schedules, the Market Clearing Price for units exempt from FERC Ancillary Service rate caps or the bid price for those Units subject to the cap for Regulation Up Capacity in the Day-Ahead Market for Trading Interval t in Zone x. In the case of Capacity not included in the ISO's Final Day-Ahead Schedules but made available in accordance with amended Ancillary Services supplier schedules issued in accordance with Section 2.5.21, the bid price for the unit for Regulation Up Capacity in Zone x for Trading Interval t.

$PAGCDownDA_{xt}$ - $/MW

In the case of Capacity made available in accordance with the ISO's Final Day-Ahead Schedules, the Market Clearing Price for units exempt from FERC Ancillary Service rate caps or the bid price for those Units subject to the cap for Regulation Down Capacity in the Day-Ahead Market for Trading Interval t in Zone x. In the case of Capacity not included in the ISO's Final Day-Ahead Schedules but made available in accordance with amended Ancillary Services supplier schedules issued in accordance with Section 2.5.21, the bid price for the unit for Regulation Down Capacity in Zone x for Trading Interval t.

C 3.4 $AGCUpPayTotalDA_{jxt}$ - $

The total payment for Regulation Up capacity to Scheduling Coordinator j in the Day-Ahead Market in Zone x for Trading Interval t.

$AGCDownPayTotalDA_{jxt}$ - $

The total payment for Regulation Down capacity to Scheduling Coordinator j in the Day-Ahead Market in Zone x for Trading Interval t.

C 3.5 $AGCUpPayHA_{ijxt}$ - $

The payment for Scheduling Coordinator j for providing incremental (additional to Day-Ahead) Regulation Up capacity in the Hour-Ahead Market from a resource i in Zone x for Trading Interval t.

$AGCDownPayHA_{ijxt}$ - $

The payment for Scheduling Coordinator j for providing incremental (additional to Day-Ahead) Regulation Down capacity in the Hour-Ahead Market from a resource i in Zone x for Trading Interval t.

C 3.5.1 $AGCUpReceiveHA_{ijxt}$ - $

The payment from Scheduling Coordinator j for buying back from the ISO in the Hour-Ahead Regulation Up capacity which the ISO had purchased from Scheduling Coordinator j in the Day-Ahead Market from a resource i in Zone x for Trading Interval t.

$AGCDownReceiveHA_{ijxt}$ - $

The payment from Scheduling Coordinator j for buying back from the ISO in the Hour-Ahead Regulation Down capacity which the ISO had

purchased from Scheduling Coordinator j in the Day-Ahead Market from a resource i in Zone x for Trading Interval t.

C 3.6 $AGCUpQIHA_{ijxt}$ – MW

The total quantity of incremental (additional to Day-Ahead) Regulation Up capacity provided in the ISO Hour-Ahead Market from resource i by Scheduling Coordinator j in Zone x for Trading Interval t.

$AGCDownQIHA_{ijxt}$ – MW

The total quantity of incremental (additional to Day-Ahead) Regulation Down capacity provided in the ISO Hour-Ahead Market from resource i by Scheduling Coordinator j in Zone x for Trading Interval t.

C 3.7 $AGCUpQDHA_{ijxt}$ – MW

The total quantity of decremental (less than Day-Ahead) Regulation Up capacity provided in the ISO Hour-Ahead Market from resource i by Scheduling Coordinator j in Zone x for Trading Interval t.

$AGCDownQDHA_{ijxt}$ – MW

The total quantity of decremental (less than Day-Ahead) Regulation Down capacity provided in the ISO Hour-Ahead Market from resource i by Scheduling Coordinator j in Zone x for Trading Interval t.

C 3.7.1 $PAGCUpHA_{xt}$ - $/MW

The Market Clearing Price for units exempt from FERC Ancillary Service rate caps or the bid price for those units subject to the cap for incremental (additional to Day-Ahead) Regulation Up capacity in the Hour-Ahead Market for Trading Interval t in Zone x. On buyback condition, MCP applies.

$PAGCDownHA_{xt}$ - $/MW

The Market Clearing Price for units exempt from FERC Ancillary Service rate caps or the bid price for those units subject to the cap for incremental (additional to Day-Ahead) Regulation Down capacity in the Hour-Ahead Market for Trading Interval t in Zone x. On buyback condition, MCP applies.

C 3.8 $AGCUpPayTotalHA_{jxt}$ - $

The total payment for incremental (additional to Day-Ahead) Regulation Up capacity to Scheduling Coordinator j in the Hour-Ahead Market in Zone x for Trading Interval t, after deduction of payments from Scheduling Coordinator j for buying back from theISO in the Hour-Ahead, Regulation Up capacity which the ISO had purchased from Scheduling Coordinator j in the Day-Ahead Market in Zone x for Trading Interval t.

$AGCDownPayTotalHA_{jxt}$ - $

The total payment for incremental (additional to Day-Ahead) Regulation Down capacity to Scheduling Coordinator j in the Hour-Ahead Market in

~~Zone x for Trading Interval t, after deduction of payments from Scheduling Coordinator j for buying back from the ISO in the Hour-Ahead, Regulation Down capacity which the ISO had purchased from Scheduling Coordinator j in the Day-Ahead Market in Zone x for Trading Interval t.~~

~~C 3.9~~ ~~$AGCUpRateDA_{xt}$ - $/MW~~

~~The Day-Ahead Regulation Up capacity user rate charged to Scheduling Coordinators by the ISO in Zone x for Trading Interval t.~~

~~$AGCDownRateDA_{xt}$ - $/MW~~

~~The Day-Ahead Regulation Down capacity user rate charged to Scheduling Coordinators by the ISO in Zone x for Trading Interval t.~~

~~C 3.10~~ ~~$AGCUpObligTotal_{xt}$ – MW~~

~~The net total Regulation Up obligation in Zone x for Trading Interval t as defined in the Ancillary Services Requirements Protocol. This net total equals the total obligation minus that self-provided.~~

~~$AGCDownObligTotal_{xt}$ – MW~~

~~The net total Regulation Down obligation in Zone x for Trading Interval t as defined in the Ancillary Services Requirements Protocol. This net total equals the total obligation minus that self-provided.~~

~~C 3.11~~ ~~$AGCUpChgDA_{jxt}$ - $~~

~~The Regulation Up charge for Scheduling Coordinator j in the Day-Ahead Market in Zone x for Trading Interval t.~~

~~$AGCDownChgDA_{jxt}$ - $~~

~~The Regulation Down charge for Scheduling Coordinator j in the Day-Ahead Market in Zone x for Trading Interval t.~~

~~C 3.12~~ ~~$AGCUpOblig_{jxt}$ – MW~~

~~The net Regulation Up obligation for Scheduling Coordinator j in Zone x for Trading Interval t as defined in the Ancillary Services Requirements Protocol. This net obligation equals the obligation minus that self-provided.~~

~~$AGCDownOblig_{jxt}$ – MW~~

~~The net Regulation Down obligation for Scheduling Coordinator j in Zone x for Trading Interval t as defined in the Ancillary Services Requirements Protocol. This net obligation equals the obligation minus that self-provided.~~

~~C 3.13~~ ~~$AGCUpRateHA_{xt}$ - $/MW~~

~~The Hour-Ahead incremental (additional to Day-Ahead) Regulation Up capacity user rate charged to Scheduling Coordinators by the ISO in Zone x for Trading Interval t.~~

~~$AGCDownRateHA_{xt}$ - $/MW~~

~~The Hour-Ahead incremental (additional to Day-Ahead) Regulation Down capacity user rate charged to Scheduling Coordinators by the ISO in Zone x for Trading Interval t.~~

~~C 3.14 $AGCUpChgHA_{jxt}$ - $~~

~~The incremental (additional to Day-Ahead) Regulation Up charge for Scheduling Coordinator j in the Hour-Ahead Market in Zone x for Trading Interval t.~~

~~$AGCDownChgHA_{jxt}$ - $~~

~~The incremental (additional to Day-Ahead) Regulation Down charge for Scheduling Coordinator j in the Hour-Ahead Market in Zone x for Trading Interval t.~~

~~C 3.15 $EnQPay_{ijxt}$ - $~~

~~The payment for Scheduling Coordinator j for Instructed Imbalance Energy output from a resource i in the Real Time Market in Zone x for Trading Interval t.~~

~~C 3.16 [NOT USED]~~

~~C 3.17 [NOT USED]~~

~~C 3.18 [NOT USED]~~

~~C 3.19 $SpinPayDA_{ijxt}$ - $~~

~~The payment for Scheduling Coordinator j for providing Spinning Reserve capacity in the Day-Ahead Market from a resource i in Zone x for Trading Interval t.~~

~~C 3.20 $SpinQDA_{ijxt}$ – MW~~

~~The total quantity of Spinning Reserve capacity provided in the Day-Ahead Market by resource i represented by Scheduling Coordinator j in Zone x for Trading Interval t.~~

~~C 3.20A $REPA_{ijxt}$ - $~~

~~The Regulation Energy Payment Adjustment payable for real time incremental or decremental Energy provided from Regulation resource i of Scheduling Coordinator j in Zone x in Trading Interval t.~~

~~C 3.20B~~ ~~RUP_{ijxt} – MW~~

~~The upward Regulation capacity of Regulation resource i in Zone x included in the Final Schedule for Ancillary Services of Scheduling Coordinator j for Trading Interval t, weighted in proportion to the ISO's need for upward Regulation.~~

~~C3.20C~~ ~~RDN_{ijxt} – MW~~

~~The downward Regulation capacity of Regulation resource i in Zone x included in the Final Schedule for Ancillary Services of Scheduling Coordinator j for Trading Interval t, weighted in proportion to the ISO's need for downward Regulation.~~

~~C 3.20D~~ ~~CUP – number~~

~~The constant established by the ISO and subject to change by resolution of the ISO Governing Board. Initially this shall be set at 1. The ISO may modify the value of CUP 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 modifications, 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.~~

~~C 3.20E~~ ~~CDN – number~~

~~The constant established by the ISO and subject to change by resolution of the ISO Governing Board. Initially this shall be set at 1. The ISO may modify the value of CDN 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 modifications, 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.~~

~~C 3.21~~ ~~$PSpinDA_{xt}$ –$/MW~~

~~In the case of Capacity made available in accordance with the ISO's Final Day-Ahead Schedules, the Day-Ahead Market Clearing Price for units exempt from FERC Ancillary Service rate caps or the bid price for those units subject to the cap for Spinning Reserve Capacity in Zone x for Trading Interval t. In the case of Capacity not included in the ISO's Final Day-Ahead Schedules but made available in accordance with amended Ancillary Services supplier schedules issued in accordance with Section 2.5.21, the bid price for the unit for Spinning Reserve Capacity in Zone x for Trading Interval t.~~

~~C 3.22 SpinPayTotalDA$_{ijxt}$ - $~~

~~The total payment to Scheduling Coordinator j for Spinning Reserve capacity in the Day-Ahead Market in Zone x for Trading Interval t.~~

~~C 3.23 SpinPayHA$_{ijxt}$ - $~~

~~The payment for Scheduling Coordinator j for providing incremental (additional to Day-Ahead) Spinning Reserve capacity in the Hour-Ahead Market from a resource i in Zone x for Trading Interval t.~~

~~C 3.23.1 SpinReceiveHA$_{ijxt}$ - $~~

~~The payment from Scheduling Coordinator j for buying back from the ISO in the Hour-Ahead, Spinning Reserve capacity which the ISO had purchased from Scheduling Coordinator j in the Day-Ahead Market from a resource i in Zone x for Trading Interval t.~~

~~C 3.24 SpinQIHA$_{ijxt}$ – MW~~

~~The total quantity of incremental (additional to Day-Ahead) Spinning Reserve capacity provided in the Hour-Ahead Market by resource i represented by Scheduling Coordinator j in Zone x for Trading Interval t.~~

~~C 3.25 SpinQDHA$_{ijxt}$ – MW~~

~~The total quantity of decremental (less than Day-Ahead) Spinning Reserve capacity provided in the ISO Hour-Ahead Market from resource i by Scheduling Coordinator j in Zone x for Trading Interval t.~~

~~C 3.25.1 PSpinHA$_{xt}$ - $/MW~~

~~The Hour-Ahead Market Clearing Price for units exempt from FERC Ancillary Service rate caps or the bid price for those units subject to the cap for incremental (additional to Day-Ahead) Spinning Reserve capacity in Zone x for Trading Interval t. On Buyback condition, MCP applies charge for HA.~~

