February 24, 2004

Ms. Pamela B. Katz
Chairman
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: Docket No. 272 - Middletown-Norwalk 345kV Transmission Line

Dear Ms. Katz:

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

With this filing, the Company has completed responding to all of the interrogatories requested during this proceeding.

Response to OCC-01 Interrogatories dated 02/05/2004
OCC - 001 *, 002 , 003 , 004 , 005 , 006 , 007

Very truly yours,

Anne B. Bartosewicz
Project Director - Transmission Business

ABB/tms
cc: Service List

* Due to the bulk nature of this material, the Companies request bulk filing status.

Witness: **Peter T. Brandien**
Request from: **Office of Consumer Counsel**

Question:
In the second paragraph of page ES-2 of Volume 1 of The Connecticut Light and Power Company (CL&P) and The United Illuminating Company (UI) joint application to the Connecticut Siting Council, it is stated that, "Construction of the proposed line will (together with the 115-kV construction between Norwalk and Stamford) enable the Companies to meet national and regional reliability criteria that govern the interconnected grid."

Please use the following format to compare specific quantitative measures of bulk supply system performance, with and without the project, under "normal conditions". By "normal conditions" we refer to expected SWCT load, generation retirements and generation and transmission availability. Where data is not readily available for the year specified, please provide readily available data for a year closest to the specified year.

i. Loss of load expectation (LOLE) for SWCT

	NERC/NEPOOL Annual LOLE Standard	Projected Annual LOLE in 2008	Projected Annual LOLE in 2010
SWCT LOLE without the project	0.1days/year		
SWCT LOLE with the project	0.1days/year		

ii. Please list each system component of the SWCT bulk supply system that experiences short circuit duty violations and which the proposed project is targeted to remedy. Please use the format shown below to quantify the nature of each short circuit violation and how the proposed project serves as a remedy.

System component	Short circuit rating	Projected Short circuit duty in 2008 without the project	Projected Short circuit duty in 2008 with the project
.	.	.	.
.	.	.	.

iii. Please list each electrical node, location or component of the SWCT bulk supply system that experiences voltage performance violations and which the proposed project is targeted to remedy. Please use the format shown below to quantify the nature of voltage performance violations and how the proposed project serves as a remedy.

Electrical node, location or component	Rated Voltage	Voltage in 2008 without the project	Voltage in 2008 with the project
.	.	.	.
.	.	.	.

Response:

i. Loss of Load Expectation (LOLE) is a criterion used for evaluating the adequacy of area-wide generation capacity to serve load. The Companies do not determine the adequacy of area-wide generation capacity and therefore did not submit LOLE calculations in the Application. The reference to national and reliability standards that govern the interconnected transmission grid are security calculations with respect to transmission facility contingencies. LOLE numbers for Connecticut are calculated by ISO-NE and can be obtained from them. It does not relate to the security of the transmission system to reliably transmit power.

ii. The report titled Southwestern Connecticut Electric Reliability Study, Final Power-Flow, Voltage and Short-Circuit Report dated December 2002 contains the short circuit analyses for the project in Section 4.3. In addition to the circuit breakers listed in Appendix D of the above report, other substation equipment such as ground grids, bus work, disconnect switches and structural support components would have to be upgraded to accommodate higher short circuit levels. A detailed evaluation of each substation would have to be performed to identify all of the specific components other than the circuit breakers that would need to be modified. The Companies do not anticipate a substantial change in short-circuit levels were underground 345-kV cables to be used between East Devon and Norwalk rather than the proposed overhead construction used in the reference study.

iii. The attached report* titled Southwest Connecticut Electric Reliability Study, 345-kV Plumtree - Norwalk Project, Final Power-Flow, Voltage and Short-Circuit Report dated November 2003 contains the post 345-kV Plumtree - Norwalk transmission line voltage results. These results reflect the pre Middletown - Norwalk Project conditions. The post Middletown - Norwalk project voltage results are contained in the report titled Southwest Connecticut Reliability Study Comparison of Middletown to Norwalk Project vs East Shore Alternative dated February 18, 2004 submitted as an attachment to Addendum #3 to the Supplemental Filing dated February 23, 2004. The individual reports reflect the coordination of siting and construction activities to complete the transmission solution for southwest Connecticut. The extent to which other components such as surge arrestors, reactors and filters that would be required by the Project will be identified by a transient and harmonic analysis to be performed by GE in concert with the equipment manufacturers.

