May 27, 2009

Mr. S. Derek Phelps
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: Docket No. 370 - CT Greater Springfield Reliability Project

Dear Mr. Phelps:

This letter provides the response to requests for the information listed below.

Response to OCC-02 Interrogatories dated 04/24/2009
OCC-029, 030, 031, 036, 037, 038, 043, 044, 047, 048

Very truly yours,

Robert Carberry
Project Manager
NEEWS Siting and Permitting
NUSCO
As Agent for CL&P

cc: Service List

Witness: **CL&P Panel**
Request from: **Office of Consumer Counsel**

Question:
The 2008 IRP, Figure G.33, estimated that omission of the Central Connecticut Reliability Project (CCRP) from NEEWS would reduce the Connecticut Import interface limit by 400 MW, compared to the full NEEWS configuration.

a. Does CL&P have any update to that estimate?
b. If not, why not? If so, please provide that update.

Response:

Each of the NEEWS Projects improves reliability by increasing the capability of the transmission network to move additional power across the southern New England region and into Connecticut. A minimum and maximum of a range of transfer limits for each of the various interfaces within New England is developed by the ISO-NE following extensive studies which simulate various generation dispatches, load levels, and regional power flows within and between areas. The Company understands that the ISO-NE has not recently performed an update of the transfer capabilities for each of the NEEWS Projects.

NUSCo has performed preliminary analyses to estimate the effect of the NEEWS projects together on the Connecticut Import capability levels, and the effect of completing all but the Central Connecticut Reliability Project on the Connecticut Import capability levels. With all of the NEEWS projects, NUSCO's calculations support the ISO-NE determination for an increase in the interface transfer range into Connecticut to between 3,600 MW and 4,000 MW. NUSCo's calculations continue to indicate an increase of approximately 200 - 600 MW to the Connecticut Import interface following the construction of CCRP.

Witness: **CL&P Panel**
Request from: **Office of Consumer Counsel**

Question:
Application, p. F-12 states that: "completion of a 345-kV loop serving SWCT in 2009 will enable power to move freely through SWCT, and the construction of the Interstate Reliability Project and the GSRP will enable the import of sufficient power to provide more reliable service to the entire state, including SWCT. However, the increased power flows across central Connecticut necessary to serve the growing SWCT load will result in overloads on existing transmission lines following contingency conditions on the transmission system."

a. Please explain whether the "increased power flows across central Connecticut" will be caused by "growing SWCT load," the completion of the SWCT 345-kV loop, completion of the Interstate Reliability Project or completion of the GSRP.
b. Please provide the basis for CL&P's explanation of need for the Central Connecticut Reliability Project (CCRP).
c. If the GSRP is not built, is there any need for the CCRP, and if so, what?
d. If the Interstate Reliability Project is not built, is there any need for the CCRP, and if so, what?

Response:
a) The growing SWCT load, completion of the SWCT 345-kV loop, the planned addition of the Interstate Reliability Project and completion of GSRP all contribute to increased power flows across central Connecticut. Additional factors contributing to increased power flow levels across Connecticut would be power transfers between New England and New York, and following certain contingencies both within and outside of Connecticut.
b) Approximately 70% of Connecticut's load is concentrated in the western part of the state, while a high percentage of the state's base load generating units (Millstone Station) are located east of the Connecticut River (for example Millstone Station). New England's existing transmission system does not allow for the reliable delivery of surplus capacity to all load centers in Southern New England. Planning study simulations for the 10-year planning horizon, representing various combinations of generation dispatches and inter-area transfers, identified a number of cases where power flows on transmission elements or on the southern New England east-west, Connecticut, and Connecticut east-west interfaces exceeded their ratings, resulting in violations of national and regional reliability planning standards. Table 3-7 "Connecticut Transmission Line Overloads, 2009 Peak Load, Line Out (N-1-1)" of the Needs Analysis lists a number of contingencies which result in power flows that exceed the emergency ratings of Connecticut transmission elements. In addition to the listed contingencies in Table 3-7, the studies found a number of more significant N-1-1 overload conditions, but these were not listed due to operation of the special protection system (SPS) at Millstone Generating Station, which automatically reduces the output of the nuclear generating units for those contingency conditions.