~~C 3.26 SpinPayTotalHA$_{ijxt}$ - $~~

~~The total payment to Scheduling Coordinator j for incremental (additional to Day-Ahead) Spinning Reserve capacity in the Hour-Ahead Market in Zone x for Trading Interval t, after deduction of payments from Scheduling Coordinator j for buying back from the ISO in the Hour-Ahead, Spinning Reserve capacity which the ISO had purchased from Scheduling Coordinator j in the Day-Ahead market in Zone x for Trading Interval t.~~

~~C 3.27 SpinRateDA$_{xt}$ - $/MW~~

~~The Day-Ahead Spinning Reserve capacity user rate charged to Scheduling Coordinators by the ISO in Zone x for Trading Interval t.~~

~~C 3.28 $SpinObligTotal_{xt}$ – MW~~

~~The net total Spinning Reserve capacity obligation in Zone x for Trading Interval t as defined in the Ancillary Services Requirements Protocol. This net total equals the total obligation minus that self-provided.~~

~~C 3.29 $SpinChgDA_{jxt}$ - $~~

~~The Spinning Reserve capacity charge for Scheduling Coordinator j in the Day-Ahead Market in Zone x for Trading Interval t.~~

~~C 3.30 $SpinOblig_{jxt}$ – MW~~

~~The net Spinning Reserve capacity obligation for Scheduling Coordinator j in Zone x for Trading Interval t as defined in the Ancillary Services Requirements Protocol. This net obligation equals the obligation minus that self-provided.~~

~~C 3.31 $SpinRateHA_{xt}$ - $/MW~~

~~The Hour-Ahead incremental (additional to Day-Ahead) Spinning Reserve capacity user rate charged to Scheduling Coordinators by the ISO in Zone x for Trading Interval t.~~

~~C 3.32 $SpinChgHA_{jxt}$ - $~~

~~The incremental (additional to Day-Ahead) Spinning Reserve capacity charge for Scheduling Coordinator j in the Hour-Ahead Market in Zone x for Trading Interval t.~~

~~C 3.33 $NonSpinPayDA_{ijxt}$ - $~~

~~The payment for Scheduling Coordinator j for providing Non-Spinning Reserve capacity in the Day-Ahead Market from a resource i in Zone x for Trading Interval t.~~

~~C 3.34 $NonSpinQDA_{ijxt}$ – MW~~

~~The total quantity of Non-Spinning Reserve capacity provided from resource i in the Day-Ahead Market by Scheduling Coordinator j in Zone x for Trading Interval t.~~

~~C 3.35 $PNonSpinDA_{xt}$ - $/MW~~

~~In the case of Capacity made available in accordance with the ISO's Final Day-Ahead Schedules, the Day-Ahead Market Clearing Price for units exempt from FERC Ancillary Service rate caps or the bid price for those units subject to the cap for Non-Spinning Reserve Capacity for Trading Interval t in Zone x. In the case of Capacity not included in the ISO's Final Day-Ahead Schedules but made available in accordance with amended Ancillary Services supplier schedules issued in accordance with Section 2.5.21, the bid price for the unit for Non-Spinning Reserve Capacity in Zone x for Trading Interval t.~~

~~C 3.36 NonSpinPayTotalDA$_{jxt}$ - $~~

~~The total payment to Scheduling Coordinator j for providing Non-Spinning Reserve capacity in the Day-Ahead Market in Zone x for Trading Interval t.~~

~~C 3.37 NonSpinPayHA$_{ijxt}$ - $~~

~~The payment for Scheduling Coordinator j for providing incremental (additional to Day-Ahead) Non-Spinning Reserve capacity in the Hour-Ahead Market from a resource i in Zone x for Trading Interval t.~~

~~C 3.37.1 NonSpinReceiveHA$_{ijxt}$ - $~~

~~The payment from Scheduling Coordinator j for buying back from the ISO in the Hour-Ahead, Non-Spinning Reserve capacity which the ISO had purchased from Scheduling Coordinator j in the Day-Ahead Market from a resource i in Zone x for Trading Interval t.~~

~~C 3.38 NonSpinQIHA$_{ijxt}$ – MW~~

~~The total quantity of incremental (additional to Day-Ahead) Non-Spinning Reserve capacity provided from resource i in the Hour-Ahead Market by Scheduling Coordinator j in Zone x for Trading Interval t.~~

~~C 3.39 NonSpinQDHA$_{ijxt}$ – MW~~

~~The total quantity of decremental (less than Day-Ahead) Non-Spinning Reserve capacity provided in the ISO Hour-Ahead Market from resource i by Scheduling Coordinator j in Zone x for Trading Interval t.~~

~~C 3.39.1 PNonSpinHA$_{xt}$ - $/MW~~

~~The Hour-Ahead zonal Market Clearing Price for units exempt from FERC Ancillary Service rate caps or the bid price for those units subject to the cap for incremental (additional to Day-Ahead) Non-Spinning Reserve capacity for Trading Interval t in Zone x. On Buyback condition, MCP applies.~~

~~C 3.40 NonSpinPayTotalHA$_{jxt}$ - $~~

~~The total payment to Scheduling Coordinator j for providing incremental (additional to Day-Ahead) Non-Spinning Reserve capacity in the Hour-Ahead Market in Zone x for Trading Interval t, after deduction of payments from Scheduling Coordinator j for buying back from the ISO in the Hour-Ahead, Non-Spinning Reserve capacity which the ISO had purchased from Scheduling Coordinator j in the Day-Ahead market in Zone x for Trading Interval t.~~

~~C 3.41 NonSpinRateDA$_{xt}$ - $/MW~~

~~The Day-Ahead Non-Spinning Reserve capacity user rate charged to Scheduling Coordinators by the ISO in Zone x for Trading Interval t.~~

~~C 3.42 NonSpinObligTotal$_{xt}$ – MW~~

~~The net total Non-Spinning Reserve capacity obligation in Zone x for Trading Interval t as defined in the Ancillary Services Requirements Protocol. This net total obligation equals the total minus that self-provided.~~

~~C 3.43 NonSpinChgDA$_{jxt}$ – $~~

~~The Non-Spinning Reserve Capacity charge for Scheduling Coordinator j in the Day-Ahead Market in Zone x for Trading Interval t.~~

~~C 3.44 NonSpinOblig$_{jxt}$ – MW~~

~~The net Non-Spinning Reserve capacity obligation for Scheduling Coordinator j in Zone x for Trading Interval t as defined in the Ancillary Services Requirements Protocol. This net obligation is the obligation minus that self-provided.~~

~~C 3.45 NonSpinRateHA$_{xt}$ - $/MW~~

~~The Hour-Ahead incremental (additional to Day-Ahead) Non-Spinning Reserve capacity user rate charged to Scheduling Coordinators by the ISO in Zone x for Trading Interval t.~~

~~C 3.46 NonSpinChgHA$_{jxt}$ - $~~

~~The incremental (additional to Day-Ahead) Non-Spinning Reserve Capacity charge for Scheduling Coordinator j in the Hour-Ahead Market in Zone x for Trading Interval t.~~

~~C 3.47 NonSpinObligHA$_{jxt}$ – MW~~

~~The net incremental (additional to Day-Ahead) Non-Spinning Reserve capacity obligation in the Hour-Ahead Market for Scheduling Coordinator j in Zone x for Trading Interval t as defined in the Ancillary Services Requirements Protocol. This net obligation is the obligation minus that self-provided.~~

~~C 3.48 ReplPayDA$_{ijxt}$ - $~~

~~The payment for Scheduling Coordinator j for providing Replacement Reserve capacity in the Day-Ahead Market from a resource i in Zone x for Trading Interval t.~~

~~C 3.49 ReplQDA$_{ijxt}$ – MW~~

~~The total quantity of Replacement Reserve capacity provided in the Day-Ahead Market from resource i by Scheduling Coordinator j in Zone x for Trading Interval t.~~

~~C 3.50 PReplDA$_{xt}$ -$/MW~~

~~In the case of Capacity made available in accordance with ISO's Final Day-Ahead Schedules, the Day-Ahead Market Clearing Price for units exempt from FERC Ancillary Service rate caps or the bid price for those units not subject to the cap for Replacement Reserve Capacity in Zone~~

~~x for Trading Interval t. In the case of Capacity not included in the ISO's Final Day-Ahead Schedules but made available in accordance with amended Ancillary Services supplier schedules issued in accordance with Section 2.5.21, the bid price for the unit for Replacement Reserve Capacity in Zone x for Trading Interval t.~~

~~C 3.51 ReplPayTotalDA$_{jxt}$ - $~~

~~The total payment to Scheduling Coordinator j for providing Replacement Reserve capacity in the Day-Ahead Market in Zone x for Trading Interval t.~~

~~C 3.51.1 ReplReceiveHA$_{ijxt}$ - $~~

~~The payment from Scheduling Coordinator j for buying back from the ISO in the Hour-Ahead, Replacement Reserve capacity which the ISO had purchased from Scheduling Coordinator j in the Day-Ahead Market from a resource i in the Zone x for Trading Interval t.~~

~~C 3.52 ReplPayHA$_{ijxt}$ - $~~

~~The payment for Scheduling Coordinator j for providing of incremental (additional to Day-Ahead) Replacement Reserve capacity in the Hour-Ahead Market from a resource i in Zone x for Trading Interval t.~~

~~C 3.53 ReplQIHA$_{ijxt}$ – MW~~

~~The total quantity of incremental (additional to Day-Ahead) Replacement Reserve capacity provided in the Hour-Ahead Market from resource i by Scheduling Coordinator j in Zone x for Trading Interval t.~~

~~C 3.54 ReplQDHA$_{ijxt}$ – MW~~

~~The total quantity of decremental (less than Day-Ahead) Replacement Reserve capacity provided in the ISO Hour-Ahead Market from resource i by Scheduling Coordinator j in Zone x for Trading Interval t.~~

~~C 3.54.1 PReplHA$_{xt}$ -$/MW~~

~~The Hour-Ahead Market Clearing Price for Non-FERC jurisdictional units or the bid price for FERC jurisdictional units for incremental (additional to Day-Ahead) Replacement Reserve capacity in Zone x for Trading Interval t. On Buyback condition, MCP applies.~~

~~C 3.55 ReplPayTotalHA$_{jxt}$ - $~~

~~The total payment to Scheduling Coordinator j for providing of incremental (additional to Day-Ahead) Replacement Reserve capacity in the Hour-Ahead Market in Zone x for Trading Interval t, after deduction of payments from Scheduling Coordinator j for buying back from the ISO in the Hour-Ahead, Replacement Reserve capacity which the ISO had purchased from Scheduling Coordinator j in the Day-Ahead Market in Zone x from Trading Interval t.~~

~~C 3.56 ReplRateDA$_{xt}$ - $/MW~~

~~The Day-Ahead Replacement Reserve capacity user rate charged to Scheduling Coordinators by the ISO in Zone x for Trading Interval t.~~

~~C 3.57 ReplChgDA$_{jxt}$ - $~~

~~The Replacement Reserve capacity charge for Scheduling Coordinator j in the Day-Ahead Market in Zone x for Trading Interval t.~~

~~C 3.58 ReplRateHA$_{xt}$ – $/MW~~

~~The Hour-Ahead incremental (additional to Day-Ahead) Spinning Reserve capacity user rate charged to Scheduling Coordinators by the ISO in Zone x for Trading Interval t.~~

~~C 3.59 ReplChgHA$_{jxt}$ - $~~

~~The incremental (additional to Day-Ahead) Replacement Reserve capacity charge for Scheduling Coordinator j in the Hour-Ahead Market in zone x for Trading Interval t.~~

~~C 3.60 ReplObligTotal$_{xt}$ – MW~~

~~The net total Replacement Reserve capacity obligation in the Day-Ahead and Hour-Ahead Markets in Zone x for Trading Interval t as defined in the Ancillary Services Requirements Protocol. This net total obligation is the total obligation minus that self-provided.~~

~~C 3.61 ReplPayTotal$_{jxt}$ - $~~

~~The total payment to Scheduling Coordinator j for providing Replacement Reserve capacity in the Day-Ahead and Hour-Ahead Markets in zone x for Trading Interval t.~~

~~C 3.62 PavgRepl$_{xt}$ - $/MW~~

~~The average price paid for Replacement Reserve capacity in the Day-Ahead Market and the Hour-Ahead Market in Zone x in Trading Interval t.~~

