

NYISO Review  
of the  
System Reliability Impact Study  
for  
CPV Valley Energy Center Project  
Interconnection Queue #251

Report dated February 11, 2009

DRAFT

February 26, 2009

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STATE OF NEW YORK  
DEPT. OF PUBLIC SERVICE  
DATE 3/21/09  
CASE NO. 09-T-050  
EX 289

# 1. Introduction

CPV Valley, LLC (the “Developer”) has requested to interconnect the proposed CPV Valley Energy Center project (the “Project”), a 630 MW combined cycle plant located in Orange County, New York. The point of interconnection (“POI”) will be on the New York Power Authority (“NYPA”) Coopers Corners – Rock Tavern 345 kV transmission line #42, approximately 31.8 miles from the Coopers Corners Substation..

The Project has a proposed in-service date of May, 2012.

Siemens Energy, Inc., Power Technologies International (the “Consultant”) has conducted a full<sup>1</sup> System Reliability Impact Study (“SRIS”) on behalf of the Developer to evaluate the impact of the Project on the New York State Transmission System and to ensure that the resulting power system would conform to all Applicable Reliability Standards as defined in the Attachment X<sup>2</sup> of the New York Independent System Operator (“NYISO”) Open Access Transmission Tariff.

The NYISO Operating Committee approved the Project SRIS Scope on July 17, 2008.

The original SRIS report was issued November 25, 2008. Subsequent revisions have been received to address NYISO, NYPA, New York State Electric & Gas (“NYSEG”), Central Hudson Gas & Electric (CHG&E), Consolidated Edison Company of New York (“ConEd”), Orange and Rockland Utilities (O&R), and Developer comments. The report dated February 11, 2009 is the subject of this review.

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<sup>1</sup> Projects with proposed capability greater than or equal to 80 MW undergo a full SRIS as defined in the NYISO “SRIS Criteria and Procedures”, [http://www.nyiso.com/public/services/planning/interconnection\\_studies\\_process.jsp](http://www.nyiso.com/public/services/planning/interconnection_studies_process.jsp)

<sup>2</sup> Standard Large Facility Interconnection Procedures, applicable to Generating Facilities that exceed 20MW and to Merchant Transmission Facilities”, [http://www.nyiso.com/public/webdocs/documents/tariffs/oatt/att\\_x.pdf](http://www.nyiso.com/public/webdocs/documents/tariffs/oatt/att_x.pdf).

## 2. Report Content

In order to properly evaluate the reliability impact of a project on the New York State Transmission System, a minimum amount of supporting data is required. At the time of writing this review, the Developer has submitted the following documentation and data:

1. Approved Scope of Work.
2. Study report
3. Appendices containing analysis results including power flow, short circuit results, stability plots, one-line diagrams, etc.

### **Information Needed to Complete Review**

All information needed to complete this review has been received.

### 3. Commentary

In reviewing the contents of this SRIS report, the NYISO has the following comments and observations.

#### Project description and modeling

Modeling data for the Project in power flow and stability analysis was provided by the Developer to the NYISO, and included in the NYISO database provided to the Consultant.

The SRIS results and conclusions are based on the studied scenarios and various assumptions related with the study methodologies, system, and project modeling; any project modeling change can result in different results and may require restudy.

The Project consists of two gas turbines (GT) and one steam turbine (ST) with a total net output of 630 MW (a gross output of 653 MW and an auxiliary load of 23 MW) in both summer and winter conditions. The output of each of the two GTs is 182 MW and the output of the ST is 289 MW for summer conditions. In winter conditions, the output of the two GTs is 232 MW and the output of the ST is 189 MW. Note that the scenario when the STG output is 289 MW reflects additional capacity associated with duct firing. The comparable non duct fired STG output would be in the 185 to 205 MW range depending on the ambient conditions.

