Gardenville-South Load Pocket and the potential for Market Power

Description of the Gardenville-South Load Pocket

During periods where the West 230kV tie to PJM (68 Line, S. Ripley-Dunkirk) is in-service, an import constrained area ("load pocket") may be described in the West Zone comprised of southern tier load served by the 115kV system emanating from Gardenville station. For this load pocket, the import limiting transmission facilities are typically found to be the 115kV lines from Gardenville to Dunkirk (141, 142 Lines) for the loss of the Gardenville Tower (73, 74 230kV Lines) – where base flow on the 73/74 lines is transferred to the underlying 115kV system. When the 68 Line is open, the 73/74 lines are lightly loaded and generally do not present an issue to the 115kV system as a contingent loss. However, during periods where this tie is closed, the 73 and 74 Lines may carry a substantial amount of energy towards PJM (particularly LEC flow). Under these conditions the transfer of energy for the loss of the Gardenville Tower may result in significant overloads on the underlying 115kV system.

Additionally, the Gardenville-South load pocket may be "active" where either the 141 or 142 line is out of service under high load conditions. This is a less severe condition, however, under these circumstances the loss of the 73/74 Tower transfers load serving energy from the Dunkirk 115 path to the remaining in-service 115kV feeds – which may become limiting.

The simplified one-line diagram (Fig. 1) illustrates the topology of the Gardenville-South Load Pocket and the contingent flows that may result for the loss of the 73/74 Lines with the 68 Line in-service.

Resolution of Overloads on the 141/142 and Pricing

For a given commitment, overloads on the 141/142 may be resolved by several means:

- Dispatching flexible generation within the load pocket.
- Relaxation of the constraint along the GTDC
- Out of market actions in order to reduce base flow on 73/74 lines.

At present, only one flexible (dispatchable) resource exists internal to this load pocket that may be dispatched to off-load limiting transmission facilities. As such, constraining periods may yield an opportunity for the exercise of market power. In order to resolve the constraint, the market solutions will utilize energy from the resource at any cost up to the incremental cost (various steps) associated with transmission relaxation. Depending on the amount of resolution required, the single resource may offer its flexible MWs such in order readily move shadow prices towards the upper end of the relaxation steps – and yield higher LBMPs.

As an example, the following table contains the schedule and price results for one hour in the Day Ahead Market for a series of five different offers by a single resource within this pocket. The results clearly illustrate the ability for a single resource to strongly influence price under the topology described.

Example: Offer to Schedule and Price for 1 hour of the DAM

Offer	Min Gen	IE MW1	IE1 $/MWh	IE MW2	IE2 $/MWh	Schedule	LBMP
1	0	50	100	78	150	74	$223.76
2	0	50	200	78	250	67.5	$254
3	0	50	300	78	360	66.3	$364
4	0	50	400	78	450	62.4	$450
5	0	50	500	78	550	50	$507

Fig. 1 Gardenville-South Load Pocket with 68 Line In-Service