Appendix A

Work Scope

Assessment of a Deliverability Product in New York
Scope of Work
6/22/05

Background

Given a transmission system topology, the primary objective of any deliverability analysis is to determine if the control area's capacity and demand resources in the aggregate meet or exceed the resource adequacy criteria – e.g., a loss-of-load expectation which on average is no more than once in ten years. A secondary issue is, given the geographical distribution or location of resources and their availability, whether transmission constraints increase the amount of resources needed to meet the resource adequacy criteria. For instance, resources that are sited in a location from which export capacity is limited will contribute positively to improving reliability but at a diminished level relative to resource in other locations. This can result, potentially at least, in an increase[5] in the installed reserve margin or capacity margin required to meet the reliability criteria.

As new resources are connected to the transmission system, the full load carrying capability of the resource may or may not be realized. In its Large Generator Interconnection Rulemaking (LGIR), the Federal Energy Regulatory Commission (FERC) defined two interconnection products. They were the "Energy Only" and "Network Resource" interconnection products. The primary distinction between these two products is the network resource is considered fully deliverable[6] as a capacity resource while the energy only is not. The two product interconnection model provides a basis for differentiating the value of new resources based on a predefined deliverability test and its contribution to resource adequacy. Also, the deliverability test provides a mechanism for new resources to determine the system upgrades facilities that would be required in order for the generator to fulfill its deliverability obligations.

Currently, New York offers a single interconnection product which is defined as the "minimum interconnection standard" – i.e., a resource can interconnect to the grid without having to procure point-to-point or network transmission service. This standard was adopted as the result of a FERC order regarding the startup of the New York wholesale electricity market in January 1999. Also, New York adopted the locational capacity requirements model to differentiate the value of new resources based on their location and their overall contribution to resource adequacy. In addition, the locational capacity model provides a basis for determining that sufficient resources are located in load zones/pockets to ensure that the aggregate of the resources are deliverable to the load in order to meet the resource adequacy criteria – i.e., ensure reliability. In its LGIR compliance filing, the NYISO, as allowed for under the independent entity variation, opted to maintain its single interconnection product in conjunction with locational capacity requirements. However, the stakeholder process did result in an agreement to study the issue of deliverability as it relates to the two product model.

In New York, the New York State Reliability Council (NYSRC) is the entity responsible for determining annually on a statewide basis the aggregate resources that are required to meet the resource adequacy criteria. The NYSRC utilizes General Electric's Multi-Area Reliability Simulation (MARS) modeling software to determine the requirements. This model accounts for the impact of inter-zonal transmission constraints (between the present eleven

[5] It should be noted that changes in resource availability/performance, transmission system performance, and geographical distribution of load also impact the requirements.

[6] Deliverability ensures, only, that the aggregate of the resources can be utilized to deliver energy to the aggregate of the Control Area load to maintain reliability. The intent of deliverability is to certify a generator as a capacity resource. It is not intended to guarantee any rights to transmission service within the Control Area nor does it guarantee any rights to produce energy during any particular operational circumstances.

LBMP zones representing the New York Control Area) but assumes that all resources are fully deliverable within each of these zones. As part of the determination of the resource requirement for the 2005 – 2006 capability year, the NYSRC is reviewing how inter-zonal transmission constraints in conjunction with the quantity of resources located in load pockets impacts the statewide resource requirement. The NYSRC reviews and approves all modeling assumptions at its August meeting each year. This deliverability assessment should be based on the NYSRC modeling assumptions where appropriate.

Purpose

The purpose of this assessment of deliverability of electric generating resources is multifold:

1. Validate whether electric generating resources are currently fully deliverable within a locational capacity zone and/or super-zone – i.e., zones A - I can be defined as a single super-zone defined as Rest-Of-State;

2. Develop an annual study process for identifying and updating transmission "bottlenecks" that, potentially at least, could impact statewide and locality resource requirements;

3. Determine if new market rules and criteria would need to be developed to account for any deliverability issues identified in the assessment;

4. Because of the potential impact on resource adequacy requirements, coordinate this assessment with the 2005 – 2006 NYSRC installed reserve margin study.

Requirements

1. Develop a basis and/or criteria for evaluating intra-zonal deliverability.

2. Summarize present NYISO methodologies and procedures regarding load and generation deliverability. 3.

Identify potential transmission constraints/"bottlenecks".

4. Develop sub-zone and super-zone area definitions and their associated transfer capability, based on the transmission constraints identified in step 3.