~~C 3.63 UnDispReplChg$_{jxt}$ - $~~

~~The undispatched Replacement Reserve Capacity charge for Scheduling Coordinator j in the Day-Ahead and Hour-Ahead Markets in Zone x for Trading Interval t.~~

~~C 3.64 ReplOblig$_{jxt}$ – MW~~

~~The Replacement Reserve capacity obligation in the Day-Ahead and Hour-Ahead Markets for Scheduling Coordinator j in Zone x for Trading Interval t as defined in the Ancillary Services Requirements Protocol.~~

~~C 3.65 ReplQDisp$_{xt}$ – MWh~~

~~The Dispatched Replacement Reserve capacity in the Day-Ahead Market in Zone x in Trading Interval t.~~

~~C 3.66 AGCUpPurchDA$_{xt}$ – MW~~

~~The total quantity of Regulation Up capacity provided in the Day-Ahead Market in Zone x for Trading Interval t, not including self-provided quantities.~~

~~AGCDownPurchDA$_{xt}$ – MW~~

~~The total quantity of Regulation Down capacity provided in the Day-Ahead Market in Zone x for Trading Interval t, not including self-provided quantities.~~

~~C 3.67 SpinPurchDA$_{xt}$ – MW~~

~~The total quantity of Spinning Reserve capacity provided in the Day-Ahead Market in Zone x for Trading Interval t, not including self-provided quantities.~~

~~C 3.68 NonSpinPurchDA$_{xt}$ – MW~~

~~The total quantity of Non-Spinning Reserve capacity provided in the Day-Ahead Market in Zone x for Trading Interval t, not including self-provided quantities.~~

~~C 3.69 AGCUpPurchHA$_{xt}$ – MW~~

~~The net quantity of Regulation Up capacity provided in the Hour-Ahead Market in Zone x for Trading Interval t, not including self-provided quantities.~~

~~AGCDownPurchHA$_{xt}$ – MW~~

~~The net quantity of Regulation Down capacity provided in the Hour-Ahead Market in Zone x for Trading Interval t, not including self-provided quantities.~~

~~C 3.70 SpinPurchHA$_{xt}$ – MW~~

~~The net quantity of Spinning Reserve capacity provided in the Hour-Ahead Market in Zone x for Trading Interval t, not including self-provided quantities.~~

~~C 3.71 NonSpinPurchDA$_{xt}$ – MW~~

~~The net quantity of Non-Spinning Reserve capacity provided in the Hour-Ahead Market in Zone x for Trading Interval t, not including self-provided quantities.~~

APPENDIX D. IMBALANCE ENERGY CHARGE COMPUTATION

D.1 Scheduled Energy

"Scheduled Energy" is the Energy produced or consumed in each Dispatch Interval according to the Final Hour-Ahead Schedule as modified to account for Schedule changes between consecutive hours. A zero (0) MW Final Hour-Ahead Schedule is assumed by default for resources not scheduled in the Day-Ahead or Hour-Ahead Markets. All Schedule changes between consecutive hours shall be performed by a smooth linear ramp ("Scheduling Ramp") between the relevant Final Hour-Ahead Schedules. The Scheduling Ramp specifications, i.e., start time, end time, duration, and maximum ramp, may differ by resource depending on the resource's ramping ability and shall be specified by the ISO in the ISO Home Page. The ISO may periodically modify the Scheduling Ramp specifications as needed 24 hours after notifying Market Participants. The Scheduling Ramp specifications shall be taken into account in all scheduling and Dispatch tools used by the ISO to produce feasible Schedules and Dispatch Instructions consistent with the resource operational capabilities and constraints.

The Final Hour-Ahead Schedule and the associated Scheduling Ramp define the "Scheduled Operating Point (SOP)," which is the expected operating point of a resource as a function of time when no Dispatch Instructions are issued to that resource.

The Scheduled Energy shall be calculated in each Dispatch Interval as the integral of the SOP as follows:

$$SE_{i,h,k} = \int_{t=(k-1)T}^{kT} SOP_{i,h}(t)\,dt \quad (1)$$

where:

T	is the time index;
I	is the resource index;
H	is the hour index;
K	is the Dispatch Interval index;
$SE_{i,h,k}$	is the Scheduled Energy from resource i during Dispatch Interval k of

hour *h*;

$SOP_{i,h}(t)$ is the SOP of resource *i* during hour *h* as a function of time; and

T is the duration of the Dispatch Interval (10 minutes).

D.2 Metered Energy

"Metered Energy" is Energy produced or consumed in real time during each Dispatch Interval. Metered Energy for ISO-Metered Entities is obtained from actual meter data that are aggregated for the duration of each Dispatch Interval. Metered Energy for non-ISO-Metered Entities is obtained from hourly meter data that are evenly distributed to the Dispatch Intervals of each hour. Meter data do not exist for individual System Resources. Therefore, Metered Energy for System Resources is obtained by inference from their Scheduled Energy and the Imbalance Energy that they are expected to produce or consume by responding to Dispatch Instructions.

D.3 Imbalance Energy

Imbalance Energy is real-time Energy deviation from Scheduled Energy. Positive Imbalance Energy is Energy that is produced in excess of Scheduled Energy or Scheduled Energy that is not consumed.. Negative Imbalance Energy is Scheduled Energy that is not produced or Energy that is consumed in excess of Scheduled Energy. Imbalance Energy shall be measured, calculated, and settled in each Dispatch Interval for each resource separately. Imbalance Energy is composed of Instructed Imbalance Energy, Uninstructed Imbalance Energy, and Unaccounted For Energy.

D.3.1 Instructed Imbalance Energy

Instructed Imbalance Energy is Energy produced or consumed as the result of responding to Dispatch Instructions. Dispatch Instructions specify the operating point where a dispatched resource is instructed to be after accounting for any start-up time (if the resource is off-line) and/or ramping with the relevant maximum ramp rate, as registered in the Master File. The start-up time must be less than ten (10) minutes for Non-Spinning Reserve. The Dispatch Instructions and the relevant start-up times and ramp rates define the Dispatch Operating Point (DOP) of resources in real time. The DOP of resources that are not dispatched defaults to the respective SOP.

Dispatch Instructions include pre-dispatch instructions issued after the Day-Ahead and Hour-Ahead Residual Unit Commitment Processes, pre-dispatch instructions issued after the Hourly Pre-Dispatch process, and Dispatch Instructions issued within the hour. Hourly Pre-dispatch instructions are for a full hour. The associated Energy deviations are settled as Instructed Imbalance Energy. Dispatch Instructions issued within the hour are 10-minute (or until the end of the hour, whichever less) instructions issued after a SCED execution or after an Exceptional Dispatch. Such instructions issued to resources with start-up times longer than ten minutes shall be issued sufficiently in advance to allow the resource time to start up. Dispatch Instructions also include implicit "end-of-hour instructions" that instruct a resource to return to its Final Hour-Ahead Schedule for the next hour and apply by default at the end of the hour to all resources that are not pre-dispatched for the next hour or not dispatched for the first Dispatch Interval of the next hour. All Dispatch Instructions are deemed delivered. Instructed Imbalance Energy shall be calculated in each Dispatch Interval as the integral of the difference between the DOP and the SOP as follows:

$$IIE_{i,h,k} = \int_{t=(k-1)T}^{kT} \left(DOP_{i,h}(t) - SOP_{i,h}(t)\right) dt = \int_{t=(k-1)T}^{kT} DOP_{i,h}(t)\,dt - SE_{i,h,k} \quad (2)$$

where:

$IIE_{i,h,k}$ is the Instructed Imbalance Energy from resource *i* during Dispatch Interval *k* of hour *h*; and

$DOP_{i,h}(t)$ is the DOP of resource *i* during hour *h* as a function of time.

Positive Instructed Imbalance Energy shall be paid the relevant Dispatch Interval Locational Marginal Price and negative Instructed Imbalance Energy shall be charged the relevant Dispatch Interval Locational Marginal Price. In algebraic terms, adopting the injection convention (injections are positive whereas ejections are negative), the Instructed Imbalance Energy charge is given by:

$$IIEC_{i,h,k} = -IIE_{i,h,k}\, LMP_{i,h,k} \quad (3)$$

where:

$IIEC_{i,h,k}$ is the Instructed Imbalance Energy charge for resource *i* during Dispatch Interval *k* of hour *h*; and

$LMP_{i,h,k}$ is the LMP at the Location of resource *i* during Dispatch Interval *k* of hour *h*, as determined in accordance with Section 31.4.3.2.4.

Side payments may apply in addition to the Instructed Imbalance Energy charge as set forth in Section 31.4.3.4.4.

D.3.2 Uninstructed Imbalance Energy

Uninstructed Imbalance Energy is Energy produced or consumed due to deviations from the DOP. Uninstructed Imbalance Energy shall be calculated in each Dispatch Interval as the difference between Metered Energy and the integral of the DOP over that Dispatch Interval as follows:

$$UIE_{i,h,k} = ME_{i,h,k} - \int_{t=(k-1)T}^{kT} DOP_{i,h}(t)\,dt = ME_{i,h,k} - \left(SE_{i,h,k} + IIE_{i,h,k}\right) \quad (4)$$

where:

$UIE_{i,h,k}$ is the Uninstructed Imbalance Energy from resource *i* during Dispatch Interval *k* of hour *h*; and

$ME_{i,h,k}$ is the Metered Energy from resource *i* during Dispatch Interval *k* of hour *h*.

Positive Uninstructed Imbalance Energy shall be paid the relevant Dispatch Interval Locational Marginal Price and negative Uninstructed Imbalance Energy shall be charged the relevant Dispatch Interval Locational Marginal Price. In algebraic terms, adopting the injection convention, the Uninstructed Imbalance Energy charge is given by:

$$UIEC_{i,h,k} = -UIE_{i,h,k}\, LMP_{i,h,k} \quad (5)$$

where:

$UIEC_{i,h,k}$ is the Uninstructed Imbalance Energy charge for resource *i* during Dispatch Interval *k* of hour *h*.

Uninstructed Deviation Penalties may apply in addition to the Uninstructed Imbalance Energy charge as set forth in Section 11.2.4.1.2.

D.3.3 Unaccounted For Energy

Unaccounted For Energy (UFE) shall be calculated for each UDC Service Area and for each Dispatch Interval as the difference between the net Energy delivered into the UDC Service Area, adjusted for UDC Service Area Transmission Losses, and the total metered Demand within the UDC Service Area. The net Energy delivered into the UDC Service Area is obtained by aggregating the meter data of all UDC Interconnections in the import direction and the Metered Energy from all Generators within the UDC Service Area. The total metered Demand within the UDC Service Area is obtained by aggregating the Metered Energy from all Loads within the UDC Service Area. The UDC Service Area Transmission Losses are obtained by the State Estimator function of the Energy Management System as set forth in Section 31.4.3.2.1. Before the State Estimator is available, the ISO shall estimate UDC Service Area Transmission Losses using power flow calculations.

In algebraic terms, adopting the injection convention, the UFE is given by:

$$UFE_{j,h,k} = \sum_{l \in UDC_j} I_{l,h,k} + \sum_{i \in UDC_j} ME_{i,h,k} - TL_{j,h,k} \quad (6)$$

where:

J	is the UDC index;
L	is the UDC Interconnection index;
UDC_j	is the set of UDC Interconnections into UDC Service Area j or the set of Generators and Loads within UDC Service Area j;
$UFE_{j,h,k}$	is the UFE in UDC Service Area j during Dispatch Interval k of hour h;
$I_{l,h,k}$	is the net import into UDC Service Area j from UDC Interconnection l during Dispatch Interval k of hour h; and
$TL_{l,h,k}$	is the transmission loss in UDC Service Area j during Dispatch Interval k of hour h.

The UFE in each UDC Service Area shall be distributed to all Loads and exports within the UDC Service Area in proportion to their Metered Energy as follows:

$$UFE_{i,h,k} = UFE_{j,h,k} \frac{ME_{i,h,k}}{\sum_{i \in UDC_j} ME_{i,h,k}} \quad (7)$$

where:

i is the index of Loads within UDC Service Area *j* or exports from UDC Service Area *j* outside the ISO Control Area; and

$UFE_{i,h,k}$ is the UFE allocated to Load within the UDC Service Area *j* or exports from UDC Service Area *j* outside the ISO Control Area during Dispatch Interval *k* of hour *h*;

Positive UFE shall be paid the relevant Dispatch Interval Locational Marginal Price and negative UFE shall be charged the relevant Dispatch Interval Locational Marginal Price. In algebraic terms, adopting the injection convention, the UFE charge is given by:

$$UFEC_{i,h,k} = -UFE_{i,h,k} \, LMP_{i,h,k} \quad (8)$$

where:

$UFEC_{i,h,k}$ is the UFE charge for Load *i* within UDC Service Area *j* or export *i* from UDC Service Area *j* outside the ISO Control Area during Dispatch Interval *k* of hour *h*.