(c)(d) If either the GSRP or the Interstate Reliability Project were not constructed there would still be a need to improve the capability of the Connecticut transmission system to transmit power from the generation resources concentrated in the eastern part of the state to the load concentrated in SWCT for certain dispatch scenarios, especially following certain contingency conditions. In either scenario, the problem remains almost identical – the ability to move power from Manchester Substation to the load centers in western Connecticut in a reliable manner recognizing various generation dispatches, inter-Area transfers, load levels, and recognized contingencies that may occur on the transmission system. In addition, as stated on Page 33 of the decision in Connecticut DPUC Docket No. 08-07–01 "The Department believes that a conservative generator retirement projection would include nine units totaling 929 MW during the planning period. In 2011, all units that are 50 years old or older would retire after two new LFRM peaking units begin operation. After 2011, all units reaching 50 years of operation would retire during their 50th year of operation." Table 8 of the same Docket identifies Norwalk Harbor Unit #1, Norwalk Harbor Unit #2 and Bridgeport Harbor Unit #2 which are between 46 and 49 years of age as of January 1, 2009. All three generating units are located in western Connecticut; with their retirement one should expect that an additional 460 MW of power would have to flow from east to west across the Connecticut east – west interface to serve the load centers in western Connecticut. In addition, following the guidance put forth by the Connecticut DPUC, transmission engineers should provide for the retirement of Bridgeport Unit #3, a base load generating unit with a capacity of 383 MW in 2018, which is also within the 10-year planning period. By 2018, one must then anticipate a total of an additional 843 MW of power flowing over the Connecticut east – west interface, minus of course any new generation resources installed in western Connecticut during this time frame.

Witness: **CL&P Panel**
Request from: **Office of Consumer Counsel**

Question:
Please provide CL&P's best estimate of the effect of the Interstate Reliability Project alone, without any other portions of the NEEWS system, on various relevant measures of transmission capacity.

Response:

ISO-NE develops a range of transfer limits for each defined interface within New England after conducting extensive studies which simulate various generation dispatches, load levels, and regional power flows within and between areas. An interface's transfer limit may be limited by transmission facilities within the receiving area, within the external or sending area and also on transmission facilities that define the interface. ISO-NE has determined that the current range of Connecticut Import interface transfer limits is between 1,700 MW and 2,500 MW. The construction of the Interstate Reliability Project will result in transmission system enhancements that enable higher incremental power imports across the interface, and when the CCRP is constructed additional incremental transfer limit increases will be realized.

ISO-NE has not determined and published in their Regional System Plan what the estimated impact of each of the three Connecticut NEEWS projects will be on the range of the Connecticut Import transfer limits. However, NUSCo has performed a preliminary analyses to estimate the effect of each NEEWS project on Connecticut's import transfer limits when constructed in the proposed sequence, and the effect of completing only the Interstate Reliability Project on the Connecticut Import transfer levels. CL&P estimates that GSRP will increase the transfer limit range by approximately 200 to 300 MW, that the Interstate Reliability Project will then incrementally add approximately 300 to 600 MW to that limit, and that CCRP will then incrementally increase the transfer limit an additional 200 to 600 MW. Together the NEEWS projects will increase the Connecticut Import transfer limit by approximately 1,100 MW. When all of the NEEWS projects are in service, NUSCo's calculations support ISO-NE's determination that the range of the Connecticut Import transfer levels would be between 3600 MW and 4000 MW.

NUSCo has not attempted to estimate the range of increases to the Connecticut Import transfer limit that would result from construction of the Interstate Reliability Project first because it has always planned to construct GSRP first. See CL&P's response to Data Request CSC-01, Q-CSC-002. However, we are certain that the transfer limits would be different than the incremental increases that would result from constructing the Interstate Reliability Project after the GSRP. If only the Interstate Reliability Project was constructed there would still be a need to address the reliability problems in the greater Springfield area.

Witness: **CL&P Panel**
Request from: **Office of Consumer Counsel**

Question:
Please provide the equivalent of Needs Analysis Tables 3-1 and 3-2, using the 2009 ISO-NE load forecast and including in the CT analyses all capacity under contract to the Connecticut utilities.

Response:

This question asks CL&P to re-create ISO-NE's estimate of Projected Transfer Capacity Requirements for Rhode Island, Springfield, and Connecticut, for 2009 and 2016, with updated assumptions. CL&P does not have all of the specific data required for this task. The level of detail needed to develop several assumptions including generator forced outage rates is based on specific generator operating characteristics. This information is not publicly available and can only be obtained from ISO-NE. CL&P will attempt to obtain and develop the data that is necessary to update the tables as requested and provide in a summary that can be made publicly available. When CL&P completes this calculation a supplemental response to this data request will be filed. However, the effort required to accomplish this task is substantial and will require significant time and resources.