The two GTs will operate at a nominal voltage of 16.5 kV and the ST will operate at a nominal voltage of 18 kV. The outputs of the three generators will be stepped up to 345 kV through individual transformers. The ratings of the generators' step-up transformers are 290 MVA for the two GTs and 315 MVA for the ST.

The Project will be connected to the Coopers Corners – Rock Tavern 345 kV line # 42 via a 6-breaker ring bus arrangement as shown in Figure 1. There are two breakers in series between the two Line 42 positions to mitigate concerns that a stuck break fault would cause the trip of both line segments. As the ability to physically accommodate this additional breaker and the substation arrangement for the plant is still undergoing review, the final configuration will continue to be reviewed with the transmission owners. Additional discussions with the transmissions owners will include the consideration of a high-side breaker on the steam turbine and other configuration options. The Developer will work with the transmission owners to determine an appropriate substation configuration and the revisions, if any, to the substation design will be included in the Facilities Study.

A non-binding good faith cost estimate of System Upgrade Facilities (SUFs) necessary to accommodate the Project is \$23,300,000, with an estimated time to construct of 16 months. Protection and associated communications changes may be required at the remote terminals. The estimated cost for these changes at Coopers Corners is \$400,000. Similar updates at Rock Tavern are likely necessary.

## Power Flow Analysis

Power flow analysis was performed for 2012 summer peak load and 2012/2013 winter peak load conditions per the SRIS study scope. In the summer and winter cases, approximately half of the Project output is dispatched against generation in the Oswego area and the other half against generation on Long Island. The proposed New York Regional Interconnect (“NYRI”) HVDC line connecting to Rock Tavern 345 kV was in-service at 600 MW in the summer peak cases and at 300 MW in the winter peak cases.

The Project has an impact on thermal loading within the Study Area, both pre-contingency and post-contingency. With the original dispatch of the Project, thermal loading increased east of the Project causing some overloads post-contingency on the underlying 138, 115, and 69 kV systems in the area. These overloads were mitigated by increasing generation in New York City and decreasing generation in the Capital Region, in accordance with the Minimum Interconnection Standard. This effectively means the Project displaces generation completely upstate, rather than half upstate and half downstate.

Sensitivity analysis was performed for four levels of Danskammer generation to determine the Project’s impact on the CHG&E underlying system. For the studied dispatch scenarios the Project aggravates existing post-contingency thermal overloads, indicating that the Project may reduce CHG&E’s operating flexibility to secure their system.

The Project does not cause any new voltage violations, nor does it significantly impact the voltage profile in either summer or winter. An impact on lower voltage systems was observed at first, but low voltages were mitigated by transformer tap adjustments.

The above mentioned mitigation measures are in accordance with the NYISO Minimum Interconnection Standard and NYISO SRIS Criteria and Procedures, and the Project meets the NERC, NPCC, and NYSRC reliability standards. It is assumed that the owners and operators of the proposed facilities will be subject to, and shall abide by, the applicable NYISO and/or Connecting Transmission Owner’s operating procedures.

NYISO concurs with the conclusions.

## Stability Analysis

Stability analysis was performed for 2012 summer peak and light load conditions per the SRIS study scope. Standard New York stability contingencies associated with the Total-East and UPNY-ConEd interfaces as well as other local three-phase and single line to ground faults were simulated on both peak and light load base cases without and with the Project.

The system remained stable and positively damped for all system faults and all local faults under normal and delayed clearing conditions, except for a three-phase fault at Rock Tavern 345 kV with delayed clearing. Both the system and the Project were unstable in the light load case with the Project for this extreme contingency. This contingency was run again for a single-line-to-ground fault, making it a design contingency, and both the system and the Project were stable.

This contingency was also run with the three-phase fault while simulating relay tripping of the Project, which resulted in a stable response by the system. The Project does not have an adverse impact on the system.

A critical clearing time assessment was performed using the summer peak and light load base cases with and without the Project. The Project does reduce critical clearing times in the local area, but this is not identified as a significant adverse impact on reliability.

