Operations Reactive Studies

Summary and Status Report – August 2004

Introduction

During the Summer peak load days in 1999, 2001, and 2002 the NYISO experienced significant periods when the observed EHV Transmission System voltages were generally lower than predicted by system study models for the forecast conditions. At the request of the System Operations Advisory Subcommittee, the Operations Engineering staff developed several benchmark power flow analyses to identify factors contributing to the differences between the forecast and actual voltage conditions observed in real time.

These analyses identified key differences between the study model representations and the actual observed system conditions:

- EHV voltage declines greater than predicted for small incremental changes in transfer
- Area transmission voltage profiles higher than study representation
- Higher than expected MVAr flow toward the lower voltage (115, 138kV) area transmission systems
- Generator reactive power capabilities less than study representation data
- Reactive demand (modeled load power factor) optimistic in study data

Of these, the most significant are:

1. Area transmission voltage profiles modeled lower than actual operation
2. Accuracy of reactive demand in the load forecasting process

Operations Reactive Studies

In 2002 Operations Engineering staff developed a scope of studies and investigations to identify the key issues in the voltage performance (Attachment A). The scope identified the following specific areas to be addressed through these studies:

- *Detailed review of recent system peak load conditions and relationship of system load to EHV voltage profile*
- *Review of the NYISO Voltage Support Ancillary Service and the performance of VSS providers and reactive capability testing*
- *Update voltage transfer limits and modeling*
- *Load Power Factor Assessment*

This report presents the results of these studies and the NYISO staff's recommendations.

Continuing the Reactive Studies Process

1. Improve representation and accuracy of reactive load as part of the development of a reactive resource forecasting model
2. Improvements to the Voltage Support Ancillary Service
3. Perform Phase 2 of the Load Power Factor Assessment, including analysis for mid- and light-load conditions
4. Support effective response to NERC Board Of Trustees Blackout Recommendations (and similar Recommendations from the Joint International Task Force, U.S. DOE, and NYSRC):
    - #7: Evaluate Reactive Power and Voltage Control Practices
    - #13: Reevaluate System Design, Planning and Operating Criteria
    - #14: Improve System Modeling and System Data Exchange

Detailed review of recent system peak load conditions

Inability to maintain EHV System voltages during peak load conditions has resulted in curtailment of power transfers in real-time leading to an increase in congestion costs. To address this issue, NYISO has reduced the Central East voltage transfer limit to secure the Day-Ahead commitment:

> *SCUC/DAM limits reduced from 2950 to 2850 to 2750 over successive seasons recognizing continuing problems in supporting transmission system voltages and, therefore, power transfers during peak conditions.*

Further investigation of the system voltage performance indicates that voltage problems are not just occurring during the peak/design condition, but generally NYISO experiences voltage constrained transfer conditions on the cross-state 345kV when the Control Area load is above 26,000MW.

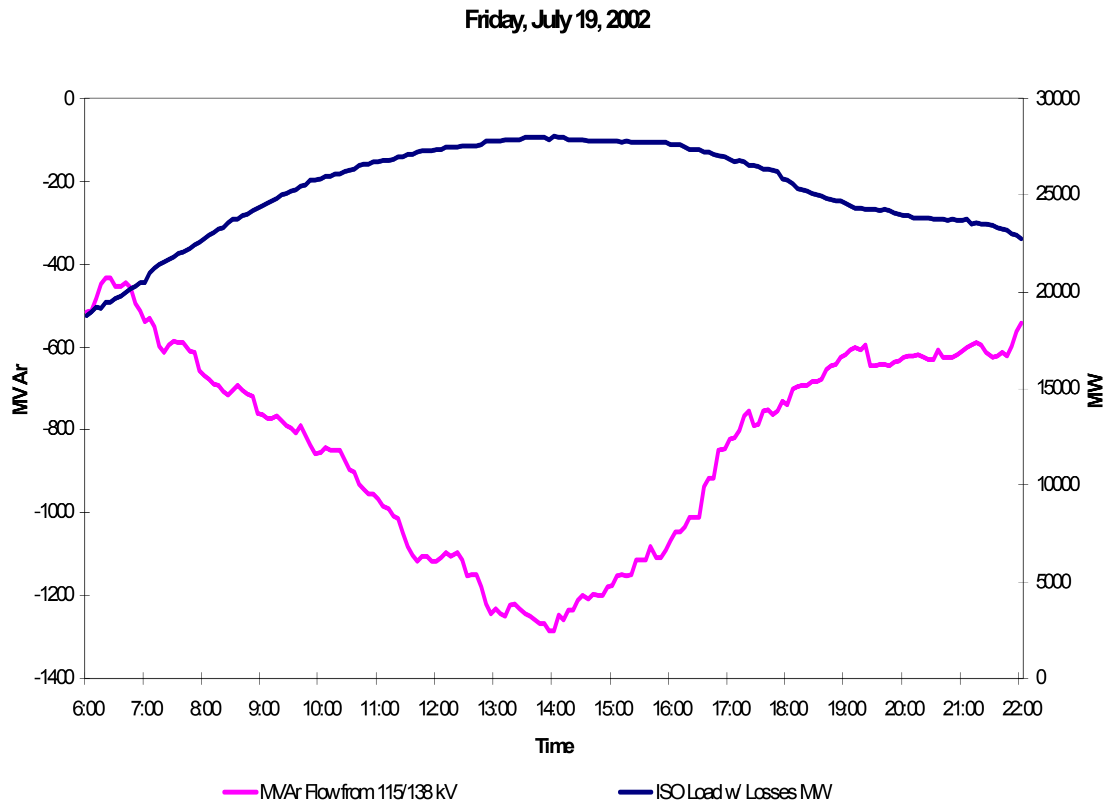
Shunt capacitive compensation of the NYISO 345kV transmission system is approaching its practical limit. Additional shunt capacitors in the vicinity where voltage problems are occurring is no longer a viable solution as adding more capacitors will worsen the pre- to post-contingency voltage drop, and necessitate even higher pre-contingency voltage limits and increase the likelihood of a voltage collapse (stability) event.