Finally, please note that the information provided in Tables 3-1 and 3-2 in the ISO-NE Needs Analysis is of only limited value for analyzing the capability of the transmission system to reliably serve customer peak demands for electricity. The characterization of this type of calculation as a "security" analysis must be tempered by the fact that the high-level assumptions used do not produce a result that validates compliance with mandatory reliability standards. Rather, this type of analysis is a simplistic adequacy screening tool that is useful in identifying problems for detailed power-flow analysis. This type of analysis assumes that the transmission grid within an area of interest has infinite capability for all generation to serve all the load at all times. This is rarely true. The real validation of the robustness of a transmission system, or its security, can only be achieved by power-flow studies utilizing a deterministic methodology that simulates customer load demands, generation dispatches and regional transfer assumptions which test both the adequacy of available resources and the ability of the transmission system to serve the load following a contingency. Such power-flow analyses must be performed in accordance with national and regional reliability standards (NPCC A-2 and ISO-NE PP3).

At the time ISO-NE prepared the Needs Report, including Tables 3-1 and 3-2, the power-flow studies that had been performed modeled all of the NEEWS projects together, and the screening tool of the Area Requirements Tables was used to examine requirements for the separate areas of Springfield, Connecticut, and Rhode Island. Since then, CL&P has prepared and provided to the Council and to parties and intervenors who have qualified to receive CEII, detailed power-flow studies performed in accordance with NPCC A-2 and ISO-NE PP3, which specifically model the Springfield / northern Connecticut problems and the proposed GSRP and MMP improvements.

Witness: **CL&P Panel**
Request from: **Office of Consumer Counsel**

Question:
Please describe the effect of operation of MMWEC's proposed Stony Brook Unit #3 on the need for the CVETRP. (a) Would Stony Brook Unit #3 be Springfield-area capacity in Needs Analysis Tables 3-1 and 3-2?

Response:

The Stony Brook Unit #3 plant adds to the need for the CVETRP. Without the GSRP, operation of Stony Brook Unit #3 overloads transmission facilities in the Greater Springfield area. That is why ISO-NE did not qualify Stony Brook #3 in FCA 1. See the associated filing by ISO-NE with the Federal Energy Regulatory Commission at the following link:

http://www.iso-ne.com/regulatory/ferc/filings/2007/nov/er08-190-000_11-06-07_informational_filing.pdf

a) Stony Brook generating units were not included as Springfield-area capacity in the Needs Analysis Tables 3-1 and 3-2 because they are outside of the Springfield electrical zone, as defined by ISO-NE. Stony Brook Unit #3 would also not be available generation without GSRP being constructed.

Witness: **CL&P Panel**
Request from: **Office of Consumer Counsel**

Question:
Please describe NU' s understanding of the energy-efficiency targets under consideration by the Massachusetts Energy-Efficiency Advisory Council.

a. Please describe the effect on Needs Analysis Table 3-2 if Massachusetts achieves the 3% annual load reductions suggested in "Context for EE Savings" (presentation at the March 10, 2009 EEAC meeting).
b. Please describe the effect on the need for the CVETRP if Massachusetts achieves the 3% annual load reductions.

Response:

a. The referenced "Context for EE Savings" presentation at the March 10, 2009 Energy Efficiency Advisory Council meeting addresses potential energy savings in the decade ahead but does not identify any associated potential for peak-load reductions. Therefore, we have no basis to analyze the effect on Table 3-2 in the ISO-NE Needs Analysis report.

b. The ICF "*Assessment of Non-Transmission Alternatives to the NEEWS Transmission Projects: Greater Springfield Reliability Project*" included an alternative (Case 2, Exhibit A.1, on page 65, Appendix A) that would reduce the Western Massachusetts zonal demand in 2013 by approximately 44% (1000 MW zonal demand reduction from the ISO-NE's 90/10 peak-load forecast). This peak-load reduction is substantially higher than that postulated in this question. Results of the power-flow analysis for this alternative (Exhibit A.3, page 67, ICF report) showed that several transmission lines in the greater Springfield area and north-central Connecticut remain overloaded beyond their respective Long Time Emergency ratings under both N-1 and N-1-1 contingencies. This degree of load reduction does not affect the pressing need for the GSRP and MMP, nor would the much smaller peak-load reduction postulated by this question.

Witness: **CL&P Panel**
Request from: **Office of Consumer Counsel**

Question:
Please explain why various dispatch cases assume that one or both Bear Swamp units are off line at the peak-load hour.

Response:

Bear Swamp generating station is a pumped storage facility located in the towns of Rowe and Florida, Massachusetts along the Deerfield River. During low customer load demand periods water is pumped from the Deerfield River to the complex's upper reservoir, which is hundreds of feet above the river. During high load periods the water is released from the upper reservoir through the combination generator/pump producing electric energy for the power grid.

