The ISO shall pay to the Scheduling Coordinator for that Participating Generator the opportunity cost of reducing Energy output to enable reactive energy production. This opportunity cost shall be:

Max{0, Zonal Hourly Ex Post Price - Generating Unit bid price } x reduction in Energy output (MW).

If necessary, the ISO shall develop a regulatory cost based determination of marginal operating cost to be used in place of the Generating Unit bid price.

2.5.19   Black Start Capability and Energy Output.

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

2.5.20   Obligations for and Self Provision of Ancillary Services.

2.5.20.1 Ancillary Service Obligations. Each Scheduling Coordinator shall be assigned a share of the total Regulation, Spinning Reserve, Non-Spinning and Replacement Reserve requirements by the ISO. The share assigned to each Scheduling Coordinator is described in Section 2.5.20 and in Section 2.5.28 as that Scheduling Coordinator's obligation. Each Scheduling Coordinator's Regulation obligation in each Zone shall be pro rata based upon the same proportion as the Scheduling Coordinator's metered hourly Demand bears to the total metered Demand

served in each hour in that Zone. Each Scheduling Coordinator's Operating Reserve obligation in each Zone shall

be pro rata based upon the same proportion as the ratio of the product of its percentage obligation based on

Schedules and the sum of its metered Demand and firm exports bears to the total of such products for all

Scheduling Coordinators in the Zone. The Scheduling Coordinator's percentage obligation based on Schedules

shall be calculated as the sum of 5% of its scheduled Demand (except the Demand covered by firm purchases from

outside the ISO Control Area) scheduled to be met by Generation from hydroelectric resources plus 7% of its

scheduled Demand (except the Demand covered by firm purchases from outside the ISO Control Area) scheduled

to be met by Generation from non-hydroelectric resources in that Zone, plus 100% of any Interruptible Imports and

on-demand obligations which it schedules. Each Scheduling Coordinator's Replacement Reserve obligation in each

Zone shall be pro rata based upon the same proportion as the metered Demand of the Scheduling Coordinator

bears to the total metered Demand in the Zone.

2.5.20.2   Right to Self Provide.

Each Scheduling Coordinator may choose to self provide all, or a portion, of its Regulation and Reserve obligation in

each Zone. The ISO shall schedule self provided Ancillary Services, Day-Ahead and Hour-Ahead, and Dispatch

self provided Ancillary Services in real time. To the extent that a Scheduling Coordinator self provides, the

ISO shall correspondingly reduce the quantity of the Ancillary Services concerned, which it procures as described in Sections 2.5.14 to 2.5.17.

2.5.20.3   Literal Self Provision by a Metered Subsystem.   A MSS operator must be the Scheduling Coordinator or act through a Scheduling Coordinator and must submit the Energy, Ancillary Services, and Adjustment Bids for all End Users within the MSS who are not served by other Scheduling Coordinators.

The MSS operator may provide its Regulation, Spinning Reserve, Non-Spinning Reserve, and Replacement Reserve requirements through any combination of Literal Self Provision, In-Kind Self Provision, or purchases from the ISO. A MSS may utilize a System Unit to participate in the procurement processes of the ISO for Regulation, Spinning Reserve, Non-Spinning Reserve, and Replacement Reserve. A System Unit is defined as one or more resources within a MSS controlled by the MSS operator so as to simulate a single resource for Regulation, Spinning Reserve, Non-Spinning Reserve, and Replacement Reserve with specified performance characteristics. A System Unit must consist of resources located within the MSS or resources dynamically scheduled into the MSS. For

2.5.21   Scheduling of Units to Provide Ancillary Services.

The ISO shall prepare supplier schedules for Ancillary Services (both self provided and purchased by the ISO) for the Day-Ahead and the Hour-Ahead Markets. The ISO shall notify each Scheduling Coordinator no later than 1:00 p.m. of the day prior to the Trading Day of their Ancillary Services schedules for the Day-Ahead and no later than one hour prior to the operating hour of their Ancillary Services schedules for the Hour-Ahead. The ISO Protocols set forth the information, which will be included in these schedules. Where long-term contracts are involved, the information may be treated as standing information for the duration of the contract.