5. Recommend methods and procedures for recognizing, representing, and accounting for transmission constraints in Installed Reserve Margin (IRM) and Locational Capacity requirements.

6. Provide a report on the analysis results and conclusions that pertain to this assessment.

Analysis

1. Develop definition(-s) of deliverability for the purpose of this study.

2. Provide documentation on present NYISO and NYSRC procedures that addresses deliverability.

3. Review completed and ongoing reliability assessments, as appropriate, (2004 IRM Study, 2005 IRM Study, 2005 Locational Capacity Study, 2005 Reliability Needs Analysis, 2002 NYSRC Deliverability Issues

Study and Reactive Working Group Voltage Study) to identify potential "bottlenecks" – e.g., proposed areas for study, potentially at least, could include: the three LI sub-areas ; the Astoria pocket; Staten Island; In-City 138kv; West 49th Street; the Oswego complex etc.

4. Starting with a consistent set of base cases, the MARS database (i.e., the NYSRC approved base case) and load flow database, conduct sufficient load flow analyses to evaluate the normal and post contingency performance of the NYSTS and identify potential intra-zonal constraints. The analysis will be conducted under peak load conditions. For example, an area would be considered to have no internal transmission constraints if all of the generation within that area can be coincidentally dispatched to their aggregate unforced capacity when subject to security constraints of monitored transmission facilities within that load area. Generation outside the study area would be dispatched to maintain the generation and load balance. This assessment should identify the maximum impact of dispatch on each monitored transmission facility. These analyses will be conducted for selected years over the planning horizon – e.g., 2005, 2010 and 2013.

5. "Bottled" generation will be identified by the procedure in Item 4.

6. Modify MARS transmission and zonal model to represent the identified transmission constraints, if any.

7. Conduct sufficient MARS analysis to determine the impact of any additional transmission constraints, if any, on statewide and locational requirements.

8. From 7, determine the need to develop additional procedures for generation deliverability.

9. Prepare and include an update of the inter-zonal "unforced capacity" accounting approach included in the April 21, 2004 slide presentation (slides 7 and 8). This should include a more definitive description of the calculation along with an explanation of the results and incorporate the results of the NYSRC assessment.

10. If new requirements are proposed, provide a description of the potential impact of the new requirements on the reliability needs assessment done in the Planning Process including alternative ways the deliverability requirements can be met – e.g., the adoption of two (2) generator interconnection products (Energy-Only Resource and Network Resource) as described in FERC's Order 2003.

11. Prepare a report of the results and determinations.

12. Present the study results for review and comment by the appropriate NYISO/NYSRC committees.

Attachments

A Work Plan
B Study Assumptions

ATTACHMENT I(A) (revised 12/1/05)
REVISED WORK PLAN FOR DELIVERABILITY ANALYSIS

April 18, 2005 — **Stakeholder meeting to review Work Plan and to identify issues related to study scope, models, assumptions and methodology**

May 1, 2005 — **NYISO filing of Work Plan with Commission**

May/June 2005 — **NYISO revision of study scope, assumptions and methodologies based upon stakeholder comments. Revisions to include consideration of both Zonal Resource Adequacy Analysis as well as the Intra-zonal Load Flow Analysis. Studies to be coordinated with the NYISO's Comprehensive Reliability Planning Process as well as with the IRM analysis conducted by the New York State Reliability Council.**

July 1, 2005 — **NYISO submits status report to Commission**

July/September 2005 — **NYISO to present interim study results and conduct stakeholder briefings and discussions to review interim study results. NYISO may revise analysis as needed in response to stakeholder comments.**

October 1, 2005 — **NYISO submits status report to Commission**

NYISO to finalize study assumptions and prepare draft outline of methodology for circulation to stakeholders. NYISO to revise report based upon stakeholder comments. Base cases to be finalized and distributed to stakeholders.

NYISO submits status report to Commission which will include recent Stakeholder comments and proposed Revised Work Plan, Study Assumptions and Methodology Writeup.