Uninstructed Deviation Penalties shall not apply to UFE.

D.4 Hourly Ex Post Price

For each Settlement Period and Location where Instructed Imbalance Energy is procured, the ISO shall calculate the Hourly Ex Post Price as the weighted average of the relevant six Dispatch Interval Locational Marginal Prices during the Settlement Period. The weights shall be the Instructed Imbalance Energy procured during the corresponding Dispatch Intervals, as follows:

$$HEPP_{i,h,k} = \frac{\sum_{k=1}^{6} \left(\left| IIE_{i,h,k} \right| LMP_{i,h,k} \right)}{\sum_{k=1}^{6} \left| IIE_{i,h,k} \right|} \quad (9)$$

where:

$HEPP_{i,h,k}$ is the Hourly Ex Post Price at Location *i* during Dispatch Interval *k* of hour *h*; and

$IIE_{i,h,k}$ is the total Instructed Imbalance Energy procured at Location *i* during Dispatch Interval *k* of hour *h*.

~~APPENDIX D~~

~~IMBALANCE ENERGY CHARGE COMPUTATION~~

~~D 1 Purpose of charge~~

~~The Imbalance Energy charge is the term used for allocating the cost of not only the Imbalance Energy (the differences between scheduled and actual Generation and Demand), but also any Unaccounted for Energy (UFE) and any errors in the forecasted Transmission Losses as represented by the GMMs. Any corresponding cost of Dispatched Replacement Reserve Capacity that is not allocated as an Ancillary Service is also included along with the Imbalance Energy charge.~~

~~D 2 Fundamental formulae~~

~~D 2.1.1 Uninstructed Imbalance Energy Charges on Scheduling Coordinators~~

~~Uninstructed Imbalance Energy attributable to each Scheduling Coordinator in each Settlement Period in the relevant Zone shall be deemed to be sold or purchased, as the case may be, by the ISO and charges or payments for Uninstructed Imbalance Energy shall be settled by debiting or crediting, as the case may be, the Scheduling Coordinator with an amount for each BEEP Interval of each Settlement Period calculated in accordance with the following formulae:~~

$$DevC = \sum_i GenDevC_i + \sum_i LoadDevC_i + \sum_q ImpDevC_q + \sum_q ExpDevC_q + UFEC$$

$$ASSEDevC = \sum_i ASSEGenDevCi + \sum_i ASSELoadDevCi + \sum_q ASSEImpDevCq$$

~~$DevC_{bjxt} = NetDev_{bjxt} * BIP_{bxt}$~~

~~Where:~~

~~$NetDev_{bjxt} = \left[\sum_i GenDev_{bixt} - \sum_i LoadDev_{bixt} + \sum_q ImpDev_{bq\text{-}xt} - \sum_q ExpDev_{bq\text{-}xt}\right]$~~

~~If $NetDev_{bjxt} < 0$, then~~

~~BIP_{bxt} = BEEP Interval Price for decremental Energy for BEEP Interval b in Settlement Period t.~~

~~If $NetDev_{bjxt} > 0$, then~~

~~BIP_{bxt} = BEEP Interval Price for incremental Energy in Zone x for BEEP Interval b in Settlement Period t.~~

~~The deviation quantity between scheduled and actual Energy Generation for Generator i represented by Scheduling Coordinator j in Zone x during each BEEP Interval b of each Settlement Period t is calculated as follows:~~

$$\text{GenDev}_{ixbt} = \left[\left(G_{sb} \right) * \text{GMM}_t - \left[\left(G_a - G_{b,adj} \right) * \text{GMM}_a - G_{b,a/s} - G_{b,s/e} \right] \frac{UnavailAncServMW_{bx}}{HBI} \right]$$

~~Where:~~

~~If the BEEP Interval Ex Post Price for decremental Energy is negative, then:~~

~~$UnavailAncServMW_{ix} = 0$~~

~~If the BEEP Interval Ex Post Price for decremental Energy is greater than or equal to zero, then:~~

~~$UnavailAncServMW_{ix} = Max\ [\ (G_{i,oblig} - G_{a/s*6})\ Min[0,\ Pmax - G_{a*6} - (G_{i,oblig} - G_{a/s}*6))]$~~

~~The value of G_a for Generation scheduled on behalf of Participating Generators for each BEEP Interval in each Settlement Period shall be the actual meter data aggregated on a 10-minute basis. The value of G_{sb} for Generation scheduled on behalf of Participating Generators for each BEEP Interval in each Settlement Period shall be determined as follows for BEEP Intervals 2 through 5:~~

$$G_{s,b} = \frac{G_s}{6}$$

~~For BEEP Interval 1 and BEEP Interval 6, implicit Dispatch instructions for ramping will be applied to adjust the Schedules attributed to those BEEP Intervals as follows:~~

$$G_{s,1} = \left(\frac{G_s}{6} \right) - \left(\frac{\left(G_s - G_{s-1} \right)}{24} \right)$$

$$G_{s,6} = \left(\frac{G_s}{6} \right) + \left(\frac{\left(G_{s+1} - G_s \right)}{24} \right)$$

~~The value of G_s and G_a for Generation which has not undertaken in writing to be bound by the ISO Tariff in accordance with Article 5 shall be determined as follows for all six BEEP Intervals:~~

$$G_{s,b} = \frac{G_{s,t}}{6}$$

$$G_a = \frac{G_{at}}{6}$$

~~The deviation quantity between scheduled and actual Load consumption for Load i represented by Scheduling Coordinator j in Zone x for each BEEP Interval of each Settlement Period t is calculated as follows:~~

$$LoadDev_{ibxt} = L_{sb} - \left[\left(L_a - L_{b,adj}\right) + L_{b,a/s} + L_{b,s/e} - \frac{UnavailDispLoadMW_{bx}}{HBI}\right]$$

Where;

If the BEEP Interval Ex Post Price for decremental Energy is negative, then:

$UnavailDispLoadMW_{ix} = 0$

If the BEEP Interval Ex Post Price for decremental Energy is greater than or equal to zero, then:

$UnavailDispLoadMW_{ix} = Max[0, [((L_{i, oblig}) - L_{a/s}*6) - (L_a*6]]$

The value of $L_{b,a/s}$, $L_{b,s/e}$ and L_{adj} are determined on a 10-minute basis. The value of L_a for Load scheduled on behalf of Participating Loads for each BEEP Interval in each Settlement Period shall be the actual meter data aggregated on a 10-minute basis. The value of L_{sb} for Load scheduled on behalf of Participating Loads for each BEEP Interval in each Settlement Period t, shall be determined as follows:

For BEEP Intervals 2 through 5,

$$L_{sb} = \frac{L_s}{6}$$

For BEEP Interval 1 and BEEP Interval 6, implicit Dispatch instructions for ramping will be applied to adjust the schedules attributed to those BEEP Intervals as follows:

$$L_{s,1} = \left(\frac{L_s}{6}\right) - \left(\frac{(L_s - L_{s-1})}{24}\right)$$

$$L_{s,6} = \left(\frac{L_s}{6}\right) + \left(\frac{(L_{s+1} - L_s)}{24}\right)$$

The value of L_{sb} and L_a for Loads that are not Participating Loads shall be determined as follows for all six BEEP Intervals:

$$L_{sb} = \frac{L_s}{6}$$

$$L_a = \frac{L_{at}}{6}$$

L_{at} is Load i hourly metered quantity for Settlement Period t.

The deviation quantity between forward scheduled and Real Time adjustments to Energy imports*, adjusted for losses, for Scheduling

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* Note that this deviation is a difference between a forward Market value and a Real Time value. It is not inadvertent energy.

Point q represented by Scheduling Coordinator j into zone x during each BEEP Interval of each Settlement Period is calculated as follows:

$$ImpDev_q = I_{sb} * GMM_{fq} - [(I_a + I_{b,a/s} - I_{b,adj}) * GMM_{ahq}] + I_{b,a/s}$$

The values of $I_{b,a/s}$, I_a and $I_{b,adj}$ are determined on a 10-minute basis. The value of I_{sb} shall be determined as follows:

For BEEP Intervals 1 through 6,

$$I_{sb} = \frac{I_s}{6}$$

The deviation quantity between forward scheduled and Real Time adjustments to Energy exports* for Scheduling Point q represented by Scheduling Coordinator j from Zone x for each BEEP Interval for each Settlement Period *t* is calculated as follows:

$$ExpDev_q = E_{s,b} - E_a - E_{adj,b}$$

The values of E_a and $E_{b,adj}$ are determined on a 10-minute basis. The value of $E_{s,b}$ shall be determined as follows:

For BEEP Intervals 1 through 6,

$$E_{sb} = \frac{E_s}{6}$$

The Hourly Ex Post Price applicable to uninstructed deviations in Settlement Period t in each zone will equal the Energy weighted average of the BEEP Interval charges in each zone, calculated as follows:

$$P_{xt} = \frac{(\sum_{ji} |\text{MWh}_{jix}| * \text{BIP}_{ix})}{\sum_{ji} |\text{MWh}_{jix}|}$$

Where:

BIP_{ix} = BEEP Interval Ex Post Prices to be used for settlement of Uninstructed Imbalance Energy. The BEEP Interval Price for incremental Energy will be charged to decremental uninstructed deviations in that interval, and the BEEP Interval Price for incremental Energy will be charged to incremental uninstructed deviations in that interval.

P_{xt} = the Hourly Ex Post Price in Zone x

MWH_{jix} = the Instructed Imbalance Energy for Scheduling Coordinator j for the BEEP Interval i in Zone *x*

D 2.1.2 Instructed Imbalance Energy Charges on Scheduling Coordinators

Implicit Dispatch instructions for ramping Energy shall be calculated

~~based on Final Hour Ahead Schedules for Energy to result in a linear ramp by all Participating Generators and Participating Loads beginning 10 minutes prior to the start, and ending 10 minutes after the start of~~

~~each Settlement Period. Ramping Energy shall be deemed delivered and settled at a price of zero dollars per MWh.~~

~~The amount of Instructed Imbalance Energy to be delivered in each BEEP Interval will be determined based on the ramp rates and time delays bid in accordance with SBP 5 and 6. Payment due a Load, Generator, Import or Export for Instructed Imbalance Energy to be delivered in a BEEP Interval shall be calculated based on the actual Energy delivered to the ISO Grid in accordance with the Dispatch instruction.~~

~~Instructed Imbalance Energy by an Import or Export is deemed delivered. The actual Energy delivered by a Load or Generator in response to Dispatch instructions will be determined by first attributing Energy deviations to any Energy associated with redispatch of that Load or Generation in that BEEP Interval according to Section 7.2.6.2, or to Dispatch orders to be settled in accordance with Section 11.2.4.2. If instructions for both incremental and decremental Energy are issued in a BEEP Interval, then any instructions described in the previous sentence for decremental Energy, together with any decremental Dispatch instructions on Supplemental Energy, shall be deemed delivered.~~

~~Any remaining deviation will then be sequentially attributed to Instructed Imbalance Energy, first from Supplemental Energy, then from Replacement Reserve, then from Non-Spinning Reserve, and then from Spinning Reserve in that BEEP Interval.~~

~~Residual Instructed Imbalance Energy arising due to Dispatch instructions shall be priced based on the applicable BEEP Interval Ex Post Price for the BEEP Interval to which the Dispatch instruction applied. If Instructed Imbalance Energy is to be delivered in the last BEEP Interval of the hour preceeding the Settlement Period to which a Dispatch instruction applies shall be settled at the applicable BEEP Interval Ex Post Price for the first BEEP Interval of the Settlement Period for which the bid was submitted.~~

~~Subject to the above conditions, the Instructed Imbalance Energy charge for each BEEP Interval b of each Settlement Period t for Scheduling Coordinator j for Zone x is calculated using the following formulas:~~

