MEMORANDUM

TO:	Management Committee
FROM:	Generation Issues Task Force/S&P
RE:	Uninstructed Over-Generation;

The Generation Issues Task Force agreed, on 02/12/2001, to recommend, as described in this memo, paying off-dispatch generators for over-generation relative to their schedules and bids submitted to BME.

Under this approach, off-dispatch generation will be paid for over-generation relative to BME schedules if their level of over-generation is consistent with the unit's stated BME bid curve, its current operating level and submitted ramp rate.

Under a separate proposal, regulation penalties for generating above the BME schedule will be suspended. Penalties will remain, however, for consistently generating below a unit's BME schedule when such Real-Time operation is inconsistent with the LBMP at the generator's bus and the unit's BME bid curve.

Under the proposed over-generation logic:

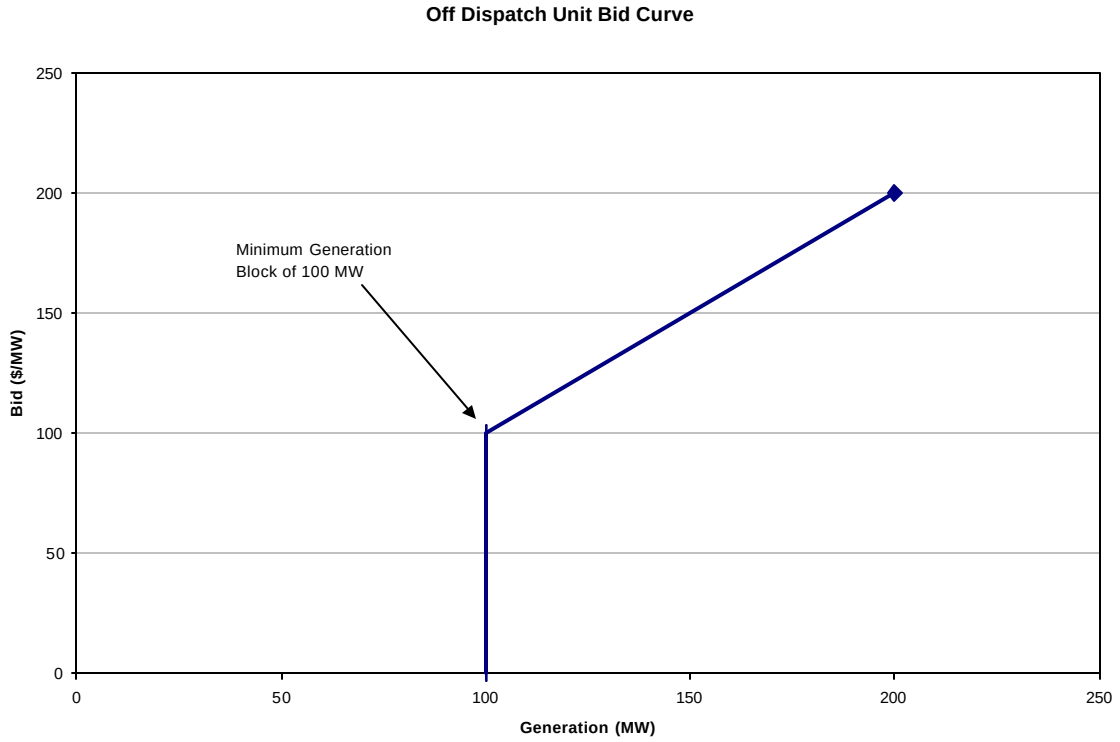
- All on-dispatch and off-dispatch units will be paid for uninstructed over generation to the extent that additional generation falls within a dead-band around the final basepoint communicated to the unit;
  - The dead-band will be 3% around the units final basepoint;
- Off-dispatch units can continue to operate by ramping from one hour's BME schedule to the next hour's BME schedule even if real-time prices during that time are inconsistent with their bid curves. This allowance is made as there are some units that do not want to have to respond based on their bid curve in real time;
- Off-dispatch units may also alter their real time output to follow price so long as the change in output is consistent with their metered generation at the time SCD runs, their hour-ahead bid curve, their ramp rate and the real-time LBMP at their location. These units will be compensated as described in the bullets that follow and the example below;
- A ramp rate and bid curve constrained basepoint will be determined to ensure that off-dispatch units that follow price above their BME schedule are required to follow price back down to their BME schedule at a rate consistent with their ramp rate. This applies both within an hour and between hours. This can be applied by including logic in SCD to reduce the final basepoint sent to off-dispatch units operating above their BME schedule and above the point on their bid curve implied by the real-time LBMP; This will be difficult to enforce without the over-generation basepoint penalties that have been suspended.
- A ramp rate and bid curve constrained basepoint will be determined to ensure that off-dispatch units that follow price down below their BME schedule are required to follow price back up to their BME schedule at a rate consistent with their ramp rate.