Once the ISO has given Scheduling Coordinators notice of the Day-Ahead and Hour-Ahead schedules, these schedules represent binding commitments made in the markets between the ISO and the Scheduling Coordinators concerned. Any minimum energy input and output associated with Regulation and Spinning Reserve services shall be the responsibility of the Scheduling Coordinator, as the ISO's auction does not compensate the Scheduling Coordinator for the minimum energy output of Generating Units bidding to provide these services. Accordingly the Scheduling Coordinators shall adjust their schedules to accommodate the minimum outputs required by the Generating Units included on the Schedules.

Notwithstanding the foregoing, a Scheduling Coordinator who has sold Regulation, Spinning Reserve, Non-Spinning Reserve or Replacement Reserve capacity to the ISO in the Day-Ahead Market may buy back that capacity in whole or in part from the ISO in the Hour-Ahead Market at the Zonal Market Clearing Price for the Ancillary

Service for the Settlement Period concerned for the Zone in which the Generating Units or other resources on

behalf or which the Scheduling Coordinator buys back the capacity, are located. The ISO will purchase the Ancillary

Service concerned from another Scheduling Coordinator in the Hour-Ahead Market in accordance with the

provisions of the ISO Tariff.

2.5.22   Rules For Real Time Dispatch of Ancillary Service Resources.

2.5.22.1   Overview. During real time, the ISO shall dispatch Generating Units, Loads and System Resources

to procure Imbalance Energy. In addition, the ISO may also need to purchase additional Ancillary Services if the

services arranged in advance are used to provide Imbalance Energy, and such depletion needs to be recovered to

meet reliability contingency requirements.

Each Scheduling Coordinator's obligation for Regulation, Spinning Reserve, Non-Spinning Reserve and Replacement Reserve for each Zone shall be calculated in accordance with Section 2.5.20.1.

The cost of Voltage Support and Black Start shall be allocated to Scheduling Coordinators as described in Sections 2.5.28.

Quantities and rates for the Hour-Ahead markets shall be calculated by substituting the Hour-Ahead quantities and prices in the relevant formulae (including self provided quantities of the Ancillary Service) except that the user rates for Regulation, Spinning Reserve, Non-Spinning Reserve and Replacement Reserve capacity shall be calculated by dividing the net payments made by the ISO for each service by the obligation for each service which has not been self-provided. The net payments are the total payments for each service net of sums payable by Scheduling Coordinators who have bought back in the Hour-Ahead Regulation, Spinning Reserve, Non-Spinning Reserve or Replacement Reserve capacity, as the case may be, which they had sold to the ISO in the Day-Ahead Market.

Separate rates shall be calculated for each Service as follows:

2.5.28.1   Regulation. The user rate per unit of purchased Regulation service for each Settlement Period in the

Day-Ahead Market for each Zone shall be calculated by dividing the total Regulation capacity payments by the ISO's

total requirement for Regulation for that Settlement Period for that Zone which has not been self provided by

Scheduling Coordinators. The ISO will calculate the user rate for Regulation in each Zone for each Settlement

Period as:

RegRateDA ($/MWh) = AGCPayDA /AGCObligTotal

where:

AGCPayDA = Total Regulation payments for the Settlement Period in the Market for the Zone Day-Ahead.

AGCObligTotal = the total ISO Regulation requirement for the Settlement Period for the Zone less that which has

been self provided by Scheduling Coordinators.

      For each Settlement Period, each Scheduling Coordinator shall pay to the ISO a sum calculated as

follows for each Zone:

*RegRateDA * AGCOblig*

where *AGCOblig* is the Scheduling Coordinator's obligation for Regulation in the Zone in the Settlement Period for

which it has not self provided.

