MEMORANDUM

TO:	Management Committee
FROM:	Generation Issues Task Force/S&P
RE:	Recommendation on a "Hybrid Pricing" Methodology

The NYISO recommended the pricing strategy described below in response to FERC's request that we more fully describe a "hybrid" solution to determine LBMPs when the operation of fixed block gas turbines (GTs) is forced by minimum run time constraints. The hybrid pricing approach falls between the current NYISO approach that treats all GTs as flexible in the pricing dispatch and the approach FERC earlier endorsed which would preclude GTs from setting LBMP. Participants in the February 12, 2001 Generation Issues Task Force meeting generally endorsed the hybrid pricing approach.

The NYISO also recommended, independent of any pricing methodology changes, that it better determine if additional fixed block capacity needs to be committed. To achieve this, a separate commitment dispatch would be performed before prices or schedules are determined in which all fixed block GT capacity that had not met its minimum run-time would be treated like a minimum generation block on a steam unit. The NYISO intends to block these minimum run-time constrained GTs on at their upper operating limits in this commitment dispatch, in effect moving them to the bottom of the supply curve. Doing this ensures that no unnecessary lower cost fixed block units are committed at times when more expensive GTs are still fulfilling their minimum run-time requirements.
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In response to suggestions made at the February 12, 2001 Generation Issues Task Force meeting, the NYISO evaluated the application of a tolerance band around GT bids that would be applied during the test that determines whether there are uneconomic minimum run-time constrained fixed block units. If the difference between the marginal unit and the minimum run-time constrained GT was less than the tolerance the unit would not be considered uneconomic and would not be blocked on at its upper operating limit in the pricing dispatch. GTs that are uneconomic and minimum run-time constrained are moved to the bottom of the supply curve in SCD's pricing pass. (See charts below.) The NYISO recommended at the February 21st, 2001 Scheduling and Pricing Working Group meeting that no such tolerance be applied as it would distort the intended impact of the proposed hybrid approach.

It was further suggested at the February 21st, 2001 Scheduling and Pricing Working Group meeting that the NYISO investigate a methodology to prevent newly available cheap GTs from displacing minimum run-time constrained GTs in the price setting pass. The NYISO has investigated this approach and while it would be feasible to implement such an approach it believes the methodology would distort the intended impact of the proposed hybrid approach.

The NYISO recognizes that the hybrid pricing approach is not perfect. There will be times that it will not send the most appropriate short-run price signal given the state or the system. However, the NYISO did not feel it was possible to implement a hybrid pricing approach that would use different pricing methodologies dependent on an operator defined view of the state of the system. Recognizing that the current pricing methodology has been rejected by FERC and that the NYISO believes FERC proposed solution was also not appropriate, the hybrid pricing approach that the NYISO is recommending is a compromise position.

NYISO also will evaluate the hybrid pricing approach within one year and report back to the BIC on its conclusions.

DISCUSSION

There were a number of issues considered in developing an approach on this issue:

- Not turning on unnecessary GTs when there are uneconomic GTs still in their minimum run times.
- Turning off GTs when their operation is no longer economic or required for meeting load or reserves.
- Having SCD send the right short-run price signal such that if more capacity or imports are needed the price will be high and if the NYISO is past the peak of the day and does not need additional capacity or imports the price will be lower.
- How to determine prices if fixed block GTs must be kept online due to minimum down time and reserve requirements. Ideally, the price should be at least as high as the bid of the unit the NYISO wants to turn off. Under SCD's current ex ante pricing approach this is difficult to model. The closest solution is setting prices with all GTs treated as flexible units. To correctly price this situation an ex post pricing model would be necessary.

The Hybrid Pricing proposal is built from the following SCD dispatch steps:

1. A commitment decision ideal dispatch that blocks on all minimum run-time constrained GTs at their maximum operating limits. All other GTs are flexible. This step determines if it is necessary to turn GTs on or off. It ensures that we won't turn on additional GTs while there are sufficient uneconomic GTs that have not met their minimum run times. If prices are calculated from this dispatch we are sending a short run signal that we don't need more capacity.
2. A flexible ideal dispatch that treats all GTs as flexible regardless of their minimum runtime status. This is the equivalent of today's ideal dispatch.
3. A pricing step that uses a semi-flexible ideal dispatch that puts uneconomic minimum run-time constrained units (cannot yet be turned off) on at their maximum operating limits.
4. A final dispatch that blocks all GTs on at their maximum operating levels if they had a final SCD basepoint from the prior SCD cycle and had not been turned off by the

operator before SCD ran, or if they were started in the commitment dispatch pass of the current SCD cycle.

The Recommendation

- First Pass: A commitment decision ideal dispatch.
- Second Pass: A flexible ideal dispatch with all GTs flexible including units not started in the first pass.
- Third pass: An intermediate ideal dispatch with all uneconomic minimum run-time constrained GTs from Pass two blocked on at their upper operating limits. Prices would be calculated in this step.
- Fourth Pass: A final dispatch based on the commitment decision ideal dispatch blocking on at their upper operating limits all fixed block units that had not been turned off by the operator and any that were committed in the commitment decision ideal dispatch.

Currently, because the real-time dispatch has only a 5 minute horizon, and to prevent inappropriate cycling of GTs, dispatchers are given final authority to actually turn GTs on or off when recommended by the dispatch software. Therefore, any GT that is online at the time that SCD runs is given a final basepoint. This does not allow GTs 4 and 5 from the example below to be turned off before final basepoints are determined. The operators receive a message telling them that the GTs are uneconomic and are candidates to be turned off but the operators do not make these decisions until after SCD has run.

