2.5.6.2 Communication Equipment. Unless otherwise authorized by the ISO, all Scheduling Coordinators wishing to submit an Ancillary Service schedule or bid must have the capability to submit and receive information by direct computer link. In addition, they must provide the ISO with a telephone number, fax number or other approved voice communication system such as direct line access through which Dispatch instructions for each Generating Unit, System Unit, Load and System Resource may be given if necessary. The ISO will determine which method of communication is appropriate. Participating Generators, owners or operators of Loads and operators of System Units or System Resources whose resources are scheduled, bid in or under contract, shall ensure that there is a 24 hour personal point of contact with the ISO for the Generating Unit, System Unit, Load or System Resource. Participating Generators and operators of System Units providing Regulation shall also provide communication links meeting ISO standards for direct digital control. Operators of System Resources providing Regulation shall provide communications links meeting ISO standards for external imports of Regulation. If any communication system becomes unavailable, the relevant Participating Generators, operators of System Units, Loads and System Resources and the ISO shall take immediate action to identify the cause of the interruption and to restore the communication system. A Scheduling Coordinator, which has scheduled or bid in or contracted for Ancillary Services shall ensure that the Generating Unit, System Unit, Load or System Resource concerned is able to receive and implement Dispatch instructions.

* * * * *

2.5.7.4.3 ~~Except as provided in section 2.5.7.4.4,~~ Scheduling Coordinators may~~cannot~~ bid or self-provide external imports of Regulation ~~Reserve~~ from System R~~r~~esources located outside the ISO Control Area, where technically feasible and consistent with WSCC criteria; provided that the operator of the Control Area in which the System Resources are located has entered into an agreement with the ISO for interconnected Control Area operations; and provided that such Scheduling Coordinator and the operator of the Control Area in which the resources are located have been certified by the ISO as to their ability to dynamically adjust interchange schedules based on control signals issued by the ISO anytime during a Settlement Period at the discretion

of the ISO. Such certification shall include a demonstration of their ability to support the dynamic interchange of Regulation service based on ISO control signals received on dedicated communications links in accordance with ISO standards and procedures posted on the ISO Home Page.

* * * * *

2.5.14 The Regulation Auction.

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

(a) bidder name/Identification Code;

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

(c) the date for which the bid applies;

(d) maximum operating level (MW);

(e) minimum operating level (MW);

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

(g) the upward and downward range of generating capacity over which Generating Unit or System Unit i from Scheduling Coordinator j is willing to provide Regulation for Settlement Period t ($Cap_{ijt}max$ (MW)) where $Cap_{ijt}max \leq$ Period $_{minutes}$ * $Ramp_{ijt}$. Period $_{minutes}$ is established by the ISO, by giving Scheduling Coordinators twenty-four (24) hours advance notice, within a range from a minimum of 10 minutes to a maximum of 30 minutes.) Bidders shall offer upward and downward range for Regulation service;

(h) the bid price of the capacity reservation, stated separately for Regulation Up and Regulation Down ($CapRes_{ijt}$ ($/MW));

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

If the bid is for the provision of Regulation from an external import of a System Resource, each Scheduling Coordinator j shall submit the following information for each System Resource i for each Settlement Period t of the following Trading Day:

(a) bidder name/Identification Code;

(b) type of market (Day-Ahead or Hour-Ahead) and Trading Day;

(c) Scheduling Point;

(d) interchange ID code;

(e) external Control Area ID;

(f) Schedule ID (NERC ID number) and complete WSCC tag;

(g) preferred bid flag, a "YES" indicates a bid and a "NO" indicates a self-provided schedule;

(h) the contract reference number, if applicable;

(i) maximum operating level (MW);

(j) minimum operating level (MW);

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

(l) the upward and downward range of generating capacity over which System Resource i from Scheduling Coordinator j is willing to provide Regulation for Settlement Period t ($Cap_{ijt}max$ (MW)) where $Cap_{ijt}max \leq$ Period $_{minutes} * Ramp_{ijt}$. Period $_{minutes}$ is established by the ISO, by giving Scheduling Coordinators twenty-four (24) hours advance notice, within a range from a minimum of 10 minutes to a maximum of 30 minutes. Bidders shall offer upward and downward range for Regulation service;

(m) the bid price of the capacity reservation, stated separately for Regulation Up and Regulation Down ($CapRes_{ijt}$ ($/MW));

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

Bid Evaluation. Based on the quantity and location of the system requirements, the ISO shall select Generating Units, ~~and~~ System Units, and System Resources with the bids, which minimize the sum of the total bids of the Generating Units, ~~and~~ System Units, and System Resources selected for Regulation Up or Regulation Down, subject to two constraints:

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

(b) each Generating Unit's, ~~or~~ System Unit's, or System Resource's bid capacity must be less than or equal to that Generating Unit's, ~~or~~ System Unit's, or System Resource's ramp rate times *Period* $_{minutes}$.