NYISO staff reviewed system conditions during the peak load hours of several different days in 2001 and 2002. The primary observations made from this review were:

- Correlation between peak real (MW) load and reactive (MVAr) power flow to 115/138kV system (Figure 1)
- Correlation between high reactive power flow to 115/138kV system and low 345kV voltage (Figure 2)
- Correlation between high load and low 345kV voltage

The following Figures 1 and 2 present real time observed values for a typical peak load of approximately 28,000MW, considerably below recent forecast seasonal peak loads.

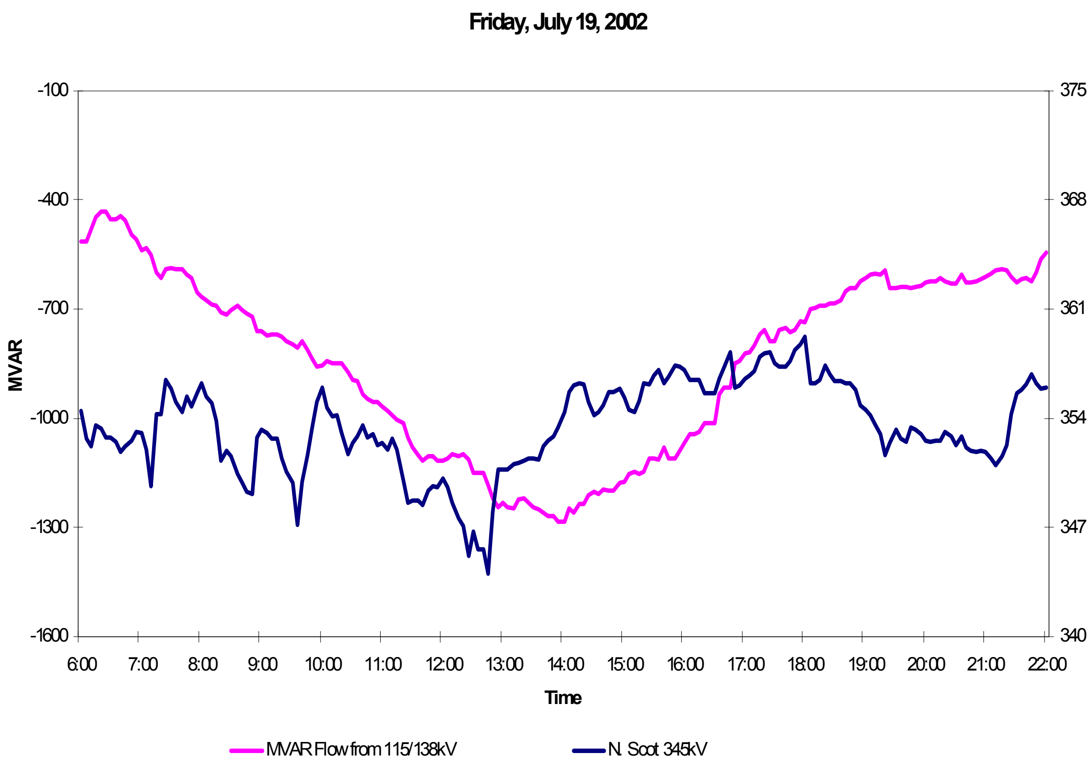
Figure 1



Reactive Power (MVAr flow) from 115kV and 138kV and NYCA Load (MW)

Reactive power flow from 115/138 to 345kV in Zones F and G (only) shows an increase of about 800MVAr as the system load peaks at about 28,000MW.