~~The instructed Generation deviation payment/charge is calculated as follows:~~

~~$IGDC_{ib} = G_{ib} * P_b$~~

~~The instructed Load deviation payment/charge is calculated as follows:~~

~~$ILDC_{ib} = L_{ib} * P_b$~~

~~The instructed import deviation payment/charge is calculated as follows:~~

$~~IIDC_{qb} = I_{qb} * P_b~~$

~~**D 2.2 Unaccounted for Energy Charge**~~

~~The Unaccounted for Energy Charge on Scheduling Coordinator j for each BEEP Interval of each Settlement Period t for each relevant Zone is calculated in the following manner:~~

~~The UFE for each utility service territory *k* is calculated as follows,~~

$$E_{UFE\_UDC\_k} = \left(I_k - E_k + G_k - \left(RTM_k + LPM_k\right) - TL_k\right)$$

~~The Transmission Loss calculation for each BEEP Interval of each Settlement Period t per relevant Zone for each utility service territory k is calculated as follows,~~

$$TL_k = Total\_TLRC_{Losses} * (UDC_k\_Branch_{Losses} / Total\_Branch_{Losses})$$

~~Where:~~

$$Total\_TLRC_{Losses} = \sum\left[G_a * \left(1 - GMM_a\right)\right] + \sum\left[I_a\left(1 - GMM_{aq}\right)\right]$$

$$Total\_Branch_{Losses} = \frac{\left(\sum UDC_k - Branch_{Losses}\right)}{6}$$

~~Each metered demand point, either ISO grid connected or connected through a UDC, is allocated a portion of the UFE as follows:~~

$$E_{UFE\_z} = \frac{D_z}{\sum_z D_z} E_{UFE\_UDC\_k}$$

~~The UFE charge for Scheduling Coordinator j for each BEEP Interval b of each Settlement Period t per relevant Zone is then,~~

$$UFEC_j = \left(\sum_z E_{UFE\_z}\right) * BIP_{txt}$$

~~**D 3 Meaning of terms of formulae**~~

~~**D 3.1 IEC_j – $**~~

~~The Imbalance Energy charge on Scheduling Coordinator j in Trading Interval t for each relevant Zone.~~

~~D 3.2 $GenDev_i$ – MWh~~

~~The deviation between scheduled and actual Energy Generation for Generator i represented by Scheduling Coordinator j in Zone x during Trading Interval t.~~

~~**D 3.3 $LoadDev_i$ – MWh**~~

~~The deviation between scheduled and actual Load consumption for Generator i represented by Scheduling Coordinator j in Zone x during Trading Interval t.~~

~~**D 3.4 $ImpDev_q$ – MWh**~~

~~The deviation between forward scheduled and Real Time adjustments to Energy imports, as adjusted for losses, for Scheduling Point q represented by Scheduling Coordinator j into Zone x during Trading Interval t.~~

~~**D 3.5 $ExpDev_q$ – MWh**~~

~~The deviation between forward scheduled and Real Time adjustments to Energy exports for Scheduling Point q represented by Scheduling Coordinator j~~

~~from Zone x during Trading Interval t.~~

~~**D 3.6 G_S – MWh**~~

~~The total scheduled Generation of Scheduling Coordinator j for Generator i in Settlement Period t as a result of both the Day-Ahead Final Schedule and the Hour-Ahead Final Schedule.~~

~~**D 3.6.1 G_{s-1}**~~

~~The total scheduled Generation of Scheduling Coordinator j for Generator i in settlement Period t-1 as a result of both the Day-Ahead Final Schedule and the Hour-Ahead Final Schedule.~~

~~**D 3.6.2 G_{s+1}**~~

~~The total scheduled Generation of Scheduling Coordinator j for Generator i in settlement Period t+1 as a result of both the Day-Ahead Final Schedule and the Hour-Ahead Final Schedule.~~

~~**D 3.6.3 $G_{b,adj}$**~~

~~Is Deviation in real time ordered by the ISO in BEEP Interval b according to Section 7.2.6.2, or for settlement according to Section 11.2.4.2.~~

~~**D 3.7 G_{at} - MWh**~~

~~The total actual metered Generation of Scheduling Coordinator j for Generator i in Settlement Period t.~~

~~**D 3.8 G_{adj} – MWh**~~

~~Deviations in real time ordered by the ISO for purposes such as Congestion Management.~~

~~**D 3.9 $G_{a/s}$ – MWh**~~

~~The Energy generated from Ancillary Service resource i due to ISO dispatch instructions. This value will be calculated based on the projected impact of the Ancillary Services dispatch instruction(s) over the time period within the Trading Interval for which such Ancillary Services dispatch instruction(s) applies.~~

~~**D 3.9.1 $G_{s/e}$ MWh**~~

~~The Energy generated from Supplemental Energy resource i due to ISO dispatch instructions. This value will be calculated based on the projected impact of the Supplemental Energy dispatch instruction(s) over the time period within the Trading Interval for which such Supplemental Energy dispatch instruction(s) applies.~~

~~**D 3.10 GMM_f – fraction**~~

~~The forecasted Generation Meter Multiplier (GMM) for Generator i as provided to the Scheduling Coordinator by the ISO in advance of the operation of the Day-Ahead Market.~~

~~**D 3.11 GMM_{fq} – fraction**~~

~~The forecasted Generation Meter Multiplier for an Energy import at Scheduling Point q as provided to the Scheduling Coordinator by the ISO in advance of the Day-Ahead Market.~~

~~**D 3.12 GMM_{ah} – fraction**~~

~~The final forecasted Generation Meter Multiplier (GMM) for a Generator i as calculated by the ISO at the hour-ahead stage (but after close of the Hour-Ahead Market).~~

~~**D 3.13 GMM_{ahq} – fraction**~~

~~The forecasted Generation Meter Multiplier for an Energy import at Scheduling Point q as provided to the Scheduling Coordinator by the ISO after close of the Hour-Ahead Market.~~

~~**D 3.14 L_S – MWh**~~

~~The total scheduled Demand of Scheduling Coordinator j for Demand i in Settlement Period t as a result of both the Day-Ahead Final Schedule and the Hour-Ahead Final Schedule.~~

~~**D 3.15 L_a – MWh**~~

~~The total actual metered Demand of Scheduling Coordinator j for Demand i in BEEP Interval b of Settlement Period t.~~

~~**D 3.15.1 L_{at} – MWh**~~

~~The total actual metered Demand of Scheduling Coordinator j for Demand i in Settlement Period t.~~

D 3.15.2 $L_{b,adj}$

Is Deviation in real time ordered by the ISO in BEEP Interval b according to Section 7.2.6.2, or for settlement according to Section 11.2.4.2.

D 3.16 [Not Used]

D 3.17 $L_{a/s}$ – MWh

The Energy reduction by curtailable Load due to ISO dispatch of Ancillary Services from such curtailable Load (i.e., Load bidding into the Ancillary Services markets). This value will be calculated based on the projected impact of the Ancillary Services dispatch instruction(s) over the time period within the Trading Interval for which such Ancillary Services dispatch instruction(s) applies.

D 3.17.1 $L_{s/e}$ MWh

The Energy reduction by curtailable Load due to ISO dispatch of Supplemental Energy from such curtailable Load. This value will be calculated based on the projected impact of the Supplemental Energy dispatch instruction(s) over the time period within the Trading Interval for which such Supplemental Energy dispatch instruction(s) applies.

D 3.18 I_S – MWh

The total scheduled Energy import of Scheduling Coordinator j through Scheduling Point q in Settlement Period t as a result of both the Day-Ahead Final Schedule and the Hour-Ahead Final Schedule.

D 3.19 I_a – MWh

The total actual Energy import of Scheduling Coordinator j through Scheduling Point q in BEEP Interval b in Settlement Period t. This is deemed to be equal to the total scheduled Energy import I_S.

D 3.20 $I_{b,adj}$ – MWh

The deviation in real time import ordered by the ISO for congestion management, overgeneration, etc. or a result of an import curtailment. This value will be calculated based on the projected impact of the Dispatch instruction(s) (or curtailment event) between the close of the Hour-Ahead Market and the end of the Trading Interval for which such Dispatch Instructions(s) (or curtailment event) applies.

D 3.21 $I_{a/s}$ – MWh

The Energy generated from Ancillary Service System Resources pursuant to Existing Contracts or Supplemental Energy from interties due to ISO's Dispatch instruction.

D 3.22 E_S – MWh

The total scheduled Energy export of Scheduling Coordinator j through Scheduling Point q in Settlement Period t as a result of both the Day-Ahead Final Schedule and the Hour-Ahead Final Schedule.

D 3.23 E_a – MWh

The total actual Energy export of Scheduling Coordinator j through Scheduling Point q in BEEP Interval b of Settlement Period t. This is deemed to be equal to the total scheduled Energy export E_S.

D 3.24 E_{adj} – MWh

The deviation in Real Time export ordered by the ISO for Congestion Management, Overgeneration, etc. or as a result of an export curtailment. This value will be calculated based on the projected impact of the Dispatch Instruction(s) (or curtailment event) between the close of the Hour-Ahead Market and the end of the Trading Interval for which such Dispatch Instruction (or curtailment event) applies.

D 3.25 P_{xt} – $/MWh

The Hourly Ex Post Price for Imbalance Energy for the relevant Trading Interval. This value is calculated as the weighted average of the 12 Five Minute Ex Post Prices in each Zone during each hour. The Five Minute Ex Post Price is equal to the bid price of the marginal resource accepted by the ISO for dispatch and deemed eligible to set the price during a five minute period.

D 3.25.1 P_{eff} – $

Effective Price for Instructed Imbalance Energy for the relevant Settlement Period.

D 3.26 $UFEC_j$ – $

The Unaccounted for Energy Charge for Scheduling Coordinator j is the cost representing the difference in Energy, for each UDC Service Area and Trading Interval, between the net Energy delivered into the UDC Service Area, adjusted for UDC Service Area Transmission Losses (calculated in accordance with ISO Tariff Section 7.4.3), and the total metered Demand within the UDC Service Area adjusted for distribution losses using Distribution System loss factors approved by the Local Regulatory Authority.

This difference (UFE) which is attributable to meter measurement errors, power flow modeling errors, energy theft, statistical Load profile errors, and distribution loss deviations is multiplied by the Hourly Ex-Post Price.

D 3.27 $E_{UFE\_UDC\_k}$ – MWh

The Unaccounted for Energy (UFE) for utility service territory k.

~~**D 3.28 E_{UFE_z} – MWh**~~

~~The portion of Unaccounted for Energy (UFE) allocated to metering point z.~~

~~**D 3.29 $RRDC_j$**~~

~~The Replacement Reserve Capacity Dispatch Charge for Scheduling Coordinator j for Trading Interval t.~~

D 3.30 RRC – $

The Dispatched Replacement Reserve Capacity Cost which is to be allocated to Scheduling Coordinators in proportion to their contributions to Imbalance Energy requirements. The RRC is, in turn, calculated as the total cost of Replacement Reserve capacity in Trading Interval t (as determined in the Hour-Ahead and Day-Ahead Markets) less the Undispatched Replacement Reserve Capacity Cost. [Note: Both these costs are dealt with in the Ancillary Services payments in Appendix C]

D 3.31 G_k – MWh

The total metered Generation in BEEP Interval b of Settlement Period t in utility service territory k.

D 3.32 D_z – MWh

The Demand including Exports in BEEP Interval b of Settlement Period t at metered point z.

D 3.33 I_k – MWh

The total metered imports into utility service territory k in BEEP Interval b of Settlement Period t.

D 3.34 E_k – MWh

The total metered exports from utility service territory k in BEEP Interval b of Settlement Period t.

D 3.35 RTM_k – MWh

The Trading Interval t total of the real-time metering in utility service territory k in BEEP Interval b of Settlement Period t.

D 3.36 LPM_k – MWh

The calculated total of the Load Profile metering in utility service territory k per BEEP Interval b of Settlement Period t.

D 3.37 TL_k – MWh

The Transmission Losses per BEEP Interval b of Settlement Period t in utility service territory k.

~~D 3.38 $IGDC_{ib}$ - $~~

~~The total of instructed Generation deviation payments/charges for Scheduling Coordinator j in BEEP Interval b of Settlement Period t.~~

~~D 3.39 $ILDC_{ib}$ - $~~

~~The total of instructed Load deviation payments/charges for Scheduling Coordinator j in BEEP Interval b of Settlement Period t.~~

~~D 3.40 $IIDC_{ib}$ - $~~

~~The total of instructed import deviation payments/charges for Scheduling Coordinator j in BEEP Interval b of Settlement Period t.~~

D 3.41 **G_{ib} – MW**

Instructed Energy for Generating Unit i during BEEP Interval b.