The total bid for each Generating Unit, ~~or~~ System Unit, or System Resource is calculated by multiplying the capacity reservation bid price by the bid capacity.

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

$$\underset{i,j}{Min} \sum TotalBidi\,jt$$

Subject to

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

Where

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

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

Price Determination. The price payable to Scheduling Coordinators for Regulation Capacity made available for upward and downward movement in accordance with the ISO's Final Day-Ahead Schedules shall, for each Generating Unit, ~~and~~ System Unit, and System Resource concerned, be the zonal market clearing price as follows:

$PAGC_x = MCP_{xt}$

Where:

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

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

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

The price payable to Scheduling Coordinators for Regulation ~~C~~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 shall be the bid price of the Regulation Capacity reserved (*$CapRes_{ijt}$ ($/MW)*).

* * * * *

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

(a) the ISO shall dispatch Generating Units, ~~and~~ System Units, and System Resources providing Regulation ~~S~~service to meet NERC and WSCC Area Control Error (ACE) performance requirements;

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

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

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

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

(f) Generating Units, System Units, Loads and System Resources shall be dispatched during the operating hour only until the next variation in Demand or the end of the operating hour, whichever is sooner. In dispatching such resources, the ISO is not making any long term commitment as to the duration of their operation, nor the level of their output or Demand.

* * * * *

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

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

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

Once a bid has been accepted by the ISO, the database shall be adjusted to reflect the change in status of the bid. Once a decremental bid has been used by the ISO, it will then be included in the incremental part of the database with an incremental bid equal to its decremental price bid. Once an incremental bid has been used by the ISO it will then be included in the decremental part of the database with a decremental bid equal to its incremental price bid. In the event that

the ISO subsequently needs to decrement output, it will initially decrement the Generating Units, Loads, System Units or System Resources incremented previously, and then continue down the merit order of the decremental bids.

* * * * *

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

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

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

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

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

(e) time of the Dispatch instruction; and

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

All Dispatch instructions except those for the Dispatch of Regulation (which will be communicated by direct digital control signals to Generating Units and, for System Resources, through dedicated communication links which satisfy the ISO's standards for external imports of Regulation) will be communicated by telephone or fax, at the ISO's discretion. Except in the case of deteriorating system conditions or emergency, and except for instructions for the Dispatch of Regulation, the ISO will send all Dispatch instructions to the Scheduling Coordinator for the Generating Unit, System Unit, Load or System Resource, which it wishes to Dispatch. The recipient Scheduling Coordinator shall ensure that the Dispatch instruction is communicated immediately to the operator of the Generating Unit, System Unit, external import of System Resources or Load concerned. The ISO may, with prior permission of the Scheduling Coordinator concerned, communicate with and give Dispatch instructions to the operators of Generating Units, System Units, external imports of System Resources and Loads directly without having to communicate through their appointed Scheduling Coordinator. The recipient ~~Scheduling Coordinator~~ of a Dispatch instruction shall confirm the Dispatch instruction by repeating the Dispatch instruction to the ISO. The ISO shall record on tape all voice conversations, which occur on the Dispatch instruction communication equipment.

These recordings may be used to audit the Dispatch instructions, and to verify the response of Generating Units, System Units, external imports of System Resources and Loads ~~and System Resources~~ to Dispatch instructions.

The Dispatch instruction and all information associated with it shall be logged and recorded by the ISO as soon as practical after issuing each instruction. The ISO Protocols govern the content, issue, receipt, confirmation and recording of Dispatch instructions.

