ATTACHMENT C

FORMULAS FOR DETERMINING MINIMUM GENERATION AND START-UP AND CURTAILMENT INITIATION COST PAYMENTS

Minimum Generation and Start Up Payment = Day-Ahead Minimum Generation and Start-Up Payment + Real-Time Market Minimum Generation and Start-Up Payment;

Day-Ahead Minimum Generation and Start-Up Payment =

$$\sum_{g \in G} \max\left[\sum_{i=1}^{24}\left(\int_{MGH_{gi}^{DA}}^{EH_{gi}^{DA}} C_{gi}^{DA} + MGC_{gi}^{DA}\, MGH_{gi}^{DA} + SUC_{gi}^{DA}\, NSUH_{gi}^{DA} - LBMP_{gi}^{DA}\, EH_{gi}^{DA} - NASR_{gi}^{DA}\right), 0\right]$$

Real-Time Market Minimum Generation and Start-Up Payment =

$$\sum_{g \in G} \max\left[\sum_{i=1}^{N}\left(\int_{EI_{gi}^{DA}}^{EI_{gi}^{RT}} C_{gi}^{RT} + MGC_{gi}^{RT}\left(MGI_{gi}^{RT} - MGI_{gi}^{DA}\right) + SUC_{gi}^{RT}\left(NSUI_{gi}^{RT} - NSUI_{gi}^{DA}\right) - LBMP_{gi}^{RT}\left(EI_{gi}^{RT} - EI_{gi}^{DA}\right) - \left(NASR_{gi}^{TOT} - NASR_{gi}^{DA}\right)\right), 0\right]$$

Where:

G	=	set of Generators;
EH_{gi}^{DA}	=	Energy scheduled Day-Ahead to be produced by Generator g in hour i;
MGH_{gi}^{DA}	=	Energy scheduled Day-Ahead to be produced by minimum generation segment of Generator g in hour i;
C_{gi}^{DA}	=	Bid cost curve made by Generator g in the Day-Ahead Market for hour i;
MGC_{gi}^{DA}	=	~~Generator g's Incremental cost of eEnergy while operating at the minimum generation level determined from the m~~Minimum gGeneration ~~cost~~ Bid by Generator g for hour i in the Day-Ahead –Market, expressed in terms of $/MW;
SUC_{gi}^{DA}	=	~~s~~Start-~~u~~Up ~~cost b~~Bid by Generator g in hour i into Day-Ahead Market;
$NSUH_{gi}^{DA}$	=	number of times Generator g is scheduled Day-Ahead to start up in hour i;
$LBMP_{gi}^{DA}$	=	Day-Ahead LBMP at Generator g's bus in hour i;
N	=	number of ~~SC~~RTD intervals in 24-hour day;
EI_{gi}^{RT}	=	metered Energy produced by Generator g in ~~SC~~RTD interval i;
EI_{gi}^{DA}	=	Energy scheduled in the Day-Ahead Market to be produced by Generator g in ~~SC~~RTD interval i;

Issued by:	William J. Museler, President	Effective:	May 1, 2001
Issued on:	April 4, 2001		

$NASR_{gi}^{DA}$ = Net Ancillary Services revenue paid to Generator g as a result of having been committed to produce Energy for the LBMP Market and/or Ancillary Services Day- Ahead to operate in hour i is computed by summing the following: (1) Voltage Support payments received by that Generator for that hour, if it is not a Supplier of Installed Capacity and has been scheduled to operate in that hour; (2) Regulation Service payments made to that Generator for all Regulation Service it is scheduled Day-Ahead to provide in that hour, adjusted for that Generator's performance that hour, less that Generator's Day-Ahead Bid to provide that amount of Regulation Service in that hour (unless the Bid exceeds the payments that Generator receives for providing Regulation Services that was committed to produce Energy for the LBMP Market and/or Ancillary Services Day- Ahead, in which case this component shall be zero); and (3) ~~Availability~~ payments made to that Generator for providing ~~Spinning~~Operating Reserve in that hour if it is committed Day- Ahead to provide ~~Spinning~~Operating Reserve in that hour, less that Generator's Day-Ahead Bid to provide ~~Spinning~~Operating Reserve in that hour.