D 3.42 **L_{ib} – MW**

Instructed Energy for Load i during BEEP Interval b.

D 3.43 **I_{iqb} – MW**

Instructed Energy for import q during BEEP Interval b

D 3.44 **P_b – $/MWh**

The BEEP Incremental Ex Post Price for BEEP Interval b if the net instructed Energy for resources is positive, or the BEEP decremental Ex Post Price for BEEP Interval b if the net instructed Energy for resources is negative.

D 3.45 **HBI – Number**

The number of BEEP Intervals in Settlement Period t, currently set to 6.

D 3.46 **$ReplObligRatio_{jxt}$ – fraction**

$$ReplObligRatio_{jxt} = \frac{ReplOblig_{jxt}}{\sum_{j} ReplOblig_{jxt}}$$

where:

$ReplOblig_{jxt}$ is the replacement reserve capacity obligation as defined in Appendix C Section 3.67.

D 3.47 **$G_{i,\ oblig}$**

The amount of Spinning Reserve, the amount of Non-Spinning Reserve, and the amount of Replacement Reserve that Generating Unit or System Resource i has been selected to supply to the ISO, as reflected in final Ancillary Services Schedules.

D 3.48 **$PMax_i$**

The maximum capability (in MW) at which Energy and Ancillary Services may be scheduled from the Generating Unit or System Resource i.

D 3.49 **$L_{i,\ oblig}$**

The amount of Non-Spinning Reserve and Replacement Reserve that dispatchable Load i has been selected to supply to the ISO as reflected in final Ancillary Services schedules for Settlement Period t.

APPENDIX E

CONGESTION REVENUE DISTRIBUTION

E 1 Purpose of Charge

Scheduling Coordinators will be charged for the use of Congested transmission or will receive payments for relieving the Congestion through the Settlement of Final Day-Ahead and Hour-Ahead Energy Schedules and through the Real-Time Imbalance Energy Market at the relevant Locational Marginal Prices. Scheduling Coordinators will also be charged for using Congested interties to import Ancillary Services.

Terms used in this Appendix:

Ancillary Service Congestion Charge is a charge to a Scheduling Coordinator for importing Spinning Reserve or Non-Spinning Reserve across a Congested intertie.. The charge for each service from each resource in each market (Day-Ahead Market or Hour Ahead Market) in each Settlement Period at each intertie equals the amount of import multiplied by the Ancillary Service Congestion Price at the intertie..

Ancillary Service Congestion Price is the Shadow Price of the transmission interface for a given market (Day-Ahead Market or Hour-Ahead Market) for a Settlement Period.

Shadow Price is the marginal price of reserving transmission capacity on the congested inter-tie to accommodate the associated Ancillary Services capacity.

E 2 Fundamental Formulae

E 2.1 ISO Credits and Debits to Transmission Owners and FTR Holders of Congestion Revenues

E 2.1.1 Day-Ahead Market

The ISO will pay or charge to FTR Holder *n* of a Point-To-Point FTR Obligation from node *i* to node *j* its share of the Congestion Revenue (which will be positive for payments or negative for charges) for Settlement Period t in the Day-Ahead Market as follows:

$$PayCR_{ntd}^{i\to j} = \left(\lambda_{jtd} - \lambda_{itd}\right) * L_{nt}^{i\to j}$$

The ISO will pay to FTR Holder *n* of a Point-To-Point FTR Option from node *i* to node *j* its share of the Congestion Revenue (only if positive) for Settlement Period t in the Day-Ahead Market as follows:

$$PayCR_{ntd}^{i\to j} = \max\left(0, \left(\lambda_{jtd} - \lambda_{itd}\right) * L_{nt}^{i\to j}\right)$$

To avoid double subscripts in notations, any Network Service Right can be described, without loss of generality, as the right for sending (p_1, p_2, …, p_s) % of one MW at nodes (1,2, …, *s*) and receiving (p_{s+1}, p_{s+2}, …, p_{s+r}) % of one MW at nodes (*s*+1, *s*+2, …, *s*+r). Using this notation, the ISO will pay or charge to FTR Holder *n* of Network Service Rights from node set {*i*} to node set {*j*} its share of the Congestion Revenue (which

will be positive for payments or negative for charges) for Settlement Period t in the Day-Ahead Market as follows:

$$PayCR_{ntd}^{\{i\}\to\{j\}} = \left(\sum_{j=s+1}^{s+r} \lambda_{jtd} p_{jt} - \sum_{i=1}^{s} \lambda_{itd} p_{it} \right) * L_{nt}^{\{i\}\to\{j\}}$$

The Congestion Revenue that remains after deducting the payments to FTR holders will accumulate in the FTR Balancing Account.

E 2.1.2 Hour-Ahead Market

The Congestion Revenue collected through Settlement of Energy at Hour-Ahead LMPs and through the Ancillary Service Congestion Charge in the Hour-Ahead Market will accumulate in the FTR Balancing Account.

FTR holders are not entitled or obligated to any Congestion Revenue collected through Hour-Ahead Market.

E 3 Meaning of terms of formulae

E 3.1 λ_{jtd} **($/MWh)**

The reference Locational Marginal Price for node j for the relevant Settlement Period t in the Day-Ahead Market, as calculated by SCUC.

E 3.2 $PayCR_{ntd}^{i\to j}$ **($)**

The amount calculated by the ISO to be paid to or by the FTR Holder n of Point-To-Point FTR from node *i* to node *j* for the relevant Settlement Period t in the Day-Ahead Market.

E 3.3 $PayCR_{ntd}^{\{i\}\to\{j\}}$ **($)**

The amount calculated by the ISO to be paid to or by the FTR Holder n of Network Service Rights from node set {*i*} to node set {*j*} for the relevant Settlement Period t in the Day-Ahead Market.

E 3.4 $L_{nt}^{i\to j}$ **($)**

The amount FTR owned by the FTR Holder n of Point-To-Point FTR from node *i* to node *j* for the relevant Settlement Period t.

E 3.5 $L_{nt}^{\{i\}\to\{j\}}$ **($)**

The amount FTR owned by the FTR Holder n of Network Service Rights from node set {*i*} to node set {*j*} for the relevant Settlement Period t.

APPENDIX E

USAGE CHARGE COMPUTATION

E 1 Purpose of Charge

The Usage Charge is payable by Scheduling Coordinators who schedule Energy across Congested Inter-Zonal Interfaces pursuant to Section 7.2.5 of the ISO Tariff. Scheduling Coordinators who counter-schedule across Congested Inter-Zonal Interfaces are entitled to Usage Charge Payments. The right to schedule across a Congested Inter-Zonal Interface is determined through the ISO's Congestion Management procedures.

The following categories of Payments and Charges are covered in this Appendix E:

(a) Usage Charges payable by Scheduling Coordinators for Energy transfers scheduled across Congested Inter-Zonal Interfaces and which contribute to Congestion.

(b) Usage Charge rebates payable to Scheduling Coordinators for Energy transfers scheduled across Congested Inter-Zonal Interfaces and which contribute to relieving Congestion.

(c) Credits of net Usage Charge revenues to Participating TOs and FTR Holders.

(d) Debits of net Usage Charge revenues to Participating TOs and FTR Holders.

(e) Debits and rebates of Usage Charge to Scheduling Coordinators as set out in E 2.3.3.

E 2 Fundamental Formulae

E 2.1 ISO Usage Charges on Scheduling Coordinators

Each Scheduling Coordinator j whose Final Schedule includes the transfer of Energy scheduled across one or more Congested Inter-Zonal Interfaces shall (save to the extent that the transfer involves the use of transmission capacity represented by Existing Rights) pay, or be paid, Usage Charges in Trading Interval t calculated in accordance with the following formulae:

In the Day-Ahead Market:

$$UC_{jtd} = \sum_{x} NetZoneImp_{jtxd} * \lambda_{dxt}$$

In the Hour-Ahead Market:

$$UC_{jth} = \sum_{x} (NetZoneImp_{jtxh} - NetZoneImp_{jtxd}) * \lambda_{hxt}$$

E 2.2 Payments of Usage Charges to Scheduling Coordinators

Each Scheduling Coordinator j whose Final Schedule includes the transfer of Energy from one Zone to another in a direction opposite that

of Congestion shall (save to the extent that the transfer involves the use of transmission capacity represented by Existing Rights) receive a Usage Charge payment from the ISO calculated in accordance with the formulae described in Section E 2.1.

E 2.3 ISO Credits and Debits to Transmission Owners and FTR Holders of Usage Charge Revenues

E 2.3.1 Day-Ahead Market

The ISO will pay to the Participating TO n and FTR Holder n its share of the total net Usage Charge revenue for Trading Interval t in the Day-Ahead Market in accordance with the following formula:

$$PayUC_{ntd} = \sum_{y} \mu_{ytd} * K_{yn} * L_{ytd}$$

E 2.3.2 Hour-Ahead Market

The ISO will pay to the Participating TO n and FTR Holder n its share of the total net Usage Charge revenue for Trading Interval t in the Hour-Ahead Market in accordance with the following formula:

$$PayUC_{nth} = \sum_{y} \mu_{yth} * K_{yn} * (L_{yth} - L_{ytd})$$

Under normal operating conditions, $(L_{yth} - L_{ytd})$ is positive and Participating TOs and FTR Holders will receive a refund on the net Usage Charge for the relevant Trading Interval t in the Hour-Ahead Market.

E 2.3.3 Debits to Participating TOs and FTR Holders and Debits/Rebates to Scheduling Coordinators

If, after the close of the Day-Ahead Market, Participating TOs instruct the ISO to reduce interface limits based on operating conditions or an unscheduled transmission outage occurs and as a result of either of those events, Congestion is increased and Available Transfer Capacity is decreased in the Inter-Zonal Interface in the Hour-Ahead Market, the $(L_{yth} - L_{ytd})$ will be negative. In this case:

(a) Participating TOs and FTR Holders will be charged for the Usage Charge payments they received for the relevant Trading Interval t in the Day-Ahead Market with respect to the reduced interface limits;

(b) Any Scheduling Coordinator whose Schedule was adjusted for the relevant Trading Interval t in the Hour-Ahead Market due to the reduced interface limits will be credited with μ_{yth} for each MW of the adjustment; and

(c) Each Scheduling Coordinator will be charged an amount equal to it proportionate share, based on Schedules in the Day-Ahead Market in the direction of Congestion, of the difference between $\mu_{yth}(L_{yth} - L_{ytd})$ and the total amount charged to Participating TOs and FTR Holders in accordance with item (a) above.