* Due to the bulk nature of this material, the Companies request bulk filing status.

Witness: **Peter T. Brandien**
Request from: **Office of Consumer Counsel**

Question:
Please refer to question OCC-1 above. For each sub-part of the answers to this question, provide work papers detailing the assumptions and methodology used to perform the analyses for the purpose of arriving at the quantities in presented in OCC-1. Specifically,

i. For the LOLE quantities, provide assumptions on generation capacity and availability (or outage rate), transmission import capability assumptions, forecast load assumptions, load duration curves, and reference any commercial model(s) utilized.
ii. For the short circuit analysis, indicate the type(s) of electrical faults considered, the fault locations analyzed, SWCT system loading, assumptions on available generation capacity, and reference any commercial model(s) utilized.
iii. For the voltage analysis, provide load flow diagrams to support the results in question OCC-1 above. These diagrams should include typical detailed assumptions about generator output levels, load levels, element-by-element power flows, and node voltages. Please reference any commercial model(s) utilized.

Response:
See response to data request OCC-01 Q-OCC-001.

Witness: **Peter T. Brandien**
Request from: **Office of Consumer Counsel**

Question:
Please refer to question OCC-1 above and use the following format to compare similar, specific quantitative measures of bulk supply system performance, with and without the project, under any "stress conditions" studied. By "stress conditions" we refer to typical system stresses considered for planning studies, such as higher than normal load and higher than normal generation and transmission unavailability. Where data is not readily available for the year specified, please provide readily available data for a year closest to the specified year.

i. Loss of load expectation (LOLE) for SWCT

	NERC/NEPOOL Annual LOLE Standard	Projected Annual LOLE in 2008	Projected Annual LOLE in 2010
SWCT LOLE without the project	0.1days/year		
SWCT LOLE with the project	0.1days/year		

ii. Please list each system component of the SWCT bulk supply system that experiences short circuit duty violations and which the proposed project is targeted to remedy. Please use the format shown below to quantify the nature of each short circuit violation and how the proposed project serves a remedy.

System component	Short circuit rating	Projected Short circuit duty in 2008 without the project	Projected Short circuit duty in 2008 with the project
.	.	.	.
.	.	.	.

iii. Please list each electrical node, location or component of the SWCT bulk supply system that experiences voltage performance violations and which the proposed project is targeted to remedy.

Please use the format shown below to quantify the nature of voltage performance violations and how the proposed project serves a remedy.

.Electrical node,location or compoment .	Rated Voltage .	Voltage in 2008 without the project. .	Voltage in 2008 with the project .

Response:

See response to data request OCC-01 Q-OCC-001.

Witness: **Peter T. Brandien**
Request from: **Office of Consumer Counsel**

Question:
Please refer to question OCC-3 above. For each sub-part, provide work papers detailing the assumptions and methodology used to perform the analyses for the purpose of arriving at the quantities in question OCC-3. Specifically,

i. For the LOLE quantities, provide assumptions on generation capacity and availability (or outage rate), transmission import capability assumptions, forecast load assumptions, load duration curves, and reference any commercial model(s) utilized.
ii. For the short circuit analysis, indicate the type(s) of electrical faults considered, the fault locations analyzed, SWCT system loading, assumptions on available generation capacity, and reference any commercial model(s) utilized.
iii. For the voltage analysis, provide load flow diagrams to support the results in question OCC-3 above. These diagrams should include typical detailed assumptions about generator output levels, load levels, element-by-element power flows, and node voltages. Please reference any commercial model(s) utilized.

Response:

See response to data request OCC-01 Q-OCC-001.