* * * * *

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

* * * * *

23 TEMPORARY CHANGES TO THE REAL-TIME MARKET FOR IMBALANCE ENERGY

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23.2.1 Amendments to the Body of the ISO Tariff

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

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

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

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

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

~~(e) time of the Dispatch instruction; and~~

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

~~All Dispatch instructions except those for the Dispatch of Regulation (which will be communicated by direct digital control signals) will be communicated by telephone. Except in the case of deteriorating system conditions or emergency, and except for instructions for the Dispatch of Regulation, the ISO will send all Dispatch instructions to the Scheduling Coordinator for the Generating Unit, ***System Unit,*** Load or System Resource which it wishes to Dispatch. The recipient Scheduling Coordinator shall ensure that the Dispatch instruction is communicated immediately to the operator of the Generating Unit, ***System Unit, external import of System Resources*** or Load concerned. ***The ISO may, with***~~

the prior permission of the Scheduling Coordinator concerned, communicate with and give Dispatch instructions to the operators of Generating Units, System Units, external imports of System Resources and Loads directly without having to communicate through their appointed Scheduling Coordinator. ~~The recipient~~ ***Scheduling Coordinator*** ~~of a Dispatch instruction shall confirm the Dispatch instruction by repeating the Dispatch instruction to the ISO. The ISO shall record on tape all voice conversations which occur on the Dispatch instruction communication equipment. These recordings may be used to audit the dispatch instructions, and to verify the response of Generating Units,~~ ***System Units, external imports of System Resources and*** ~~Loads~~ ***and System Resources*** ~~to Dispatch instructions.~~

~~The~~ ***~~dispatch~~ Dispatch*** ~~instruction and all information associated with it shall be logged and recorded by the ISO as soon as practical after issuing each instruction. The ISO Protocols govern the content, issue, receipt, confirmation and recording of~~ ***~~dispatch~~ Dispatch*** ~~instructions.~~

* * * * *

Master Definition Supplement

Regulation

The service provided either by Generating Units certified by the ISO as equipped and ~~operating with AGC which will enable such units to~~ capable of responding to the ISO's direct digital control signals, or by System Resources that have been certified by the ISO as capable of delivering such service to the ISO Control Area, in an upward and downward direction to match, on a real time basis, Demand and resources, consistent with established NERC and WSCC operating criteria. Regulation is used to control the power output of electric generators within a prescribed area in response to a change in system frequency, tieline loading, or the relation of these to each other so as to maintain the target system frequency and/or the established interchange with other areas within the predetermined limits. Regulation includes both the increase of output by a Generating Unit or System Resource ("Regulation Up") and the decrease in output by a Generating Unit or System Resource ("Regulation Down"). Regulation Up and Regulation Down are distinct capacity products, with separately stated requirements and Market Clearing Prices in each Settlement Period.

ANCILLARY SERVICES PROTOCOL

ASRP 4.4 Standard for Regulation: Control

The ACE will be calculated by the ISO EMS. Control signals will be sent from the ISO EMS to raise or lower the output of Generating Units or System Resources providing Regulation when ACE exceeds the allowable ISO Control Area dead band for ACE. Use of dynamic schedules to provide R~~r~~egulation from System Resources must be certified and approved by the ISO.

ASRP 4.4.1 Dynamic Scheduling of Regulation from External Resources

Scheduling Coordinators are allowed to bid or self-provide their Regulation obligation in whole or in part from resources located outside the ISO Control Area by dynamically scheduling such resources~~use of existing transmission service rights under Existing Contracts~~; if it can be demonstrated that the control function will use dedicated communication~~existing computer~~ links (either directly or through ~~existing utility~~ EMS computers) for ISO computer control and telemetry to provide this function in accordance with the ISO's standards and procedures posted on the ISO Home Page .

* * * * *

ASRP 4.5.3 [Not Used]~~Procurement as of Operations Date~~

~~The ISO will procure, with the exception of ASRP 4.4.1, Regulation only from providers with Generating Units connected to and operating within the ISO Control Area.~~

ASRP 4.5.4 [Not Used]~~Self Provision of Regulation~~

~~Scheduling Coordinators may not self provide Regulation from resources outside the ISO Control Area except under Existing Contracts as described in Section 4.4.1.~~

* * * * *

ASRP 9.1 Compliance Testing for Regulation

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

* * * * *

ASRP 10.1 Performance Audit for Regulation

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

DISPATCH PROTOCOL

DP 8.7.1 Regulation

(a) Regulation provided from Generating Units or System Resources must meet the standards specified in the ASRP;

