

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.

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

- (a) meter type;
- (b) meter location;

- (c) meter reading responsibility;
- (d) meter capability in regard to AGC response; and

market-based rates, will not be paid above their cost-based bid for the Ancillary Service concerned even if the relevant market clearing price is higher.

2.5.7.4 Bidding and Self-Provision of Ancillary Services

The ISO will procure Ancillary Services in accordance with this ISO Tariff, and the applicable ISO Protocols.

2.5.7.4.1 Scheduling Coordinators may bid or self-provide Ancillary Services or specify Inter-Scheduling Coordinator Ancillary Service Trades from resources located within the ISO Control Area.

2.5.7.4.2 Scheduling Coordinators may bid or self-provide external imports of Spinning Reserve, Non-Spinning Reserve or Replacement Reserve from resources located outside the ISO Control Area, where technically feasible and consistent with WSCC criteria; and provided that such Scheduling Coordinators have certified to the ISO their ability to deliver the service to the point of interchange with the ISO Control Area (including with respect to their ability to make changes, or cause such changes to be made, to interchange schedules during any interval of a Settlement Period at the discretion of the ISO).

2.5.7.4.3 Scheduling Coordinators may bid or self-provide external imports of Regulation from System Resources 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.

2.5.7.4.4 Scheduling Coordinators may utilize transmission service under Existing Contracts to self-provide Regulation (consistent with the applicable ISO Protocols), Spinning Reserve, Non-Spinning Reserve or Replacement Reserve from resources located outside the ISO Control Area, where technically feasible, consistent with WSCC standards.

- (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 $e Cap_{ijt}^{max} \leq Period_{minutes} * Ramp_{ijt}$. $Period_{minutes}$ 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, System Units, and System Resources with the bids, which minimize the sum of the total bids of the Generating Units, 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, System Unit's, or System Resource's bid capacity must be less than or equal to that Generating Unit's, System Unit's, or System Resource's ramp rate times $Period_{minutes}$.

The total bid for each Generating Unit, 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:

$$\text{Min } \sum_{i,j} \text{TotalBid}_{ijt}$$

Subject to

$$\sum_{i,j} \text{Cap}_{ijt} \geq \text{Requirement}_t \text{ and } \text{Cap}_{ijt} \leq \text{Cap}_{ijtmax}$$

Where

$$\text{TotalBid}_{ijt} = \text{CapRes}_{ijt} * \text{Cap}_{ijt}$$

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, System Unit, and System Resource concerned, be the zonal market clearing price as follows:

$$\text{PAGC}_x = \text{MCP}_{xt}$$

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.

$$\text{MCP}_{xt} = \text{Max} (\text{CapRes}_{ijt}) \text{ in zone } x \text{ for Settlement Period } t$$

The ISO's auction does not compensate the Scheduling Coordinator for the minimum Energy output of Generating Units, 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 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, System Units, and System Resources providing Regulation service to meet NERC and WSCC Area Control Error (ACE) performance requirements;
- (b) once ACE has returned to zero, the ISO shall determine whether the Regulation Generating Units, System Units, and System Resources are operating at a point away from their preferred operating point. The ISO shall then adjust the output of Generating Units, 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, System Units, and System Resources to their preferred operating 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

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, System Units, and System Resources exceed their preferred operating 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, System Units, and System Resources fall below their preferred operating 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

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 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 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.

2.5.22.11 Failure to Conform to Dispatch Instructions. All Scheduling Coordinators, Participating Generators, owners or operators of Curtailable Demands and operators of System Resources providing Ancillary Services (whether self provided or procured by the ISO) or whose Supplemental Energy bids have been accepted by the ISO shall be obligated to respond or to secure response to the ISO's Dispatch instructions in accordance with their terms, and to be available and capable of doing so, for the full duration of the Settlement Period. If a Generating Unit, Curtailable Demand or System Resource is unavailable or incapable of responding to a Dispatch instruction, or fails to respond to a Dispatch instruction in accordance with its terms, the Generating Unit, Curtailable Demand or System Resource:

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

the Scheduling Coordinator for the Participating Generator, owner or operator of the Curtailable Demand or System Resource concerned shall pay to the ISO the difference between the Generating Unit's, Curtailable Demand's or System Resource's instructed and actual output (or Demand) at the Beep Interval Ex Post

Price in accordance with Section 11.2.4.1. This applies whether the Ancillary Services concerned are contracted or self provided.

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

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

2.5.25 Periodic Testing of Units.

The ISO may test Generating Units, System Units, Loads and System Resources in the manner described herein. The frequency of testing shall be within such timeframes as are reasonable under all the circumstances. Scheduling Coordinators shall manage the resulting Energy output if notification of testing permits the Energy to be scheduled. If a Generating Unit, System Unit, Load, or System Resource fails to meet requirements in a test under this section, the ISO shall notify the relevant Participating Generator, owner or operator of Loads, System Units or System Resources, or Scheduling Coordinator of such failure as soon as reasonably practicable after the completion of the test. Failure to meet requirements shall lead to the penalties described in Section 2.5.26.

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

2.5.25.2 Spinning Reserve. The ISO shall test the Spinning Reserve capability of a Generating Unit, System Unit or System Resource by issuing unannounced Dispatch instructions requiring the Generating Unit, System Unit or System Resource to ramp up

to its ten minute capability. The ISO shall measure the response of the Generating
Unit,