Witness: **Peter T. Brandien**
Request from: **Office of Consumer Counsel**

Question:
Please summarize the results of any analyses performed by CL&P or UI, or performed by others and reviewed by CL&P or UI that investigate the feasibility of applying techniques, such as series reactor installation, for the purpose of mitigating excessive short circuit duty at substations and generation stations in SWCT. Such summary should clearly indicate:

i. Locations on the SWCT bulk supply system where such an installation has been determined to be a feasible solution to existing or anticipated excessive short circuit duty,
ii. Any locations where such an installation have been studied but determined to be inappropriate as a solution to existing or anticipated short circuit problems.

Response:

The primary location for the use of a series reactor is in the generator lead. A generator lead is defined as the facilities that interconnect the generator to the transmission grid. The Companies have considered the use of series reactors at all generating stations located in southwest Connecticut. The application of series reactors in the generator leads can help to reduce the short-circuit current contribution from a generator by increasing the impedance between the generator and the transmission grid. However, at the same time these devices reduce the available reactive power output from the generator that is used to control transmission voltages. These devices increase the impedance (and therefore increase losses) between the generator terminals and the point of interconnection to the transmission system.

This technique was utilized in association with the Plumtree to Norwalk 345-kV project where this was the most practical solution possible. A series reactor was placed into the generator lead on Bridgeport Harbor 2. This unit was selected since it has limited run time and provides limited reactive support to the network, therefore limiting the impact on voltage support in the area.

Issues concerning available fault current represent only one component of the transmission problems in SWCT. While placing reactors on the generator leads may reduce fault currents to acceptable levels, the thermal and voltage problems of the area still needed to be addressed. The proposed M-N project resolves all of these issues with one solution.

Witness: **Peter T. Brandien**
Request from: **Office of Consumer Counsel**

Question:
Please refer to question OCC-5 above and provide supporting work papers for any analysis referenced.

Response:

See the response to data request OCC-01 Q-OCC-001 section iii. The report titled Southwest Connecticut Electric Reliability Study, 345-kV Plumtree - Norwalk Project, Final Power-Flow, Voltage and Short-Circuit Report dated November 11, 2003 contains the analyses for the application of a series reactor to reduce short-circuit currents in the vicinity of the Pequonnock Substation.

Witness: **Peter T. Brandien**
Request from: **Office of Consumer Counsel**

Question:
Assuming the project is constructed as proposed:

i. At what load level do CL&P/UI anticipate that additional bulk supply infrastructure will be required to ensure compliance with governing reliability standards?
ii. When do CL&P/UI anticipate this load level will be reached? Please explain the basis for your response and provide all supporting work papers.

Response:
See Application, vol. 1, pp. F-14 and F-15:

"Completion of the SWCT 345-kV loop will create a very strong source in Norwalk. Improvements to the 115-kV system will be needed to take full advantage of this strong source and the import capability of the completed 345-kV loop, and to strengthen the transmission system west of Norwalk so that it can accept power flow from the strong Norwalk source in the event of contingencies. Accordingly, CL&P expects to propose the addition of two 115-kV circuits between Norwalk Substation and Glenbrook Substation in Stamford, most likely consisting of solid dielectric cables installed underground, primarily in streets, in the near future. This project should be completed and in service before the Middletown to Norwalk line proposed in this application. At a later date, pending future system developments, an additional 115-kV underground line, from Norwalk Harbor Substation to Glenbrook and substation equipment upgrades may also be required.

Construction of the Bethel to Norwalk line extends the 345-kV "backbone" system into SWCT and eliminates transmission constraints at the present Norwalk-Stamford Sub-area interface. Construction of the Middletown to Norwalk Project would then eliminate or greatly reduce remaining transmission constraints at the SWCT interface. However, it will still be necessary to increase the import capability into Connecticut. Accordingly, CL&P's long-range plan for expanding the 345-kV system includes upgrading the link between CL&P's Card Street Substation in Lebanon, and National Grid's Sherman Road Substation in Burillville, Rhode Island, probably by the addition of a 345-kV line. "

The need for all of these improvements was identified by modeling that assumed a 27.7 MW New England load - the same load used in the studies for this Project. Complete lists of planned future transmission projects will be included in the Forecasts of Loads and Resources to be filed with the CSC by the Companies on March 1, 2004.