Figure 2

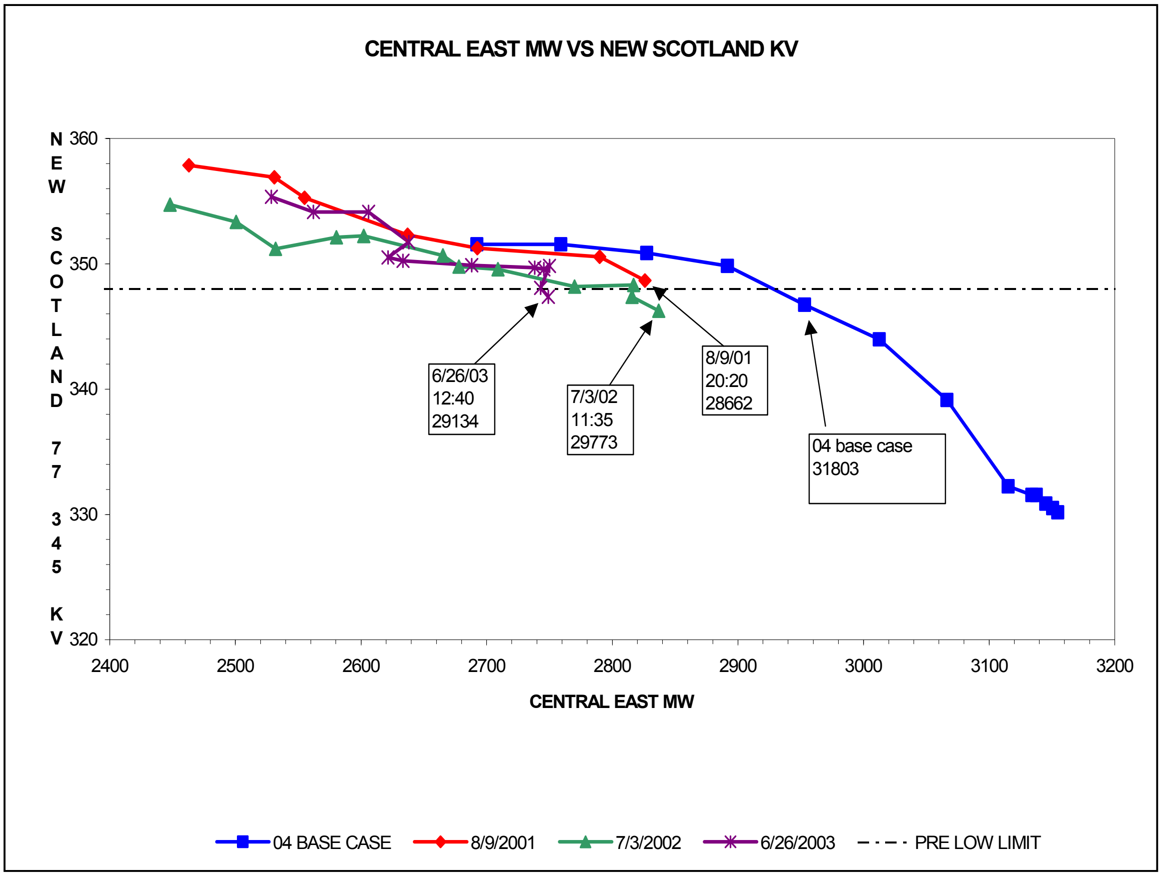


Reactive Power (MVAr flow) from 115kV and 138kV and New Scotland Voltage

Leeds and Fraser SVC's placed in manual mode providing VAR support at 12:40 Central East transfer less than 2700 MW; New Scotland NS pre-contingency low voltage limit 348 kV (lowest voltage observed about 346kV)

Review of additional near-peak system conditions demonstrates that real-time conditions are still significantly different than forecast by the power flow models.

Figure 3



This compares the predicted New Scotland voltage performance for a range of Central East derived from the Summer 2004 forecast peak load (31,800MW) base case power flow (NYISO Summer 2004 Operating Study) with real time voltage/transfer observed during actual peak load conditions. The study case predicts that a Central East transfer level of 2900MW could be supported with acceptable pre-contingency voltage at New Scotland. In 2003, with an actual system load of 30,300MW (1500MW lower) the New Scotland pre-contingency low voltage limit (348kV) was constraining at an actual Central East transfer level of less than 2750MW.

Recommendation – NYISO staff develop and implement a procedure for reviewing actual peak load conditions, including collecting necessary real-time data to confirm representational modeling of real and reactive load and actual load power factor.

Review of the NYISO Voltage Support Ancillary Service

VSS Testing Review

In 2002 the Operations Engineering staff began reviewing the test records for all of the generator market participants that were providers of Voltage Support Ancillary Service. Test report data was confirmed from archival real-time data or data logging records from the generators' actual test. Deficiencies in the test reports or claims were referred to Customer Services to review with the individual participant.

Table 1 summarizes the number of VSS suppliers and total gross MVAr available through the VSS:

Table 1
Summary of NYISO Voltage Support Service

	Suppliers	Gross MVAr Capability
2001	242	12418
2002	254	13902
2003	275	14975

VSS Improvements

During the review of testing and questions raised by Market Participants, a number of issues were identified for more detailed consideration:

- Clarification of Testing Requirements
- Six-year Test Requirement
- Reactive Capability
- Gross vs. Net Capability
- Compensation Rate
- Compensation for non-generator resources
- Interconnection Requirements
- Compensation for FACTS-type devices
- Two-tier voltage support service

Some (or portions) of these issues could be addressed immediately. However several need to be further defined and discussed at the NYISO stakeholder level to develop a more comprehensive proposal.

- Clarification of Testing Requirements – review of the annual testing process identified issues with the VSS documentation. Technical Bulletin #91 (Scheduling VSS Annual Test) was revised and clarified based on comments and clarifications suggested by the participant generators. Technical Bulletin #103 (VSS Qualification) was developed to document the process that a generator must follow to become qualified as a VSS provider.

  The reactive capability test report form (data sheet) has been revised to maintain consistency with the revised and new Technical Bulletins. This form was further enhanced in 2004 to facilitate reporting of cross-compound steam turbine-generators and combined-cycle generators. NYISO has also solicited comments from the VSS providers to improve the accuracy and ease of use of the report form and the testing process.

Recommendation – NYISO staff continue to monitor the documentation and reporting process and be responsive to comments from the Market Participants.

- Six-year Test Requirement – currently NYISO is not requiring VSS suppliers perform the 6-year test as indicated in the Ancillary Services Manual. Initially, it was determined that it would be difficult to schedule the 6-year test within the operation of the NYISO market and there was the possibility that pricing anomalies may result from the extended periods of time that each generator would need to be scheduled for each of the eight steps required in the test process. The 6-year testing requirement also is not consistent with the NERC Planning Standard II.B recommending a 5-year performance testing of voltage regulators and turbine governors.

Recommendation – NYISO continue to waive the 6-year testing requirement pending resolution of the NERC Standards pertaining to performance testing of voltage regulators and turbine governors and then develop an appropriate testing process that is responsive to NERC requirements and consistent with needs of the New York market.

Near-term Improvements

- Reactive capability – as initially implemented by the NYISO, the VSS Ancillary Service does not recognize the range of control that a unit could provide, or recognize that some units are not capable of providing any leading capability.