While a better solution in terms of minimizing the amount of steam capacity backed down because of GT block loading would be to take account of operator actions before the final dispatch is determined or prices calculated, this does not appear to be practical in the short term. This shortcoming will in most cases result in a less than optimal solution for only one additional dispatch cycle. Therefore, the sub-optimal solution impact is minimal while the benefit of dispatcher oversight on GT commitment is considered to be substantial.

Option One

Ideal Dispatch 1 : Commitment Pass

Unit	Actual Status When SCD Runs	Suggested Status From This Dispatch	Capacity (MW)	Bid ($/MW)	Lower Limit (MW)	Schedule (MW)	
Steam	On Line	On Line	1000	$0	600	1000	
GT 1	On / Out of Min Run	On / Out of Min Run	100	$10	0	100	
GT 2	On / Out of Min Run	On / Out of Min Run	100	$20	0	100	
GT 3	On / Out of Min Run	On / Out of Min Run	100	$30	0	50	Marginal
GT 4	On / Out of Min Run	Offline	100	$40	0	0	
GT 5	On / Out of Min Run	Offline	100	$50	0	0	
GT 6	Offline	Offline	100	$50	0	0	Not Started
GT 7	On / In Min Run	On / In Min Run	100	$60	100	100	Blocked On
GT 8	On / In Min Run	On / In Min Run	100	$70	100	100	Blocked On
GT 9	On / In Min Run	On / In Min Run	100	$80	100	100	Blocked On
GT 10	On / In Min Run	On / In Min Run	100	$90	100	100	Blocked On
GT 11	On / In Min Run	On / In Min Run	100	$100	100	100	Blocked On
					Total	1750	

Ideal Dispatch 2 : Flexible Pass

Unit	Actual Status When SCD Runs	Suggested Status From This Dispatch	Capacity (MW)	Bid ($/MW)	Lower Limit (MW)	Schedule (MW)	
Steam	On Line	On Line	1000	$0	600	1000	
GT 1	On / Out of Min Run	On / Out of Min Run	100	$10	0	100	
GT 2	On / Out of Min Run	On / Out of Min Run	100	$20	0	100	
GT 3	On / Out of Min Run	On / Out of Min Run	100	$30	0	100	
GT 4	On / Out of Min Run	On / Out of Min Run	100	$40	0	100	
GT 5	On / Out of Min Run	On / Out of Min Run	100	$50	0	100	
GT 6	Offline	Started	100	$50	0	100	
GT 7	On / In Min Run	On / In Min Run	100	$60	0	100	
GT 8	On / In Min Run	On / In Min Run	100	$70	0	50	Marginal
GT 9	On / In Min Run	Want Offline	100	$80	0	0	Uneconomic
GT 10	On / In Min Run	Want Offline	100	$90	0	0	Uneconomic
GT 11	On / In Min Run	Want Offline	100	$100	0	0	Uneconomic
					Total	1750	

Option One (cont'd)

Ideal Dispatch 3 : Pricing Pass

Unit	Actual Status When SCD Runs	Suggested Status From This Dispatch	Capacity (MW)	Bid ($/MW)	Lower Limit (MW)	Schedule (MW)	
Steam	On Line	On Line	1000	$0	600	1000	
GT 1	On / Out of Min Run	On / Out of Min Run	100	$10	0	100	
GT 2	On / Out of Min Run	On / Out of Min Run	100	$20	0	100	
GT 3	On / Out of Min Run	On / Out of Min Run	100	$30	0	100	
GT 4	On / Out of Min Run	On / Out of Min Run	100	$40	0	100	
GT 5	On / Out of Min Run	On / Out of Min Run	100	$50	0	50	Marginal
GT 6	Offline	Offline	100	$50	0	0	Not Started
GT 7	On / In Min Run	Want Offline	100	$60	0	0	
GT 8	On / In Min Run	Want Offline	100	$70	0	0	
GT 9	On / In Min Run	On / In Min Run	100	$80	100	100	Blocked On
GT 10	On / In Min Run	On / In Min Run	100	$90	100	100	Blocked On
GT 11	On / In Min Run	On / In Min Run	100	$100	100	100	Blocked On
					Total	1750	

Final Dispatch

Unit	Actual Status When SCD Runs	Final Status at the End of the SCD Run	Capacity (MW)	Bid ($/MW)	Lower Limit (MW)	Schedule (MW)	
Steam	On Line	On Line	1000	$0	600	750	Block Loading
GT 1	On / Out of Min Run	On / Out of Min Run	100	$10	100	100	
GT 2	On / Out of Min Run	On / Out of Min Run	100	$20	100	100	
GT 3	On / Out of Min Run	On / Out of Min Run	100	$30	100	100	
GT 4	On / Out of Min Run	On / Out of Min Run	100	$40	100	100	Get final basepoint until
GT 5	On / Out of Min Run	On / Out of Min Run	100	$50	100	100	turned off by the operator
GT 6	Offline	Offline	100	$50	0	0	
GT 7	On / In Min Run	On / In Min Run	100	$60	100	100	
GT 8	On / In Min Run	On / In Min Run	100	$70	100	100	
GT 9	On / In Min Run	On / In Min Run	100	$80	100	100	
GT 10	On / In Min Run	On / In Min Run	100	$90	100	100	
GT 11	On / In Min Run	On / In Min Run	100	$100	100	100	
					Total	1750	

The price using the NYISO recommended hybrid pricing approach would be $50/MWh.