- An under-generation penalty (AKA regulation penalty) will be applied to on-dispatch generating units that persistently generate below both their SCD schedule and the level consistent with their bid curve. An allowance of three dispatch cycles (nominally 15 minutes) will be included to allow units ample time to respond to increasing prices without incurring a penalty. Penalties for over-generation by on-dispatch units will be suspended.
- An under-generation penalty (AKA regulation penalty) will be applied to off-dispatch generating units that persistently generate below both their BME schedule and the level consistent with their bid curve. An allowance of three dispatch cycles (nominally 15 minutes) will be included to allow units ample time to respond to increasing prices without incurring a penalty. Penalties for over-generation by off-dispatch units will be suspended.
- The SCD prices and final schedules will be determined assuming all off-dispatch units stay at their actual metered generation level at the time that SCD runs.
- On-dispatch units' final basepoints will be derived off their metered generation at the time SCD runs, their final basepoints from the previous SCD cycle and five times their 1 minute ramp rate;
- On-dispatch units will continue to be paid the lower of their actual generation or their final basepoint adjusted for the dead-band.
- Off-dispatch units' final basepoints will be derived only from the actual metered generation of the unit at the time SCD runs. This will force a one SCD cycle lag on any increase in generation that falls outside the dead-band around the final basepoint.
- Off-dispatch units will continue to be paid the lower of their actual generation or their final basepoint adjusted for the dead-band except when ramping from one hours BME schedule up to a higher BME schedule in which case the unit will be paid the lower of the actual generation and the units BME schedule. This is designed to remove the one interval lag for units ramping to their posted BME schedule. This provision may not be necessary if the dead-band is sufficient to cover one SCD cycle's ramp rate;
- Bid production cost guarantees for off-dispatch units will be restricted to the start-up and minimum generation costs

Example

The following example explains how an off-dispatch unit that is chasing price might behave and how settlements would be applied given that behavior.

Consider an online off-dispatch unit with the following incremental energy bid curve submitted to BME.



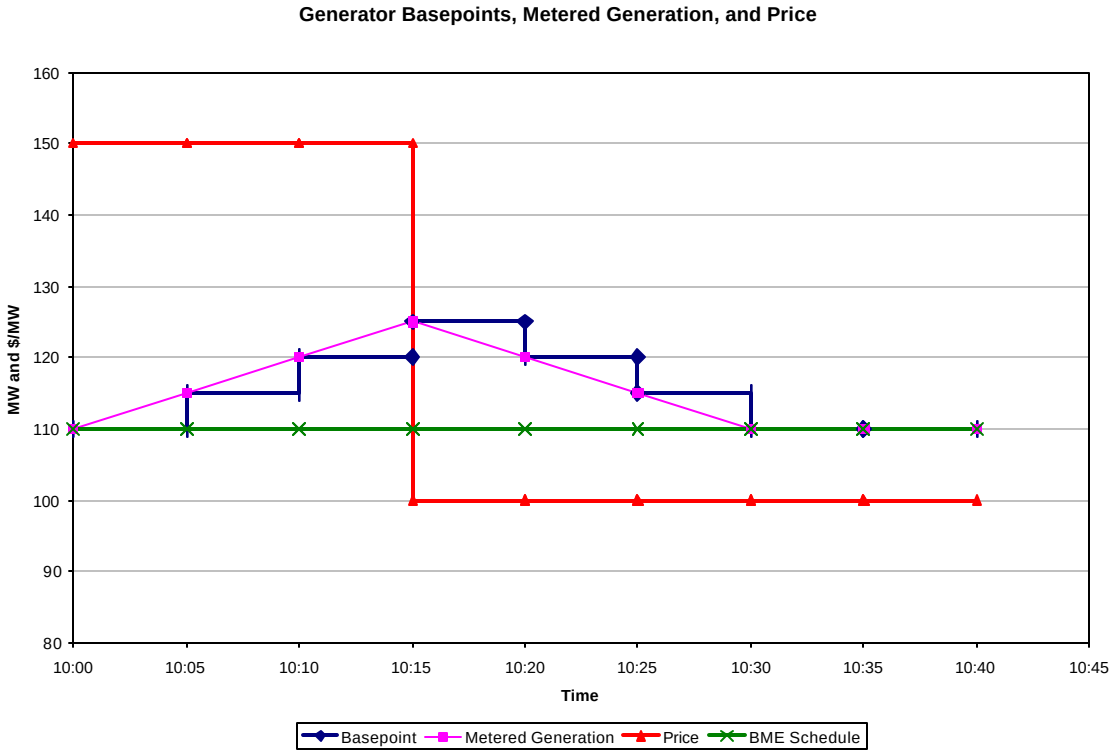
The unit has a minimum generation block of 100 MW and an incremental energy curve with a slope of 1 from 100 MW to 200 MW. The unit has a ramp rate of 1 MW/minute.