- Gross vs. Net Reactive capability – as originally implemented by the NYISO, the basis for payment is determined from the demonstrated ***gross*** lagging MVAr capability. This is the measure of reactive power produced/absorbed by the generator at the generator's terminal, not as delivered to the system (net). Effectively, this means that generators are compensated for the reactive power consumed by their auxiliary loads and the losses of the generator transformer. Conversely, real power delivery (MW) and capability (ICAP) are based on the *net* real power delivered to the system. Most of the real-time metering of generator reactive power output is net MVAr (metered at the same location as real power MW); changing the basis for determining the reactive capability of a generator would be consistent with the measurement of real power and installed capability. Using net metering and net capability reporting will also mitigate a potential source of mis-understanding in real-time operation.

- Compensation Rate – when initially established, the NYISO determined a compensation rate derived from the fixed capital cost of equipment associated with the "provision of voltage support" from each generator (i.e., that portion of the plant investment that relates to the production of reactive power). This resulted in an average rate of $ 3,919/MVAr-year paid to VSS providers based on the tested lagging MVAr capability (NYISO Tariff, Rate Schedule 2). In subsequent years, this fixed rate has been renewed and has not been reevaluated.

Recommendation – these three issues should be addressed in a coordinated fashion. Initially, NYISO staff proposes to present to the Market Participants a set of modifications that include:

1. ***Reactive power metered as net MVAr (consistent with MW metering)***
2. ***Capability basis for compensation be the full demonstrated range – lagging and leading MVAr capability as determined by actual test***
3. ***All generators participating will be required to test lagging MVAr capability during Summer Capability Period***
4. ***Compensation rate be adjusted to reflect the new basis for compensation and range of control***
5. ***Application of the adjusted compensation rate for the 2005 payment cycle***

Longer Term Issues

The following will require input from the NYISO stakeholders to consider the complexity of the issues and relationship to other aspects of the New York market. Implementation of these could require a significant restructuring of the Voltage Support Ancillary Service.

- Compensation for non-generator resources – while the Tariff explicitly recognizes "generators and synchronous condensers" as VSS service providers, it does not effectively compensate synchronous condensers for VSS. While generators can recover their fixed (capital recovery and maintenance) costs through ICAP contracts, the only mechanism for synchronous condensers to recover those costs and the variable cost of energy for operation is through the VSS payment. (When a synchronous condenser is operating it requires an amount of real power; the cost of this energy, if acquired at market rates, could easily exceed the potential revenue from the VSS payment.) Another limit to the potential revenue is that a synchronous condenser is not eligible for an ICAP contract and would only be compensated for the actual hours of operation.

Recommendation – NYISO staff work with owners of synchronous condensers to identify the unique issues associated with the operation and cost recovery needs, and develop a proposal that allows for fair compensation for service provided to the New York market.

- Interconnection requirements – as structured the VSS is an ancillary service that providers participate in at their option (there is no *requirement* that any generator resource must participate in the VSS). However, following the August 14th Blackout and the NERC Board of Trustees Recommendations to Prevent Future Blackouts (and the Recommendations of the Joint U.S. – Canada Task Force and the U.S. Department of Energy), and discussion with the NYS Reliability Council, consideration should be given that any generator electrically connected to the power system in the NY Control Area be required to participate in the VSS; at minimum, any ICAP provider in the NYISO Market should also be a VSS provider.

Recommendation – NYISO staff and Stakeholders should address this issue pending changes to NERC requirements resulting from the Blackout Recommendations or when the NYSRC approves a reliability rule incorporating this requirement. Implementation of such a rule must consider whether the requirement can be extended to generators that do not have ICAP obligation, or if it must be effected through the interconnection agreement between the generator and the connecting transmission owner. This should also be responsive to changes to Standards and Rules in response to NERC Blackout Recommendation #7 and DOE Recommendation #23 concerning reactive resources.

- FACTS devices – static VAr compensators (SVCs), voltage source converter-based static shunt compensators (including voltage regulation capability of VSC-based HVdc terminals) are, by definition, excluded from participating in VSS ancillary service. Historically, SVCs were installed in the New York system to improve the transient stability performance of the system and increasing the stability transfer limits. These voltage control devices currently are compensated through transmission congestion contract (TCC) awards for reduction in transmission congestion that can be demonstrated by the presence of the device. Owner(s) of VSC-based HVdc merchant transmission facilities have requested consideration of these devices within the voltage support ancillary service.

- Two-tier voltage support service – VSS providers that are connected to the local area transmission network generally are providing local voltage support and/or compensating for reactive (end-use) demand in the system. VSS providers that connect directly to the EHV transmission system are generally providing voltage support for EHV transmission system voltage regulation and transmission system losses. A case can be made that each service should be compensated at rates appropriate to the value of the service – that there is a different value for local load compensation than for EHV transmission voltage support. Consideration should be given to developing cost models for each service based on the appropriate capital cost of comparable switched-shunt capacitors for load compensation and dynamic compensation (SVC) for transmission support as well as the need for the compensation being reliability-based (for load) or market-based power transfer. This would also require seasonal determination of the reliability transfer requirement and accurate forecasting of reactive demand.

Several of these issues should be addressed through the NYISO Stakeholder process and the Market Structures Working Group and the Business Issues Committee to develop the appropriate market design and compensation model. Some of the issues may require considerable time to develop an appropriate model that includes the necessary changes to the Tariffs, Rate Schedules, and NYISO documentation. The near-term issues should be addressed as soon as possible to allow for filing and implementation of an appropriately adjusted rate for 2005.