NYISO concurs with the conclusions.

### **Extreme Contingency Analysis**

Loadflow assessment of the extreme contingencies was conducted on the summer peak load base cases without and with the Project. The performance of the system was found to be similar for each extreme contingency performed, with and without the Project.

Selected stability extreme contingencies were evaluated, all of which exhibited an acceptably stable response other than the extreme contingency discussed under stability analysis.

NYISO concurs with the conclusions.

### **Transfer Limit Analysis**

Thermal, voltage, and stability constrained transfer limit analyses were performed under summer peak load conditions to determine the incremental impact of the Project on the normal and emergency transfer limits of the Central East, Total East, UPNY-SENY, and UPNY-ConEd interfaces (open and closed definitions as applicable).

The results show that the Project has a negative impact on all thermal transfer limits, but UPNY-ConEd the most. The Project decreases the UPNY-ConEd normal and emergency thermal limits by 460 MW and 620 MW respectively due to limits on Rock Tavern – Ramapo 345 kV and Roseton – Fishkill 345 kV. This is highly dependent on the generation and HVDC dispatch in the vicinity of the POI, and such optimizations were not performed nor were they required.

The voltage transfer analysis results show that the project decreases Central East, Total East, and UPNY-SENY limits by 100 to 300 MW, while it increases UPNY-ConEd limits by 100 to 300 MW. Again, no effort was made to optimize these transfer limits.

Comparing thermal and voltage limits, the Project decreases the Central East, Total East, and UPNY-SENY limits by approximately 100 to 300 MW, while it increases UPNY-ConEd limits by approximately 100 to 300 MW. As with all SRIS analyses, these results are based on the studied system conditions and assumptions.

NYISO concurs with the conclusions.

### Short Circuit Analysis

NYISO Guideline for Fault Current Assessment has been used for bus fault calculation. The highest of the three faults applied (i.e.: three phase, double-line to ground, and single-line to ground faults) was compared against the respective station lowest circuit breaker rating to determine whether or not the circuit breaker is over-duty.

The results of the analysis indicate that the Project increases fault duties at the substations in proximity to the POI. The bus fault analysis indicated potential overduty conditions at Ramapo 345 kV and East Walden 115 kV substations. The Project's impact at East Walden is less than 100 A and therefore considered to be insignificant.

Individual breaker analysis was performed for Ramapo 345 kV which has two breakers rated for 40 kA with all others rated 63 kA. This analysis indicates that no breakers are overdutied. Any potential overduty conditions will be re-evaluated, identified, and mitigated during the Facilities Study.

NYISO concurs with the conclusions.

## 4. Conclusions

The results presented in the report under the system conditions evaluated and using the existent models, methodologies and applicable rules, indicate that the proposed Project would not adversely impact the reliability of the New York State Transmission System. This conclusion is based on the following understandings and assumptions:

- The Project will be operated in accordance with all NYISO requirements, including all applicable NYISO and Transmission Owner day ahead and real time operational procedures and limits. The NYISO will operate the project in a manner that does not negatively impact the New York State Transmission System; this may include dispatching patterns that eliminate potential reliability issues that may exist during certain system conditions.
- The Project and associated interconnection facilities will be designed in accordance with all the Applicable Reliability Standards.
- The SRIS results and conclusions are based on the studied scenarios and various assumptions related with the study methodologies, system, and project modeling information provided by the Developer; any project modeling change can result in different results and possible re-study.
- Additionally, it is understood that any potential overduty conditions will be re-evaluated, identified and mitigated during the Facilities Study.
- The SRIS did not include any evaluation of a deliverability standard or test, although such a standard may apply to the Project in the future.

Subject to the above, NYISO Staff is satisfied that all existent Applicable Reliability Standards have been addressed and all SRIS Scope requirements have been met in the SRIS for the Project. Therefore, NYISO Staff recommends approval of this SRIS.

Figure 1

CPV Valley Energy Center One-Line