For the purposes of this example the BME price for the hour is $110/MWh and the BME schedule for the unit is therefore 110 MW.

To simplify the example, the dead-band around the basepoint is assumed to be 0 MW and the unit is assumed to have no day-ahead schedule for energy or reserves.

The chart that follows displays data for a number of SCD intervals in an hour where BME prices were $110/MWh. The chart has four lines on it representing:

- the real time LBMP for this generator's location (red line with triangles);
- the final basepoints sent out by SCD (thick blue line with diamonds);
- the metered generation from the off-dispatch unit (thin pink line with squares)
- the BME schedule (green line with X's)



At 10:00

- Metered generation at the time SCD runs is 110 MW, exactly on the BME schedule;
- Final basepoint equals the metered generation, 110 MW;
- Real-time LBMP is $150/MWh so the off-dispatch unit begins increasing its generation, consistent with its ramp rate, in the expectation that the price increase will be sustained and reaches 115 MW by the end of the 5 minute cycle;
- Real-time settlement is the lower of the actual generation and the final basepoint multiplied by the real-time LBMP = ($150 * 110)/12 = $1,375.00;
- Note that no payment is made for energy generated in excess of the 110 MW basepoint

At 10:05

- Metered generation at the time SCD runs is 115 MW;
- Final basepoint equals the metered generation, 115 MW;
- Real-time LBMP is $150/MWh so the off-dispatch unit continues to increase its generation, consistent with it ramp rate, in the expectation that the price increase will be sustained and reaches 120 MW by the end of the 5 minute cycle;
- Real-time settlement is the lower of the actual generation and the final basepoint multiplied by the real-time LBMP = ($150 * 115)/12 = $1,437.50;
- Note that no payment is made for energy generated in excess of the 115 MW basepoint but the unit has been paid for 5 MW in excess of its BME schedule.

At 10:10

- Metered generation at the time SCD runs is 120 MW;
- Final basepoint equals the metered generation, 120 MW;
- Real-time LBMP is $150/MWh so the off-dispatch unit continues to increase its generation, consistent with its ramp rate, in the expectation that the price increase will be sustained and reaches 125 MW by the end of the 5 minute cycle;
- Real-time settlement is the lower of the actual generation and the final basepoint multiplied by the real-time LBMP = ($150 * 120)/12 = $1,500.00;
- Note that no payment is made for energy generated in excess of the 120 MW basepoint but the unit has been paid for 10 MW in excess of its BME schedule.

At 10:15

- Metered generation at the time SCD runs is 125 MW;
- Final basepoint equals the metered generation, 125 MW;
- Real-time LBMP has fallen to $100/MWh so the off-dispatch unit responds by decreasing its generation, consistent with its ramp rate, reaching 120 MW by the end of the 5 minute cycle;
- Real-time settlement is the lower of the actual generation and the final basepoint multiplied by the real-time LBMP = ($100 * 122.5)/12 = $1,020.83.
- Note that if the generator had not reduced its generation below 125 MW in this interval it would have been paid for 125 MW but would still be responsible to get down to 120 MW in the subsequent interval if price remained low.