NYISO Voltage Studies

Updated voltage transfer limits and modeling

The first comprehensive analysis of the Central East voltage collapse phenomena was performed in 1995. NYISO staff conducted voltage collapse transfer limit analysis in 2001 for the addition of the Marcy FACTS Phase I (STATCOM)[1] and Oakdale 135 MVAr capacitor. This study recommended an increase in the Central East transfer limit as constrained by voltage by 65MW. An additional limit increase of 45MW was recommended with the addition of the Edic 200MVAr capacitor in 2002[2]. These studies were conducted on power flow models based on the NYISO Transmission Planning databank and used modeling assumptions that were consistent with the 1995 study.

Based on the experience and review of system conditions during the peak load conditions of 1999 – 2002, NYISO staff revised certain base assumptions in developing the model and performing the voltage collapse analysis for 2003:

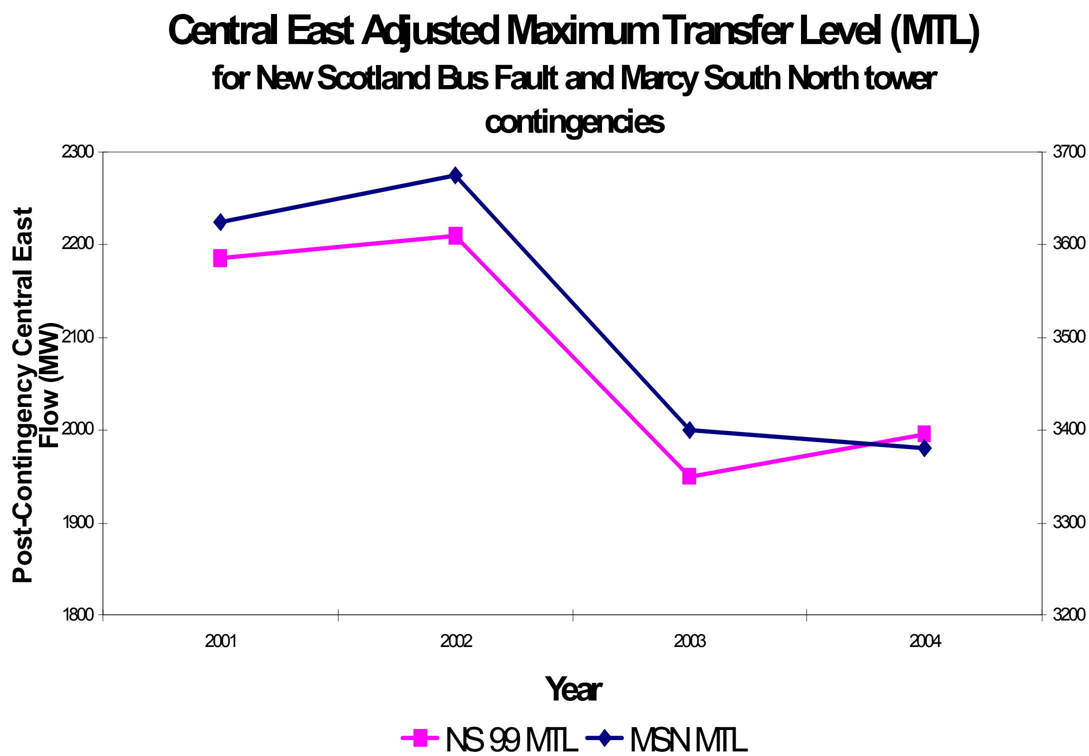
- Generator reactive capability modeled based on actual test data
- Area transmission (115kV, 138kV) voltage profile and generator voltage schedules based on observed real-time values and transmission owners' desired voltage schedules
- HQ – NY transfer modeled at 1500MW in base case (vs. 1200MW in previous studies)

The net impact of these modeling changes is a reduction of approximately 200 - 250MW in the Central East voltage collapse Maximum Transfer Level (post-contingency MTL), and was the basis for the further reduction in the SCUC/DAM Central East limit in Summer 2003. Preliminary analysis for Summer 2004 using these assumptions yields similar results.

The impact of the assumptions is graphically portrayed in Figure 4 showing the MTL values for Central East as limited by the New Scotland 345kV #99 bus fault (left vertical axis), or the Marcy-South double circuit tower contingency (right vertical axis).

[1] Central East Voltage and Stability Analysis for Marcy FACTS Project – Phase I (May 2001)
[2] Central East Voltage Analysis for Addition of 200MVAr Capacitor Bank at the Edic 345kV Substation (June 2002)

