the Hour-Ahead Market Clearing Price for the same Settlement Period for the Ancillary Service capacity concerned);

(f)   due to the design of the ISO's scheduling software, the ISO will not take into account Usage Charges in the evaluation of Ancillary Services bids or in price determination and, in the event of Congestion in the Day-Ahead Market or Hour-Ahead Market, Ancillary Services will be procured and priced on a Zonal basis; and

(g)   due to the design of the ISO's scheduling system, any specific resource can bid to supply a specific Ancillary Service or can self-provide such Ancillary Service but cannot do both in the same Settlement Period.

SP 9.2   Sequential Evaluation of Bids

(a)   When SCs bid into the Regulation, Spinning Reserve, Non-Spinning Reserve and Replacement Reserve markets, the same resource capacity may be offered into more than one of these Ancillary Services markets at the same time. The ISO will evaluate bids in the reserve markets for Regulation, Spinning Reserve, Non-Spinning Reserve and Replacement Reserve sequentially and separately in the following order:

(i)   Regulation

(ii)   Spinning Reserve

(iii)   Non-Spinning Reserve; and

(iv)   Replacement Reserve.

(b)   SCs are allowed to specify different reserve prices and different Energy prices for each Ancillary Service they bid. SCs can bid the same resource capacity into any one or all of the Ancillary Service markets they desire. Any resource capacity accepted by the ISO in one of these reserve markets will be deducted from the resource capacity bid into the other reserve markets, except that resource capacity accepted in the Regulation market that represents the downward range of movement accepted by the ISO will not be deducted from the resource capacity bid into other reserve markets.

SP 9.3   **Scheduling Ancillary Services Resources**

(a)   SCs are allowed to self-provide all or a portion of the following Ancillary Services to satisfy their obligations to the ISO:

(i)   Regulation;

Coordinators, the price for such a sale back shall be the hourly user rate for the Ancillary Service for the Settlement Period for the Zone concerned in the Hour-Ahead Market. If the ISO has no market for the sale of the Ancillary Service concerned to other Scheduling Coordinators, the price for the sale back shall be zero.

(f)   Any minimum Energy output associated with Regulation and Spinning Reserve services shall be the responsibility of the SC, as the ISO's auction does not compensate the SC for the minimum Energy output of its Generating Units or System Unit, if any, bidding to provide these services. Accordingly, the SCs shall adjust their Balanced Schedules to accommodate the minimum Energy outputs required by the Generating Units or System Units, if any, included in the Ancillary Services schedules.

(g)   SCs providing one or more of the Ancillary Services cannot change the identification of the Generating Units System Units or external imports of System Resources, if any, or Curtailable Demands offered in the Day-Ahead Market, in the Hour-Ahead Market, or in the Real Time Market (except with respect to System Units, if any, in which case SCs are required to identify and disclose the resource specific information for all Generating Units and Curtailable Demands constituting the System Unit scheduled or bid into the ISO's Day-Ahead Market and Hour-Ahead Market as required in SP 3.3.2(e)).

SP 9.4   Ancillary Service Bid Evaluation and Pricing Terminology

Unless otherwise specifically described herein, the following terminology will apply:

$CapRes_{ijt}$ =   the Ancillary Service reserve reservation bid price (in \$/MW).

$Cap_{ijt}max$ =   the maximum amount of reserve that can be scheduled by the ISO with respect to a SC's bid of that resource to supply Ancillary Services (in MW).

Cap_{ij} =   that portion of an Ancillary Services bid (in MW), identified in the ISO's evaluation process, that may be used to meet the ISO's *Requirement* for a particular Ancillary Service ($Cap_{ijt} \leq Cap_{ijt}max$)

Requirement	=	the total amount of reserve that must be scheduled for a particular Ancillary Service required by the ISO in a Settlement Period (in MW).
i, j, t	=	Generating Unit i, Scheduling Coordinator j, Settlement Period t.

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 with the Regulation bids which minimize the sum of the total Regulation bids of the Generating Units and System Units 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 must be less than or equal to that Generating Unit's or System Unit's ramp rate times *Peroid $_{minutes}$* 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 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:

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

| *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 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 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 9.6 Spinning Reserves Bid Evaluation and Pricing

SP 9.6.1 Spinning Reserves Bid Evaluation

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

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

   (ii) the amount of Spinning Reserve bid for each Generating Unit, System Unit or external import of a System Resource must be less than or equal to that Generating Unit's, System Unit's ramp rate times 10 minutes.

(b) The total Spinning Reserve bid for each Generating Unit, System Unit or external import of a System Resource is calculated by multiplying the reserve reservation bid price by the amount of Spinning Reserve bid. Subject to any locational requirements, the ISO will select the winning Spinning Reserve bids in accordance with the following criteria:

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

subject to

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

and

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

where:

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

$Requirement$ $=$ *Amount of Spinning Reserve required by the ISO.*

SP 9.6.2   Spinning Reserves Price Determination

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

$Psp_{ijt} = MCP_{xt}$

where:

the zonal Market Clearing Price (MCP_{xt}) for Spinning Reserve is the highest priced winning reservation bid of a Generating Unit, System Unit 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 9.7   Non-Spinning Reserves Bid Evaluation and Pricing

SP 9.7.1   Non-Spinning 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 System Resources with the Non-Spinning Reserve bids which minimize the sum of the total Non-Spinning 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 Non-Spinning Reserve bid must be greater than or equal to the required amount of Non-Spinning Reserve; and

(ii)   the amount of Non-Spinning Reserve bid for each Generating Unit, System Unit, or Curtailable Demand must be less than or equal to that Generating Unit's, System Unit's, or 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 10 minutes and the time to synchronize in the case of a Generating Unit, or to interruption in the case of a Load.

(b)   The total Non-Spinning 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 Non-Spinning Reserve bid. Subject to any locational requirements, the ISO will accept the winning Non-Spinning Reserve bids in accordance with the following criteria:

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

subject to

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

and

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

where:

$TotalBid_{ijt}$	=	$Cap_{ijt} * CapRes_{ijt}$
$Requirement$	=	$Amount\ of\ Non\text{-}Spinning\ Reserve\ required\ by\ the\ ISO.$

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, Curtailable Demand or external import of a System Resource concerned, be the zonal Market Clearing Price for Non-Spinning Reserve calculated as follows:

$$Pnonsp_{ijt} = MCP_x$$

where:

the zonal Market Clearing Price (MCP_{xt}) for Non-Spinning 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 (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 9.8   **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:

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

$$Requirement \quad = \quad \text{Amount of Replacement Reserve required by the ISO.}$$

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;

(b) Inter-Zonal Congestion Management will use a DC optimal power flow (OPF) program that uses linear optimization techniques with active power (MW) controls only; and