~~The ISO will issue a notice to Scheduling Coordinators of the operating hour, and extent, for which the derate will apply in the relevant Hour-Ahead Markets. The timing and form of such notices shall be set forth in ISO procedures.~~

~~**E 3 Meaning of terms of formulae**~~

~~**E 3.1 UC_{jtd} ($)**~~

~~The Usage Charge payable by or to Scheduling Coordinator j for the relevant Trading Interval t in the Day-Ahead Market.~~

~~**E 3.2 UC_{jth} - $**~~

~~The Usage Charge payable by or to Scheduling Coordinator j for Trading Interval t in the Hour-Ahead Market.~~

~~**E 3.3 $NetZoneImp_{jtxd}$ (MWh)**~~

~~The net Zonal import scheduled by Scheduling Coordinator j in Zone x for the relevant Trading Interval t in the Day-Ahead Market. For Zones internal to the ISO Control Area, net Zonal import equals scheduled Demand minus scheduled Generation plus transfers. For zones external to the ISO Control Area (i.e., for Scheduling Points), net zonal import equals scheduled imports (i.e., out of the ISO Control Area) minus scheduled exports (i.e., into the ISO Control Area).~~

~~**E 3.4 $NetZoneImp_{jtxh}$ (MWh)**~~

~~The net Zonal import scheduled by the Scheduling Coordinator j in Zone x for the relevant Trading Interval t in the Hour-Ahead Market. For Zones internal to the ISO Control Area, net Zonal import equals scheduled Demand minus scheduled Generation plus transfers. For Zones external to the ISO Control Area (i.e., for Scheduling Points), net zonal import equals scheduled imports (i.e., out of the ISO Control Area) minus scheduled exports (i.e., into the ISO Control Area).~~

~~**E 3.5 λ_{dxt} ($/MWh)**~~

~~The reference Zonal marginal price for Zone x for the relevant Trading Interval t in the Day-Ahead Market, as calculated by the ISO's Congestion Management computer optimization algorithm.~~

~~**E 3.6 λ_{hxt} ($/MWh)**~~

~~The reference Zonal marginal price for Zone x for the relevant Trading Interval t in the Hour-Ahead Market, as calculated by the ISO's Congestion Management computer optimization algorithm.~~

~~**E 3.7 $PayUC_{ntd}$ ($)**~~

~~The amount calculated by the ISO to be paid to or by the Participating TO n (in respect of its Transmission Revenue Balancing Account) and FTR Holder n for the relevant Trading Interval t in the Day-Ahead Market.~~

~~E 3.7.1 $PayUC_{nth}$ ($)~~

~~The amount calculated by the ISO to be paid to the Participating TO n (in respect of its Transmission Revenue Balancing Account) and FTR Holder n for the relevant Trading Interval t in the Hour-Ahead Market.~~

~~E 3.8 μ_{ytd} ($/MW)~~

~~The Day-Ahead Congestion price (shadow price) at Inter-Zonal interface y for Trading Interval t. This price is calculated by the ISO's Congestion Management computer optimization algorithm.~~

~~E 3.8.1 μ_{yth} ($/MW)~~

~~The Hour-Ahead Congestion price (shadow price) at Inter-Zonal Interface y for Trading Interval t. This price is calculated by the ISO's Congestion Management computer optimization algorithm.~~

~~E 3.9 K_{ytn} (%)~~

~~The percentage of the Inter-Zonal Congestion revenue alocation for Participating TO n and FTR Holder n of the Congested Inter-Zonal interface y for the relevant Trading Interval t for both Day-Ahead and Hour-Ahead Markets.~~

~~E 3.10 L_{ytd} (MW)~~

~~The total loading of Inter-Zonal Interface y for Trading Interval t in the Day-Ahead as calculated by the ISO's Congestion Management optimization algorithm.~~

~~E 3.11 L_{yth} (MW)~~

~~The total loading of Inter-Zonal Interface y for Trading Interval t in the Hour-Ahead as calculated by the ISO's Congestion Management optimization algorithm.~~

APPENDIX F

WHEELING ACCESS CHARGES COMPUTATION

F 3.3 Q_n **(MW)**

The Available **Transmission**~~Transfer~~ Capacity, whether from transmission ownership or contractual entitlements, of each Participating TO n for each ISO Scheduling Point which has been placed within the ISO Controlled Grid. Available **Transmission**~~Transfer~~ Capacity does not include capacity associated with Existing Rights of a Participating TO as defined in Section 2.4.4 of the ISO Tariff.

F 3.4 $WChg_{jq}$ **($)**

The Wheeling Charges by the ISO on Scheduling Coordinator j for Scheduling Point q in Trading Interval t. Both Wheeling Out and Wheeling Through transactions are included in this term.

F 3.5 $QChargeW_{jqt}$ **(kWh)**

The summation of kWh wheeled over Scheduling Point q by Scheduling Coordinator j in Trading Interval t. Both Wheeling Out and Wheeling Through transactions are included in this term.

APPENDIX G

VOLTAGE SUPPORT and BLACK START CHARGES COMPUTATION

G 1 **Purpose of charge**

G 1.1 Voltage Support (VS) and Black Start (BS) charges are the charges made by the ISO to recover costs it incurs under contracts entered into between the ISO and those entities offering to provide VS or BS. Each Scheduling Coordinator pays an allocated proportion of the VS&BS charge to the ISO so that the ISO recovers the total costs incurred.

G 1.2 All Generating Units are required by the ISO Tariff to provide reactive power by operating within a power factor range of 0.90 lag and 0.95 lead. Additional short term Voltage Support required by the ISO is referred to as supplemental reactive power. If the ISO requires the delivery of this supplemental reactive power by instructing a Generating Unit to operate outside its mandatory MVar range, the Scheduling Coordinator representing this Generating Unit will only receive compensation if it is necessary to reduce the MW output to achieve the MVar instructed output. Supplemental reactive power charges to Scheduling Coordinators are made on a ~~Trading~~Dispatch Interval basis. As of the ISO Operations Date the ISO will contract for long term Voltage Support Service with the Owner of Reliability Must-Run Units under Reliability Must-Run contracts.

G 1.3 The ISO will procure Black Start capability through contracts let on an annual basis. The quantities and locations of the Black Start capability will be determined by the ISO based on system analysis studies. Charges to Scheduling Coordinators for instructed Energy output from Black Start units are made on a ~~Trading~~Dispatch Interval basis.

G 2 **Fundamental formulae**

G 2.1 **Payments to Scheduling Coordinators for providing Voltage Support**

Payments to Scheduling Coordinators for additional Voltage Support service comprise:

G.2.1.1 **Lost Opportunity Cost Payments (supplemental reactive power) to Scheduling Coordinators for Generating Units**

When the ISO obtains additional Voltage Support by instructing a Generating Unit to operate outside its mandatory MVar range by reducing its MW output the ISO will select Generating Units based on their Supplemental Energy Bids ($/MWh). Subject to any locational requirements the ISO will select the Generating Unit with the highest decremental Supplemental Energy Bid to reduce MW output by such amount as is necessary to achieve the instructed MVar reactive energy production. Each ~~Trading~~Dispatch Interval the ISO will pay Scheduling Coordinator j for that Generating Unit i in ~~Zone~~Location x, the lost opportunity cost ($) resulting from the reduction of MW output in ~~Trading~~Dispatch Interval t in accordance with the following formula:

$VSST_{xijt} = Max\ \{0, P_{xt} - Sup_{xdecit}\} * DEC_{xit}$

G 2.1.2 Long term contract payments to Scheduling Coordinators for Reliability Must-Run Units for Generating Units and other Voltage Support Equipment

The ISO will pay Scheduling Coordinator j for the provision of Voltage Support from its Reliability Must-Run Units located ~~in Zone~~at Location x in month m a sum ($VSLT_{xjm}$) consisting of:

(a) the total of the Ancillary Service Pre-empted Dispatch Payments if the ISO has decreased the output of the Reliability Must-Run Units for the provision of Voltage Support outside the power factor range of the Reliability Must-Run Unit in any ~~Trading~~Dispatch Interval in month m and/or

(b) (if applicable) the total payments for the provision of Voltage Support in month m requested by the ISO from the synchronous condensers of the Reliability Must-Run Units,

calculated in each case in accordance with the terms of the relevant Reliability Must-Run Contract. Data on these payments will not be generated by the ISO. Such data will be based on the invoices issued by the Owners of Reliability Must-Run Generating Units pursuant to their Reliability Must-Run Contracts and will be verified by the ISO.

G 2.2 Charges to Scheduling Coordinators for Voltage Support

G 2.2.1 User Rate

The user rate ($/MWh) for the lost opportunity cost for voltage support referred to in G2.1.1 in ~~Zone~~Load Zone ~~x~~ y for ~~Trading~~Dispatch Interval t will be calculated using the following formula:

$$VSSTRate_{yt} = \frac{\sum_{ijx} VSST_{xijt}}{\sum_{j} QChargeVS_{yjt}} \quad \sim\sim VSSTRate_{xt} = \frac{\sum_{ij} VSST_{xijt}}{\sum_{j} QChargeVS_{xjt}} \sim\sim$$

The user rate ($/MWh) for month m for long term voltage support referred to in G2.1.2 in ~~Zone~~Load Zone ~~x~~ y will be calculated using the following formula:

$$VSSTRate_{ym} = \frac{\sum_{jx} VSLT_{xjm}}{\sum_{jm} QChargeVS_{yjt}} \quad \sim\sim VSSTRate_{xm} = \frac{\sum_{j} VSLT_{xjm}}{\sum_{jm} QChargeVS_{xjt}} \sim\sim$$

G 2.2.2 Voltage Support Charges

The lost opportunity cost Voltage Support charge ($)payable to recover the sums under G2.1.1 for ~~Zone~~Load Zone ~~x~~ y for ~~Trading~~Dispatch Interval t for Scheduling Coordinator j will be calculated using the following formula:

$$VSSTCharge_{yjt} = VSSTRate_{ym} * QChargeVS_{yjt}$$

~~$VSSTCharge_{xjt} = VSSTRate_{xt} * QChargeVS_{xjt}$~~

The monthly long term voltage support charge ($) payable to recover sums under G2.1.2 for ~~Zone~~Load Zone ~~x~~ y for month m for Scheduling Coordinator j will be calculated using the following formula:

$$VSLTCharge_{yjm} = VSLTRate_{ym} * \sum_m QCharge_{yjt}$$

$$VSLTCharge_{xjm} = VSLTRate_{xm} * \sum_m QChargeVS_{xjt}$$

G 2.3 Payments to Participating Generators for Black Start

Payments to Participating Generators that provide Black Start Energy or capability shall be made in accordance with the agreements they have entered into with the ISO for the provision of Black Start services and shall be calculated as follows:

G 2.3.1 Black Start Energy Payments

Whenever a Black Start Generating Unit provides a Black Start in accordance with the ISO's instructions, the ISO will pay the Black Start Generator for that Unit for the Generating Unit's energy output and start-up costs. The ISO will pay Black Start Generator for Generating Unit i, the Black Start energy and start-up costs ($) in ~~Trading~~Dispatch Interval t in accordance with the following formula:

$$BSEn_{ijt} = (EnQBS_{ijt} * EnBid_{ijt}) + BSSUP_{ijt}$$

G 2.3.2 Black Start Energy Payments to Owners of Reliability Must-Run Units

Whenever a Reliability Must-Run Unit provides a Black Start in accordance with the ISO's instructions, the ISO will pay the Scheduling Coordinator of the Reliability Must-Run Unit the Generating Unit's Energy and start-up costs. The ISO will pay Scheduling Coordinator j for Reliability Must-Run Unit i the Black Start Energy and start-up costs ($) in ~~Trading~~Dispatch Interval t in accordance with the following formula:

$$BSEn_{ijt} = (EnQBS_{ijt} * EnBid_{ijt}) + (BSSUP_{ijt})$$

G 2.4 Charges to Scheduling Coordinators for Black Start

G 2.4.1 User Rate

The user rate ($/MWh) for Black Start Energy payments referred to in G2.3.1 and G2.3.2 for ~~Trading~~Dispatch Interval t will be calculated using the following formula:

$$BSRate_t = \frac{\sum_{ij} BSEn_{ijt}}{\sum_j QChargeBlackStart_{jt}}$$

G 2.4.2 Black Start Charges

The user charge ($/MWh) for Black Start Energy to recover the costs of payments under G2.3.1 and G2.3.2 for ~~Trading~~Dispatch Interval t for Scheduling Coordinator j will be calculated using the following formula:

$$BSCharge_{jt} = BSRate_t * QChargeBlackStart_{jt}$$

G 3 Meaning of Terms in the Formulae

G 3.1 **$VSST_{xijt}$** **($)**

The lost opportunity cost paid by the ISO to Scheduling Coordinator j for Generating Unit i ~~in Zone~~at Location x, resulting from the reduction of MW output in ~~Trading~~Dispatch Interval t.

G 3.2 **P_{xt}** **($/MWh)**

The ~~Hourly~~ Location Marginal Price~~Ex Post price~~ for Imbalance Energy in ~~Trading~~Dispatch Interval t ~~in Zone~~at Location x.

G 3.3 **Sup_{xdecit}** **($/MWh)**

The Supplemental Energy Bid ~~submitted by~~ for Scheduling Coordinator j for Generating Unit i ~~in~~at ~~Zone~~Location~~e~~ x in ~~Trading~~Dispatch Interval t, whose output is reduced by the ISO to provide additional short term Voltage Support.

G 3.4 **Dec_{xit}** **(MW)**

The reduction in MW by Scheduling Coordinator j for Generating Unit i ~~in Zone~~at Location x in ~~Trading~~Dispatch Interval t, in order to provide short term additional Voltage Support.

G 3.5 **$VSLT_{xjm}$** **($)**

The payment from the ISO to Scheduling Coordinator j for its Reliability Must-Run Units ~~in~~at ~~Zone~~Location x for Voltage Support in month m calculated in accordance with the relevant Reliability Must-Run Contract.