Figure 4

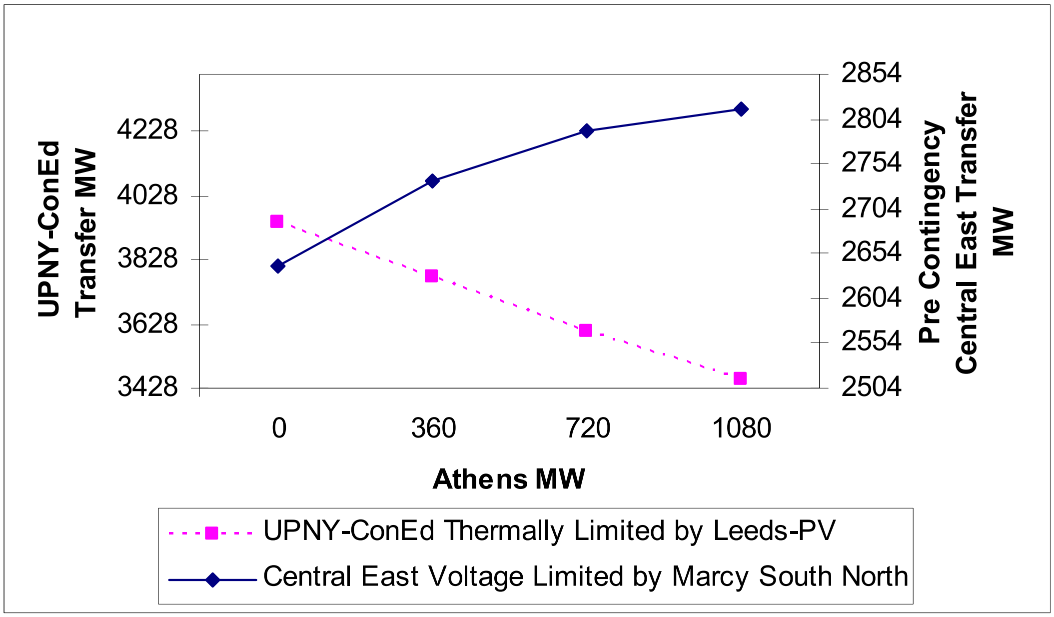


Summer 2004 Voltage Limits

In anticipation of the commercial operation of the Athens Generating Station (1080MW combined-cycle plant), NYISO staff performed analysis of Central East and UPNY – ConEd interfaces voltage performance with Athens units in service. The testing indicates an improvement in the Central East voltage constrained transfer limits because increasing Athens generation "pushes back" on flows on Central East (relieving pre- and post-contingency transfer loading), and the reactive capability improves New Scotland voltage performance post-contingency.

The analysis also demonstrates that increasing Athens generation causes the thermal transfer limits on the UPNY-ConEd interface to become more constraining (Figure 5) because it increases powerflow directly on the limiting element and limiting contingency circuits (Athens – Pleasant Valley #91, and Leeds – Pleasant Valley #92).

Figure 5



The comparison demonstrates that the UPNY-ConEd thermal limit is nearly constraining with no Athens generation and would generally be more constraining than the Central East voltage constraint at any level of Athens generation in service. Recommended adjustments to the Central East MTLs and complete discussion of the impact of Athens generation on voltage and thermal limit performance on the UPNY-ConEd interface are reported in the study report.[3]

[3] *Central East and UPNY-ConEd Voltage Analysis for Athens Generating Station* (June 2004)

Load Power Factor Assessment – Phase 1 Study[4]

Background

Adequate bulk power system voltages are required to support significant power transfers across the New York State Bulk Power System (NYSBPS). To maintain adequate system voltages both pre- and post-contingency, adequate levels of reactive resources are required within the New York Control Area (NYCA).

Accurate assessment of reactive resource requirements on a local and system basis begins with the assurance that operating and planning models reflect the actual levels of reactive load compensation (correct power factor of the loads) as documented on a seasonal or annual basis. The day-ahead and seasonal load forecasting models must accurately reflect a reasonable expectation of the reactive demand as a function of the real power forecast. End use reactive demand that is not properly represented or compensated in the study models places unexpected or unanticipated demand on system resources to meet the real-time reactive requirements.

The purpose of this phase of the Zonal Load Power Factor Assessment is to determine an appropriate methodology to evaluate reactive load and its relationship to voltage performance in the NYCA. This initial, or Phase 1, analysis was performed only for peak load conditions. The development of a load power factor assessment reported here is an evolutionary process that forms the basis for the recommendation of a "final methodology" for the Phase 2 assessment that would evaluate a more comprehensive range of NYISO load conditions.

Recommendations

Based on the Phase 1 testing and sensitivity analyses, it is recommended that NYISO perform a complete assessment incorporating the following:

- The reactive study zones should be modified as determined in the sensitivity analysis
- The Zero-VAr Interchange test should be applied on a post-contingency basis. This allows reactive power flow between study zones on a pre-contingency basis, while assuring that each study zone has sufficient reactive power reserves for post-contingency conditions.

[4] *This section is a summary of the work performed in the Phase 1 of the Load Power Factor Assessment Study. A complete description of the development and application of the method as well as the recommended assessment process for a full Phase 2 analysis is contained in the separate report: Zonal Load Power Factor Assessment – Phase 1.*

- Determine the desired range of load power factors for each study zone for peak, mid-load (70%) and light (40%) load conditions.