(b) the ISO will dispatch Regulation in merit order of Energy bid prices as determined by the EMS;

(c) in the event of an unscheduled increase in system Demand or a shortfall in Generation output and Regulation margin drops below a predetermined value, the ISO will use scheduled Operating Reserve, Replacement Reserve or Supplemental Energy to restore Regulation margin; and

(d) when scheduled Operating Reserve is used for restoration of Regulation reserve, the ISO shall arrange for the replacement of that Operating Reserve (see DP 8.7.4);

SBP 5.1.1 Regulation

SBP 5.1.1.1 Regulation: Generating Units or System Units

Each SC desiring to self-provide Regulation or to participate in the ISO's Regulation auction will submit the following information for each relevant Generating Unit or System Unit for each Settlement Period of the relevant Trading Day:

(a) type of schedule: Regulation Ancillary Service (ANC_SRVC) or Revised Regulation Ancillary Service (REVISED_ANC_SRVC);

(b) SC's ID code;

(c) type of market (Day-Ahead or Hour-Ahead) and Trading Day;

(d) Generating Unit or System Unit ID code;

(e) preferred bid flag, a "YES" indicates a bid and a "NO" indicates a self-provided schedule;

(f) upward and downward range of Generating Unit or System Unit capacity over which the Generating Unit or System Unit is offering to provide Regulation;

(g) Generating Unit or System Unit operating limits (high and low MW);

(h) Generating Unit or System Unit ramp rate (MW/minute);

(i) bid price for Regulation capacity ($/MW); and

(j) bid price for Regulation Energy if called upon ($/MWh).

SBP 5.1.1.2 Regulation: External Imports

Each SC desiring to self-provide Regulation or to participate in the ISO's Regulation auction will submit the following information for each relevant external import for each Settlement Period of the relevant Trading Day:

(a) type of schedule: (Regulation Ancillary Service);

(b) SC's ID code;

(c) type of market (Day-Ahead or Hour-Ahead) and Trading Day;

(d) Scheduling Point (the name)

(e) interchange ID code (the name of the selling entity, buying entity and a numeric identifier);

(f) external Control Area ID;

(g) Schedule ID (NERC ID number);

(h) complete WSCC tag;

(i) preferred bid flag, a “YES” indicates a bid and a “NO” indicates a self-provided schedule;

(j) in the case of Existing contracts, the applicable contract reference number;

(k) upward and downward range of System Resource capacity over which the System Resource is offering to provide Regulation;

(l) System Resource operating limits (high and low MW);

(m) ramp rate (MW/minute);

(n) bid price for Regulation capacity ($/MW); and

(o) bid price for Regulation Energy if called upon ($/MWh).

SP 9.5. Regulation Bid Evaluation and Pricing

SP 9.5.1 Regulation Bid Evaluation

(a) Based on the quantity and location of the system requirements, the ISO will select Generating Units, ~~and~~ System Units, and System Resources with the Regulation bids which minimize the sum of the total Regulation bids of the Generating Units, ~~and~~ System Units, and System Resources selected subject to two constraints:

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

(ii) the amount of Regulation bid for each Generating Unit, ~~or~~ System Unit, or System Resource must be less than or equal to that Generating Unit's, ~~or~~ System Unit's, or System Resource's ramp rate times ~~*Peroid*~~*Period* $_{minutes}$ where $Period_{minute}$ is established by the ISO, by giving Scheduling Coordinators twenty-four (24) hours advance notice, within a range from a minimum of 10 minutes to a maximum of 30 minutes.

(b) The total Regulation bid for each Generating Unit, ~~or~~ System Unit, or System Resource is calculated by multiplying the reserve reservation bid price by the amount of Regulation bid. Subject to any locational requirements, the ISO will accept winning Regulation 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 upward and downward movement (Regulation) required by the ISO.*

SP 9.5.2 Regulation Price Determination

The price payable to SCs for Regulation made available for upward and downward movement in accordance with the ISO's Ancillary Services schedules will, for each Generating Unit, ~~and~~ System Unit, and System Resource concerned, be the zonal Market Clearing Price for Regulation calculated as follows:

$Pagc_{ijt} = MCP_{xt}$

where:

the zonal Market Clearing Price (MCP_{xt}) for Regulation is the highest priced winning reservation bid of a Generating Unit, ~~or~~ System Unit, or 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.