C_{gi}^{RT} = Bid cost curve made by Generator g in the Real-Time dispatch for the hour that includes ~~SC~~RTD interval i;

MGI_{gi}^{RT} = metered Energy produced by minimum generation segment of Generator g in ~~SC~~RTD interval i;

MGI_{gi}^{DA} = Energy scheduled Day-Ahead to be produced by minimum generation segment of Generator g in ~~SC~~RTD interval i;

MGC_{gi}^{RT} = ~~Generator g's Incremental cost of e~~Energy ~~while operating at the minimum generation level determined from the m~~Minimum ~~g~~Generation ~~cost b~~Bid by Generator g in the Real-Time ~~m~~Market for the hour that includes ~~SC~~RTD interval ~~i~~, expressed in terms of $/MW;

SUC_{gi}^{RT} = ~~s~~Start-~~u~~Up ~~cost b~~Bid by Generator g in hour i into Real-Time dispatch;

$NSUI_{gi}^{RT}$ = number of times Generator g started up in ~~SC~~RTD interval i;

$NSUI_{gi}^{DA}$ = number of times Generator g is scheduled Day-Ahead to start up in ~~SC~~RTD interval i;

$LBMP_{gi}^{RT}$ = Real-Time LBMP at Generator g's bus in ~~SC~~RTD interval i;

Issued on: January 16, 2001
Filed to comply with order of the Federal Energy Regulatory Commission, Docket No. ER99-4235-000, issued December 18, 2000.

$NASR_{gi}^{TOT}$ = Net Ancillary Services scheduled revenue paid to Generator g as a result of either having been committed Day-Ahead to operate in hour i or having operated in hour i is computed by summing the following: (1) Voltage Support payments received by that Generator for that hour, if it is not a Supplier of Installed Capacity; (2) Regulation Service payments made to that Generator for that hour, adjusted for that Generator's performance for that hour, less the Bid(s) placed by that Generator to provide Regulation Service in that hour at the time it was committed to produce Energy for the LBMP Market and/or Ancillary Services to do so (unless the Bid(s) exceeds the payments that Generator receives for providing Regulation Service, in which case this component shall be zero); (3) ~~Availability~~ payments made to that Generator for providing ~~Spinning~~Operating Reserve in that hour, less the Bid placed by that Generator to provide ~~Spinning~~Operating Reserve in that hour at the time it was scheduled to do so; (4) Payments made to that Generator in that hour for Energy in excess of that Generator's ~~a~~Actual Energy ~~i~~Injections (such payments may be made to providers of Regulation Service when the ~~SC~~RTD Base Point ~~s~~Signals sent to those Generators exceed the AGC Base Point Signals sent to those Generators); and (5) Lost Opportunity Cost payments made to that ~~g~~Generator in that hour as a result of reducing that Generator's output in order for it to provide Voltage Support Service ~~or Spinning Reserve~~.

Time periods including reserve pick-ups, and time periods following a reserve pick-up in which the dispatch of a given Generator is constrained by its downward ramp rate, will not be included in the above calculation of supplemental payments for that Generator.

Also, in the above calculations, if a Supplier of Regulation Service moves above its ~~SC~~RTD ~~B~~base ~~P~~point as a result of responding to the AGC Base Points sent to it, its Bid cost for producing that Energy will be deemed equal to its Bid at its ~~SC~~RTD ~~B~~base ~~P~~point.

Supplemental payments to units that trip before completing their minimum run-time (for units that were not scheduled to run Day-Ahead) or before running for the number of hours they were scheduled to operate (for units scheduled to run Day-Ahead) may be reduced by the ISO, per ISO Procedures.

Penalty charges resulting from failure to provide an Ancillary Service will not be taken into account when calculating supplemental payments for that Supplier.

Supplemental Payment for Curtailment Initiation Costs

A Supplemental payment for Curtailment Initiation Costs shall be made when the Curtailment Initiation Cost Bid and the Demand Reduction Bid price for any Demand Reduction committed by the ISO in the Day-Ahead market over the twenty-four (24) hour day exceeds Day-Ahead LBMP revenue, provided however that Supplemental payments made to Demand Reduction Providers that fail to complete their scheduled reductions may be reduced by the ISO, pursuant to ISO Procedures.

Supplemental Payment for Special Case Resources

A Supplemental payment for Minimum Payment Nominations shall be made when the Minimum Payment Nomination for any Special Case Resource committed by the ISO during a Forecast Operating Reserve shortage exceeds the LBMP revenue received for performance by that Special Case Resource.

Generators with start-up times of greater than twenty-four (24) hours will have their ~~s~~Start-~~u~~Up ~~cost~~ Bids equally prorated over the course of each day included in their start-up period. Consequently, units whose start-ups are aborted will receive a prorated portion of those payments, based on the portion of the start-up sequence they have completed (e.g., if a unit with a seventy-two (72) hour start-up time has its start-up sequence aborted after forty-eight (48) hours, it would receive two-thirds (2/3) of its start-up cost Bid).

issued December 18, 2000.

Sheet Nos. 425 through 426 are reserved for future use.

issued December 18, 2000.