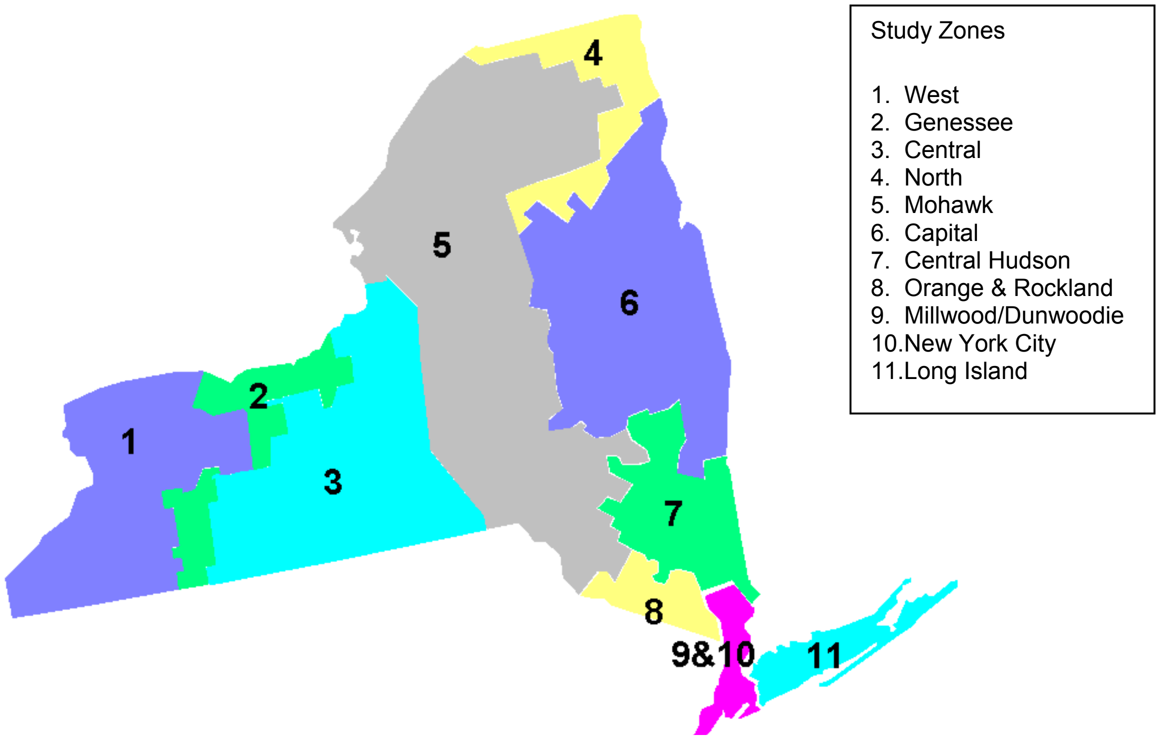
The New York Transmission Owners shall provide NYISO with information documenting their respective system power factor design standards for use in the Phase 2 assessment.

The New York Transmission Owners should take steps to ensure that reactive load compensation equipment is available for service during peak load conditions.

Overview of Methodology

The Load Power Factor Assessment determines the desired range of load power factors for each of the reactive study zones within the NYCA. It is important to note that the study zones referred to in this report are very similar to, but not identical to the NYISO LBMP Zones (Figure 6).

Figure 6
Definitions of Zones Recommended for Phase 2 Analysis

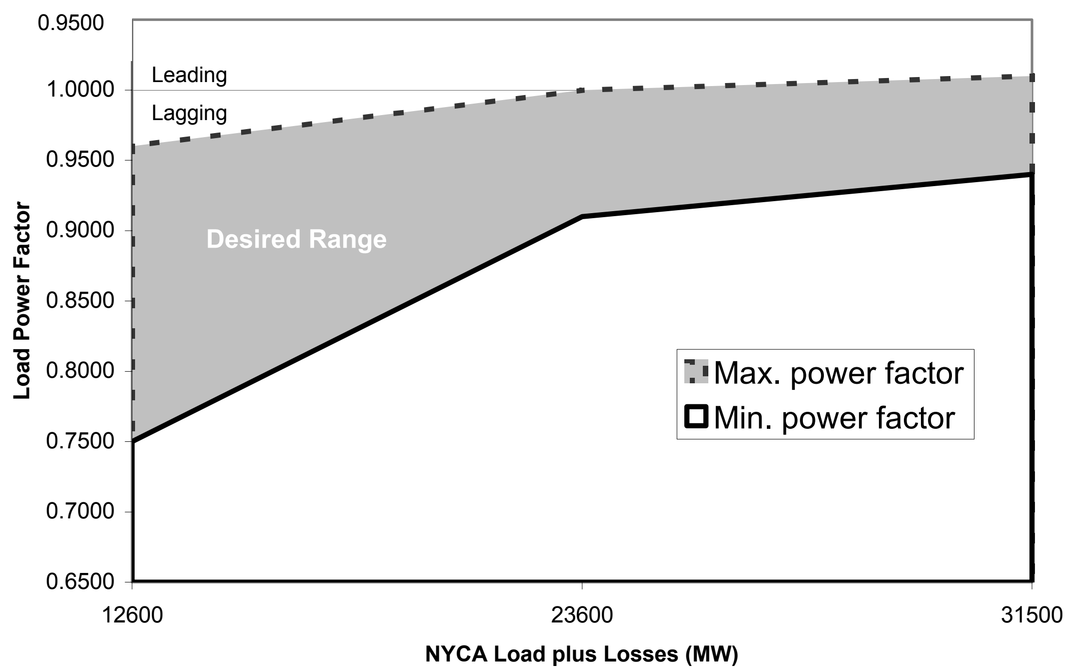


The process used to determine the minimum and maximum load power factors for each study zone at a given load level, consists of two tests:

- Zero VAr Interchange,
- Minimum/Maximum Voltage.

Each study zone is evaluated to determine a minimum and maximum power factor that meet the test conditions described in the next section. When a complete set of minimum and maximum load power factors are determined for a range of system loads, the area between these minima and maxim represents the desired range of power factors for the study zone (Figure 7).

Figure 7
Example Load Power Factor Range for a given zone



Sensitivity Analysis

Sensitivity analysis was performed to determine if modifying the initial study assumptions would produce results that were more aligned with the objectives of the overall study scope.

The separation of the higher voltage levels (<200 kV) from the lower voltage levels was discussed with reviewers and it was observed that any reactive resource connected at the higher voltage levels (i.e. generation and transmission line charging) should flow to the lower voltage levels and from zone to zone.

The study zone definitions for the sensitivity analysis were modified from the original boundaries in that the 230 kV and above facilities were included within each study zone. Reactive power was allowed to flow between the zones in the pre-contingency cases, in other words the Zero-VAr Interchange was not tested for the pre-contingency cases but was in force on a post-contingency basis. This insures that the study zone has sufficient reactive power resources on a post-contingency basis.