2.5.28.2   Spinning Reserve. The user rate per unit of purchased Spinning Reserve for each Settlement

Period in the Day-Ahead Market for each Zone shall be calculated by dividing the total capacity payments for

Spinning Reserve by the ISO's total

requirement for Spinning Reserve for that Settlement Period for that Zone which has not been self-provided by

Scheduling Coordinators. The ISO will calculate the user rate for Spinning Reserve in each Zone for each

Settlement Period as:

$$SpRateDA(\$/MWh) = \frac{SpinPayDA}{SpinObligTotal}$$

where:

SpinPayDA = Total Spinning Reserve payments for the Settlement Period in the Market for the Zone Day-Ahead.

SpinObligTotal = the total ISO Spinning Reserve requirement for the Settlement Period for the Zone less that

which has been self provided by Scheduling Coordinators.

For each Settlement Period, each Scheduling Coordinator shall pay to the ISO a sum calculated as

follows for each Zone:

*SPRateDA * SpinOblig*

where *SpinOblig* is the Scheduling Coordinator's obligation for Spinning Reserve in the Zone in the Settlement

Period for which it has not self-provided.

2.5.28.3   Non-Spinning Reserve. The user rate per unit of purchased Non-Spinning Reserve for each

Settlement Period in the Day-Ahead Market for each Zone shall be calculated by dividing the total capacity

payments for Non-Spinning Reserve by the ISO's total requirements for Non-Spinning Reserve for that Settlement

Period for that Zone which has not been self provided by Scheduling

Coordinators. The ISO will calculate the user rate for Non-Spinning Reserve in each Zone for each Settlement

Period as:

$$NonSpRateDA(\$/MWh) = \frac{NonSpinPayDA}{NonSpinObligTotal}$$

where:

NonSpinPayDA = Total Non-Spinning Reserve payments for the Settlement Period in the Day-Ahead Market for

the Zone.

NonSpinObligTotal = the total ISO Non-Spinning Reserve requirement for the Settlement Period for the Zone

less that which has been self provided by Scheduling Coordinators.

For each Settlement Period, each Scheduling Coordinator shall pay to the ISO a sum calculated as

follows for each Zone:

*NonSpRateDA * NonSpinOblig*

where *NonSpinOblig* is the Scheduling Coordinator's obligation for Non-Spinning Reserve in the Zone in the

Settlement Period for which it has not self provided.

2.5.28.4   Replacement Reserve. The user rate per unit of purchased Replacement Reserve for each

Settlement Period in the Day-Ahead Market and Hour-Ahead Markets for each Zone shall be calculated

by dividing the total cost to ISO of purchasing Replacement Reserve capacity within the Zone, for the Settlement

Period by the ISO's total Replacement Reserve requirement for the Settlement Period in the Day-Ahead Market less

that which has been self provided by Scheduling Coordinators within the Zone. The ISO will calculate the user rate

for Replacement Reserve in each Zone for each Settlement Period as:

$$ReplRateDA_{xt} = \frac{\sum_j ReplPayTotalDA_{jxt}}{ReplObligTotal_{xt}}$$

where

ReplPayDA = Total Replacement Reserve payments for the Settlement Period in the Day-Ahead Market for

the Zone.

ReplObligTotal = the total ISO Replacement Reserve requirement for the Settlement Period for the Zone less that

which has been self provided by Scheduling Coordinators.

        For each Settlement Period, each Scheduling Coordinator shall pay to the ISO a sum calculated as

follows for each Zone:

ReplRateDA*ReplOblig

where *ReplOblig* is the Scheduling Coordinator's obligation for Replacement Reserve in the Zone in the

Settlement Period for which it has not self provided.

2.5.28.5   Voltage Support. The short term market Voltage Support user rate for Settlement Period t for Zone

x shall be calculated as follows:

$$VSSTRate_{xt} = \frac{\sum_{i,j} VSST_{xijt}}{\sum_{j} QChargeVS_{xjt}}$$

$VSST_{xijt}$ = Voltage Support payment to Scheduling Coordinator j in respect of Generating Unit i in Zone x in the

short-term market applicable to Settlement Period t.

$QChargeVS_{xjt}$ = charging quantity for Voltage Support for Scheduling Coordinator j for Settlement Period t in Zone

x equal to the total metered Demand in Zone x (including exports to neighboring Control Areas) by Scheduling

Coordinator j for Settlement Period t.