October/Nov. 2005 **December/Jan. 2006** — **NYISO to finalize study and prepare draft report for Circulation to stakeholders. NYISO to revise and finalize Study report based upon stakeholder comments.**

December 1, 2005 **March 3, 2006** — **NYISO to submit status report and Final Study Report to the Commission.**

March/April 2006 — **NYISO to prepare draft compliance filing with NYTOs and other Stakeholders' input.**

May 6, 2006 — **NYISO and TOs submit compliance filing to Commission.**

ATTACHMENT I(B)(revised 12/1/2005)

BASE CASE: 2005

REVISED STUDY ASSUMPTIONS

PLANNING CASE: 2009

- **Based upon planning case from 2005 analysis**

Based upon 2005 NYSRC IRM Base Case

Update for:

- **Load forecast**
- **Generation unit changes**
- **EFORd outage rates**
- **Reflect all interface transfer limits in load flow analysis model (See Below)**

- **Modify future resource additions to match load growth plus 20% in each super zone**
- **Select units based upon interconnection queue position**
  - **Use "Catch-up Class" units first**
- **Add retirements from CRPP Base Case**
- **M-29**
  - **Model in-service if SRIS is complete when study assumptions are finalized, OR**
  - **Model M-29 in-service as a scenario**

BASE CASE ASSUMPTIONS

- **Use emergency criteria, consistent with IRM MARS analysis**

- **Monitor Lower Voltage facilities**
  - **Monitor 69kv and above on LI**
  - **Monitor 115kv and above statewide**
  - **Monitor for contingencies on the 138kv and above on LI; and 230KV and above statewide**
  - **Identified violations on lower voltage facilities are the responsibility of the local TOs to address through their respective procedures**

- **Observe NPCC/NYSRC Criteria Contingencies**
  - **Single contingency used under emergency conditions**
  - **Do not model stuck breaker or tower contingencies**
  - **Refer to NYSRC Reliability Rules: Section B-R.1.b.2**

- **Use STE ratings**
  - **Consistent with emergency criteria**
  - **Refer to NYSRC Reliability Rules: Section B-R.1.b.2**

- **Consideration of voltage/stability limits**
  - **To be reflected in transfer limit proxies in load flow analysis**
  - **Voltage constraints will be translated to a MW interface transfer limit for monitoring precontingency flows in the analysis**
  - **Voltage based transfer limits identified from other studies will be reviewed and implemented.**
  - **The present limits in the MARS analysis that reflect voltage or stability limits will also be evaluated.**
  - **Transfer limits used in 2005 IRM analysis will be used for all interfaces**

- **Generator Outage Rates**
  - **Utilize the same ICAP/UCAP outage rate translation used in the 2004 deliverability study**
  - **Update EFORd outage rates**

- **Use of PARs**
  - **PAR adjustments should be allowed to mitigate potential constraints**
  - **Need to analyze the impact on other interfaces to ensure that there is no double accounting of transfer capability**

- **"Shift Factor" Methodology**
  - **Recognize the probabilistic nature of forced outage rates and the impact on capacity requirements**
  - **The following alternative methodologies (presented at the June 22, 2005 IITF meeting) will be investigated:**
  - **Alternate 1: Resource Accounting Screen with intra-zonal power flow**
  - **Alternate 2: Power Flow Methodology with screening step (similar to PJM deliverability test)**
  - **Alternate 3: IRM and Locational Capacity Studies related to power flow analysis**
  - **Alternate 4: Combined Generation and Load Approach**
  - **Alternate 5: Shift only enough capacity to meet forecasted load**

ADDITIONAL SCENARIOS

Scenario A:

- **Utilize the same assumptions as the Base Case, except for the following:**
  - **Monitor for stuck breaker and tower contingencies**
  - **Use LTE ratings**

Scenario B:

- **Utilize the preliminary transfer limits developed for the 2006 IRM analysis and reflect the impact of the Con Ed series reactor at Sprainbrook**

Scenario C:

- **Utilize the base case, except test for all contingencies on the electric system at voltages of 115 kv and above and separately report any appropriate emergency condition criteria violations resulting from**

these additional contingencies. Utilize the list of generating units additions and retirements from *(to be determined):*

(a) List of additions and retirements in the 2005 CRPP for the Initial 2005 ATRA, Year 2010, or

(b) List of additions and retirements in the 2005 Facilities Study/Cost Allocation (Final Catch-up Class), or

(c) List of additions and retirements from the 2004 ATRA.

SENSITIVITES

(1) Evaluate the sensitivity of the results for Methods 3 and 4 to the lowering of the 15.9% Load Proxy used to represent outages and uncertainties;

(2) Evaluate the sensitivity of the result for Methods 3 and 4 to different shift factor development methods, namely;

(a) Modify shift factor calculation from generation to load, to generation to generation; (b) Modify shift factor calculation from shifting within a zone to shifting outside the zone.