The sensitivity analysis was performed for zone 1 (West), zone 6 (Capital) and zones 9 and 10 (Dunwoodie/Millwood and NYC). Zones 9 and 10 were examined as a single study zone to include the impact of switching of transmission system shunt reactors that could be utilized post-contingency for either study zone.

The other concern is that the Zero-VAr Interchange test does not allow for the normal flow of reactive power between the study zones. This is addressed in the sensitivity analysis by allowing pre-contingency reactive power flows between the study zones, and enforcing the Zero-VAr Interchange test only for the post-contingency conditions. This also insures that each study zone has sufficient reactive power reserves for the post-contingency condition.

Attachment 1
Operations Reactive Studies Scope

Revised Scope

Operations Reactive Studies

The system reactive resources can be considered in three areas:

- Generator reactive capability
- Transmission switched shunt and static compensators
- Reactive load and loss compensation

In an effort to minimize the impact of reactive resource deficiency in the system the NYISO will investigate potential measures. These measures will be categorized as short-term (can be addressed within 2002-2003), and long term (require upgrading or supplying new equipment and major procedural or tariff changes). The recommendations and work will be prioritized in this manner.

Short-term

I. Review the existing method for compensating Suppliers of the Voltage Support Service (VSS).
   a. Review historical payments made by Grid Accounting for Voltage Support.
   b. Review test data submitted by Suppliers upon which the payments are based. (Note: This data should reflect the most recent reported data, including test dates, and Operating Capability for leading/lagging VAr output.)
      i. Annual test data
      ii. Six-year test data.
      iii. Identify generators with local voltage support service contract with transmission owners
   c. Update VSS payment accounting to reflect most recent testing
      i. Verify test data submitted
      ii. Issue notices of non-compliance to any supplier out of date

II. Review events in which the desired Voltage Support was requested.
   a. Determine the performance of the Supplier when requested by the NYISO.
   b. Determine the performance of the Supplier when requested by the Transmission Owner

III. Update procedures for testing, evaluation and compliance.
   a. Establish communication protocol for real-time Voltage Support requests.
      i. Define process for requesting Voltage Support in real-time and requirements needed to demonstrate compliance with that request.

  ii. Define process and conditions when a Supplier may request Lost Opportunity Cost for providing real-time Voltage Support Service.

b. Update technical bulletin(s) for Market Participants to describe requirements for annual and 6-year testing reactive capability testing.

IV. Identify short-term issues to enhance reactive resources.
   a. Plant or unit issues that might prevent a Supplier from achieving full range of reactive capability (lag and lead).
   b. Identify reactive compensation added to NYISO system since Summer 2001 and prior to Summer 2002.
   c. Identify reactive compensation planned additions prior to Summer 2003.

V. Review end use reactive load compensation criteria:
   a. Request all Transmission Owners and/or Load Serving Entities provide design standards, rules or criteria for determining reactive load compensation or maintaining desired load power factor.
   b. Determine real-time requirements for monitoring compliance with Transmission Owners' existing design criteria.

VI. Develop a proposal for minimum design power factor for zonal/sub-zonal load and demonstrate using current NYISO system models and analysis of real-time data (following a similar design as ***NEPOOL Operating Procedure #17: Load Power Factor Correction*** and adapt to NYISO load model.

   a. Determine the necessary methods and metering to measure a zonal load power factor requirement on forecast basis and actual (real time) reactive demand.
   b. Apply to NYISO Summer 2002 study base case and real-time case.
   c. Develop a conceptual NYISO Compensation Procedure "strawman" document.
      i. Apply procedure to NYISO Summer 2003 forecast
      ii. Apply procedure to NYISO Summer 2005/7 future cases.
   d. Revise Procedure and present to appropriate interested parties.

VII. Provide interim and progress reports.
   a. Summarize results and report recommendations to SOAS (monthly).
   b. Develop presentations for Market Structures and NYSRC (quarterly).

Attachment 1
Operations Reactive Studies Scope

Long-Term/Tariff Issues

Goal: Develop procedures to insure market participant compliance to maintain reactive resources on the system at an adequate level and maintain acceptable voltage levels under any reasonably expected conditions (i.e. simultaneous heavy load and high transfer conditions).

I. Evaluate means to separate local (load) reactive requirements from transmission system reactive requirements.
   a. Determine whether a two-tier reactive service should be developed
      i. EHV/transmission support service
      ii. Local load compensation service
   b. Determine the necessary methods and metering to measure local load compensation requirement on forecast basis and actual (real time) reactive demand.
   c. Define associated penalties for non-compliance (failure to maintain the design load power factor) in forecast and actual reactive demand.

II. Address generator capability issues by redesigning the Voltage Support payment policy to enhance flexibility of the service.
   a. Investigate alternative approaches (Identify best practices for voltage support service.).
   b. Investigate alternative methods of payment.
      i. Payment based on demonstrated range achieved by the Supplier, as well as the maximum lead/lag tested values
      ii. Payment based on locational reactive requirement
   c. Develop means of obtaining data for full range of capability to minimize the impact of the 6-year test requirement.

III. Develop a Final Report on Voltage Support Services including recommendations and alternatives in cooperation with the Voltage Support Service Task Force:
   a. Prepare final Voltage Support Service design to the Market Structures Working Group
   b. The final VSS proposal shall consider and address issues including:
      i. New generation additions should include the voltage service support and capability provided by the generator,
      ii. The cost of service is not consistent with need across the system,
      iii. The service has at three components that should be reviewed for the pricing of the service: imbedded cost, generator capability, and level of service provided.
   c. Develop tariff revision issues with NYISO Legal staff.