G 3.6 **~~$VSSTRate_{xt}$~~ $VSSTRate_{yt}$** **($/MWh)**

The ~~Trading~~Dispatch Interval lost opportunity cost Voltage Support user rate charged by the ISO to Scheduling Coordinators for ~~Trading~~Dispatch Interval t for ~~Zone~~Load Zone ~~x~~y.

G 3.7 **~~$VSLTRate_{xm}$~~ $VSLTRate_{ym}$** **($/MWh)**

The monthly long term voltage support user rate charged by the ISO to Scheduling Coordinators for month m for ~~Zone~~Load Zone ~~x~~y.

G 3.8 **$QChargeVS_{xyjt}$** **(MWh)**

The charging quantity for Voltage Support for Scheduling Coordinator j for ~~Trading~~Dispatch Interval t in ~~Zone~~Load Zone ~~x~~ y equal to the total metered Demand (including exports to neighboring Control Areas) for Scheduling Coordinator j in ~~Zone~~Load Zone ~~x~~ y for ~~Trading~~Dispatch Interval t.

G 3.9 **~~$VSSTCharge_{xjt}$~~ $VSSTCharge_{yjt}$** **($)**

The lost opportunity cost Voltage Support user charge for ~~Zone~~Load Zone ~~x~~ y for ~~Trading~~Dispatch Interval t for Scheduling Coordinator j.

G 3.10	~~**VSLTCharge$_{xjm}$**~~**VSLTCharge$_{yjm}$**	**($)**
	The long term charge for voltage support for month m for ~~Zone~~Load Zone ~~x~~ y for Scheduling Coordinator j.	

G 3.11 **$BSEn_{ijt}$** **($)**

The ISO payment to Scheduling Coordinator j (or Black Start Generator j) for that Generating Unit i providing Black Start Energy in ~~Trading~~Dispatch Interval t.

G 3.12 **$EnQBS_{ijt}$** **(MWh)**

The energy output, instructed by the ISO, from the Black Start capability of Generating Unit i from Scheduling Coordinator j (or Participating Generator j) for ~~Trading~~Dispatch Interval t.

G 3.13 **$EnBid_{ijt}$** **($/MWh)**

The price for Energy output from the Black Start capability of Generating Unit i of Scheduling Coordinator j or (Black Start Generator j) for ~~Trading~~Dispatch Interval t calculated in accordance with the applicable Reliability Must-Run Contract or Interim Black Start Agreement.

G 3.14 **$BSSUP_{ijt}$** **($)**

The start-up payment for a Black Start successfully made by Generating Unit i of Scheduling Coordinator j (or Black Start Generator j) in ~~Trading~~Dispatch Interval t calculated in accordance with the applicable Reliability Must-Run Contract or Interim Black Start Agreement.

G 3.15 **$BSRate_t$** **($/MWh)**

The Black Start Energy Payment user rate charged by the ISO to Scheduling Coordinators for ~~Trading~~Dispatch Interval t.

G 3.16 **$QChargeBlackstart_{jt}$** **(MW)**

The charging quantity for Black Start for Scheduling Coordinator j for ~~Trading~~Dispatch Interval t equal to the total metered Demand (excluding exports to neighboring Control Areas) of Scheduling Coordinator j for ~~Trading~~Dispatch Interval t.

APPENDIX H. UNIT COMMITMENT COST

H.1 Calculation of Unrecovered Commitment Cost

The Unrecovered Commitment Costs will be calculated ex post for each committed unit for each Commitment Period as follows:

1) The Minimum Load Cost *MLC* will be calculated from the average proxy cost at minimum load P_{min}, using the average heat rate function *AHR(P)* in Btu/kWh, the relevant gas price index *GPI* in $/Btu, and a $6/MWh adder for O&M costs:

$$MLC = \left(0.001\ AHR(P_{\min})\ GPI + 6\right) P_{\min} \quad (1)$$

2) For each Qualifying Hour *h*, the market revenue *MR* will be calculated for each Dispatch Interval *k* as the total of all Instructed Imbalance Energy and Uninstructed Imbalance Energy payments in that interval.

3) For each Qualifying Hour *h*, the operating cost *OC* will be calculated for each Dispatch Interval *k* as the proxy cost at the dispatched output P_k:

$$OC_{h,k} = \left(0.001\ AHR(P_k)\ GPI + 6\right) P_k \quad (2)$$

4) For each Qualifying Hour *h*, the market deficiency *MD* for recovering *MLC* will be calculated as follows:

$$MD_h = \min\left(0, \sum_{k=1}^{6} MR_{h,k} - MLC\right) \quad (3)$$

5) For each Qualifying Hour *h*, the market profit *MP* will be calculated as follows:

$$MP_h = \max\left(0, \sum_{k=1}^{6} \left(MR_{h,k} - OC_{h,k}\right)\right) \quad (4)$$

6) The Unrecovered Commitment Costs *UCC* for the Commitment Period will be calculated as the net of market deficiencies, market profits, and allocated startup costs *SC*, over all Qualifying Hours:

$$UCC = \min\left(0, \sum_{h} MP_h + \sum_{h} MD_h - \frac{m}{n} SC\right) \quad (5)$$

where *n* is the number of hours in an ISO Commitment Period and *m* is the number of Qualifying Hours within the Commitment Period.

Negative *UCC* indicates unrecovered cost that should be paid to eligible resources.

H.2 Allocation of Unrecovered Commitment Cost

For cost allocation purposes, the *UCC* for each committed resource for each eligible Commitment Period will be distributed evenly over all Qualifying Hours in that Commitment Period:

$$UCC_h = \frac{UCC}{m} \quad (6)$$

The total of all distributed *UCC* from all resources in a given hour would constitute the total Unrecovered Commitment Cost *TUCC* that needs to be allocated in that hour. Then, the *TUCC* will be allocated in two tiers as follows:

$$TUCC_1 = TUCC \min\left(1, \frac{\max(0, D_M - D_S)}{\max(0, D_F - D_S)}\right)$$
$$TUCC_2 = TUCC - TUCC_1 \quad (7)$$

where D_F is the forecasted Demand plus scheduled exports, adjusted for energy schedules and bids expected at subsequent markets, D_S is the scheduled Demand plus scheduled exports, and D_M is the metered Demand. Tier 1, ($TUCC_1$), will be allocated to all SCs in proportion to their net negative demand deviations (demand under-scheduling). Tier 2, ($TUCC_2$) is due to ISO over-forecast and will be allocated to all SCs in proportion to their metered demand.

H.3 Phased Implementation

The proposed cost allocation scheme would work slightly differently in different markets and at different implementation phases of the Market Design 2002. Table 1 lists all the combinations. The short-term phase is 10/1/02–3/31/03 followed by the long-term phase on 4/1/03.

Table 1. *Phased implementation of cost allocation*

Market	Phase	Cost Allocation Basis	Tier 1 Allocation	Tier 2 Allocation
Day-Ahead Residual Unit Commitment	Short Term 10/02 – 4/03	Unrecovered commitment costs for units committed in DA RUC D_F: DA demand forecast plus DA scheduled exports D_S: final DA energy schedules	$TUCC_1$ allocated to all SCs in proportion to their net negative demand deviations from final DA Demand and export energy schedules	$TUCC_2$ allocated to all SCs in proportion to their metered demand
Hour-Ahead Residual Unit Commitment	Short Term 10/02 – 4/03	Unrecovered commitment costs for additional units committed in HA RUC D_F: HA demand forecast plus HA scheduled exports D_S: HA final energy schedules	$TUCC_1$ allocated to all SCs in proportion to their net negative deviations from final HA Demand and export energy schedules	$TUCC_2$ allocated to all SCs in proportion to their metered demand
Day-Ahead Energy Market	4/03 ff	Unrecovered commitment costs for units committed in DA Energy market	$TUCC$ (no tiers) allocated to all SCs in proportion to their final DA scheduled demand in excess of their final DA scheduled supply, taking into account inter-SC energy trades that originate from self-committed resources	

Market	Phase	Cost Allocation Basis	Tier 1 Allocation	Tier 2 Allocation
Day-Ahead Residual Unit Commitment	4/03 ff	Unrecovered commitment costs for additional units committed in DA RUC D_F: DA demand forecast plus DA scheduled exports D_S: final DA energy schedules	$TUCC_1$ allocated to all SCs in proportion to their net negative deviations from final DA Demand and export energy schedules	$TUCC_2$ allocated to all SCs in proportion to their metered demand
Hour-Ahead Energy Market	4/03 ff	Unrecovered commitment costs for additional units committed in HA Energy market	$TUCC$ (no tiers) allocated to all SCs in proportion to their final HA scheduled demand deviation in excess of their final HA scheduled supply deviation, taking into account HA inter-SC energy trade deviations that originate from self-committed resources	
Hour-Ahead Residual Unit Commitment	4/03 ff	Unrecovered commitment costs for additional units committed in HA RUC D_F: HA demand forecast plus HA scheduled exports D_S: final HA energy schedules	$TUCC_1$ allocated to all SCs in proportion to their net negative deviations from final HA Demand and energy schedules	$TUCC_2$ allocated to all SCs in proportion to their metered demand

METERING PROTOCOL

MP 2.3.4 Format for Data Submission

SCs shall submit Settlement Quality Meter Data to MDAS for the SC Metered Entities they represent using the Meter Data Exchange Format. Subject to any exemption granted by the ISO under MP 13, SCs must ensure that Settlement Quality Meter Data submitted to the ISO is in intervals of:

(a) 5 minutes for Loads and Generators providing Ancillary Services and/or Supplemental Energy; and

(b) 1 hour for other SC Metered Entities.

Each SC shall submit Settlement Quality Meter Data for all of the SC Metered Entities that it schedules aggregated by:

(a) the same Load aggregation that was used in scheduling ~~Demand Zone, Load group or bus~~ for Demand;

(b) the relevant unit for Generation; or

(c) the Scheduling Point for imports and exports.

The Settlement Quality Meter Data submitted by SCs may be in either kWh or MWh values.

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MP 13.5.2 Exemptions from Meter Standards

(a) General

The ISO has the authority under Section 10.5.2 of the ISO Tariff to exempt ISO Metered Entities from the requirement to comply with the meter standards referred to in the ISO Tariff and this Protocol.

(b) Specific Exemptions Available

i. Data Storage for Existing Meters

Revenue quality meters installed as at the ISO Operations Date are required to have 30 days data storage capacity (new revenue quality meters are required to have 60 days data storage capacity). Existing revenue quality meters that otherwise comply with the meter standards referred to in the ISO Tariff and this Protocol but which do not have 30 days data storage will be exempted from that requirement if there is alternative time stamped meter data storage of 30 days or more.

ii. Voltage Transformers

ISO Metered Entities will be exempt from the requirement to install Voltage Transformers (VT) at 500 kV and higher voltage levels provided that those ISO

Metered Entities install Capacity Coupled Voltage Transformers (CCVT) that meet the metering standards referred to in the ISO Tariff and this Protocol. The ISO Metered Entity must establish a testing program to ensure that the CCVT remains within the ISO's accuracy requirements. A copy of such test program must be supplied to the ISO and the ISO may require amendments and/or additions to that program that it reasonably believes are necessary to ensure the accuracy of the CCVT.

iii. Loss Correction Factors

The ISO may grant an ISO Metered Entity an exemption from compliance with the metering standards referred to in this Protocol and the ISO Tariff if, in the ISO's sole discretion, applicable loss correction factors can be applied to existing meters without any materially adverse effect on the accuracy or security of the Meter Data obtained from such meters.

~~**iv. 5 Minute Interval Data**~~

~~Generators that are ISO Metered Entities and that provide Ancillary Services to the ISO will not be required to provide the ISO with 5 minute interval data until such time as specified by the ISO. Until such time as the ISO requires 5 minute interval data, these entities will be required to provide the ISO with hourly interval data.~~

v. Request for Direct Polling

SCs may request the ISO to grant an exemption from the requirement to provide Settlement Quality Meter Data to the ISO for SC Metered Entities they represent if those entities are Generators which have requested the ISO, and the ISO has agreed, to directly poll them for Meter Data. Such Generators will be treated as ISO Metered Entities and must comply with all of the requirements relating to ISO Metered Entities in accordance with this Protocol and the ISO Tariff. The SC representing such Generators will be required to apply the relevant distribution loss factors to that Generator's Meter Data (the SC may obtain that Meter Data from the ISO).