Heavy loads typically occur after several days of an extended period of high temperatures and humidity. Typical dispatch assumptions used in planning studies for the pumped storage units like Bear Swamp recognize that it is unlikely that the units will be available to operate continuously during the hours of high customer demand due to pond restrictions. Also, during these periods the units may be dispatched as spinning reserve units.

Witness: **CL&P Panel**
Request from: **Office of Consumer Counsel**

Question:
Please state the date at which Northeast Utilities first became aware of the potential overloads in the Springfield area.

Response:

Northeast Utilities has for a number of years realized that the Springfield area was reliant upon local generation to serve peak demands for electricity. Implicit in this understanding was the realization that without sufficient transmission capability into such a load pocket, there could be times when enough local generation may not be available and the existing transmission lines could then overload as they attempted to serve local load. There is no single date when Northeast Utilities concluded from this realization that the potential overloads in the Springfield area should be addressed by the construction of new transmission capacity.

Witness: **CL&P Panel**
Request from: **Office of Consumer Counsel**

Question:
Please demonstrate that the ISO-NE real-time reserve standards are met with each of the "all line in service" dispatch cases modeled. (a) Please specify the units (or the MW in each zone) that would need to be operating in standby or part load to meet the standards.

Response:

Please see the response to Data Request OCC-02, Q-OCC-046 for a link to the ISO-NE Operating Procedure No. 8 titled Operating Reserve and Regulation, dated October 1, 2006. This procedure identifies the requirements for 10-minute spinning reserves, 10-minute non-spinning reserves and 30-minute operating reserves for the New England control area.

The term "real-time" means actual operating conditions. NUSCo assumes the use of the term "real-time" in this request is referring to how operating reserve requirements are reflected in transmission system planning studies. In the detailed transmission system planning studies which accompanied its application, NUSCo demonstrated compliance with OP-8 by maintaining fast-start generation in reserve throughout New England. The generation dispatch summaries contain a listing of the generators that were not dispatched prior to a transmission system contingency.

In New England, long-term planning studies have historically dispatched fast-start generating units at their claimed capability to meet reserve requirements consistent with ISO-NE Planning Procedure No.3. In "real-time" operations, generators may or may not be dispatched at their daily achievable maximum capability, and this permits the ISO-NE Operations Group to satisfy a portion of its minute-to-minute reserve requirement with generating units operating at an output level less than it is capable of achieving that day. In long-term planning there is no conceivable mathematical method of exactly determining which generating units will be in operation and at what output on a high- or peak-load day one, five or ten years from now. Therefore, to comply with national and regional planning standards, planners in the northeast utilize a stressed dispatch methodology. Stressed dispatches are an acceptable and prudent method of addressing the multitude of feasible future generation dispatches over the planning horizon to ensure the security of the transmission system.

The ISO-NE has identified four New England areas where specific market considerations are enforced to meet operating reserve requirements. These areas include southwest Connecticut, Connecticut, the Boston area and the rest of New England. The greater Springfield area is included within the category "the rest of New England". The dispatches developed for the GSRP analyses are consistent with and comply with national and regional planning standards, Operating Procedure No. 8, and ISO-NE's area specific operating reserve requirements.

Witness: **CL&P Panel**
Request from: **Office of Consumer Counsel**

Question:
For each Connecticut and WMA unit not listed in the dispatch summaries, please explain the omission of that unit. Please include

a. all such units with non-zero summer capacity in Section 2 of the 2009 CELT, and the reason for excluding each.
b. all such units not included in Section 2 of the 2009 CELT but cleared in Forward Capacity Auction 2, and the reason for excluding each.
c. all such units not included above, but listed in Table 1.4 of the 2009 IRP, and the reason for excluding each.

Response:

a, b, c. The generating units listed in the dispatch summaries include only the larger generating units in the region that are, in almost all cases, connected to the transmission system. This list is used by New England utilities and ISO-NE for transmission planning purposes and is modified by the utility when conducting local area studies. ISO-NE maintains and develops the regional power flow base cases with annual submittals to the Federal Energy Regulatory Commission. These cases are continuously updated to reflect changes on the system and their total load and generation models are consistent with ISO-NE system data.

Smaller generating units are not listed in the summaries because these are connected to distribution circuits, and virtually all regional power-flow base cases do not explicitly model distribution systems. However, to account for small distribution-connected generating units, substation loads used in the base model are reduced to reflect their impact on the load which must be served by transmission. This modeling approach is an acceptable regional methodology to represent small distribution-connected generating units.

The significant effort to correlate the generating units located in the ISO-NE CELT report, Forward Capacity Auction 2 results and CT IRP report to the regional power-flow base cases would not provide a more informative analysis.