At 10:20

- Metered generation at the time SCD runs is 120 MW;
- Final basepoint equals the metered generation, 120 MW. If the generator had not decreased its generation during the prior SCD cycle the final basepoint would still have been reduced to 120 MW based on its previous basepoint and it ramp rate applied for 5 minutes;
- Real-time LBMP is $100/MWh so the off-dispatch unit continues to decrease its generation, consistent with its ramp rate, reaching 115 MW by the end of the 5 minute cycle;
- Real-time settlement is the lower of the actual generation and the final basepoint multiplied by the real-time LBMP = ($100 * 117.5)/12 = $979.17.

At 10:25

- Metered generation at the time SCD runs is 115 MW;
- Final basepoint equals the metered generation, 115 MW. If the generator had not decreased its generation during the prior SCD cycle the final basepoint would still have been reduced to 115 MW based on its previous basepoint and its ramp rate applied for 5 minutes;
- Real-time LBMP is $100/MWh so the off-dispatch unit continues to decrease its generation, consistent with its ramp rate, reaching 110 MW by the end of the 5 minute cycle;

- Real-time settlement is the lower of the actual generation and the final basepoint multiplied by the real-time LBMP = ($100 * 112.5)/12 = $937.50.

At 10:30

- Metered generation at the time SCD runs is 110 MW;
- Final basepoint equals the metered generation, 110 MW. If the generator had not decreased its generation during the prior SCD cycle the final basepoint would still have been reduced to 110 MW based on its previous basepoint and its ramp rate applied for 5 minutes;
- Real-time LBMP is $100/MWh so the off-dispatch unit can choose to decrease its generation consistent with its bid curve below the BME schedule or as we have shown in this example generate at its BME schedule of 110 MW;
- Real-time settlement is the lower of the actual generation and the final basepoint multiplied by the real-time LBMP = ($100 * 110)/12 = $916.67.

At 10:35

- Metered generation at the time SCD runs is 110 MW;
- Final basepoint equals the metered generation, 110 MW, consistent with its BME schedule. The unit is not required to move below its BME schedule but may choose to do so;
- Real-time LBMP is $100/MWh so the off-dispatch unit can choose to decrease its generation consistent with its bid curve below the BME schedule or as we have shown in this example generate at its BME schedule of 110 MW;
- Real-time settlement is the lower of the actual generation and the final basepoint multiplied by the real-time LBMP = ($100 * 110)/12 = $916.67.

Bid Production Cost Guarantees

Bid production cost guarantees for off dispatch units in real time will only be determined relative to startup and minimum generation costs. No losses on energy above the minimum generation level will be covered by the bid production cost guarantee. Any profits associated with generation at or above minimum generation levels can be used to offset the start-up and minimum generation costs.

Off-dispatch units will not be eligible for any real-time bid production cost guarantees for hours in which they were scheduled day-ahead.

It is not clear what units, other than slow start block-loaded units, would be eligible to receive bid-production cost guarantees under this approach.

Example 1:

- A unit with a 100 MW minimum generation block at a total cost of $10,000 is started in BME for hour beginning 15:00.
- The unit has an upper operating limit of 200 MW.
- The unit was not scheduled in the day-ahead market and is scheduled at 100 MW in BME.
- The unit generates 100 MW throughout the hour.
- The real time price in the hour is $75/MWh.

- The unit would receive a bid production cost guarantee in this hour of $2,500 ($10,000 – $7,500).

Example 2:

- The same unit is scheduled at 125 MW by BME and operates at this level throughout real time.
- The real time price is still $75/MWh.
- The units incremental energy bid is $50/MWh between 100 and 125 MW.
- The units revenues are 125 * $75 = $9,375.
- The units costs are $10,000 + (25 * $50) = $10,750
- The unit would receive a bid production cost guarantee of $1,375 ($10,750 - $9,375)

Example 3:

- The same unit is scheduled at 150 MW by BME and operates at this level throughout real time.
- The real time price is still $75/MWh.
- The units incremental energy bid is $50/MWh between 100 and 125 MW.
- The units incremental energy bid is $100/MWh between 125 and 150 MW.
- The units revenues are 150 * $75 = $11,250.
- The unit costs are $10,000 + (25 * $50) + (25 * $100) = $13,250.
- The cost of the last 25 MW are adjusted to reflect losses that not guaranteed under this bid production cost guarantee by 25 * $25 or $625.
- Guaranteed costs are therefore $13,250 - $625 = $12,225
- The unit would receive a bid production cost guarantee of $1,375 ($12,625 - $11,250).