March 16, 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.

While it is not possible to provide all the information requested at this time, the Company is attaching the information which has been completed.

Response to CSC-01 Interrogatories dated 03/03/2004
CSC - 002 , 008 , 010 , 012 , 016 , 020 , 021 , 023 , 026 , 027 , 030 , 031 , 032

Very truly yours,

Anne B. Bartosewicz
Project Director - Transmission Business

ABB/tms
cc: Service List

Witness: Jay Williams
Request from: Connecticut Siting Council

Question:
What degree of slope precludes the use of a HPFF electric transmission line?

Response:
Due to the many design variables that must be considered, it is not possible to make a general statement about what degree of slope precludes the use of a HPFF electric transmission line. Cable design for a project includes calculating cable tensions and determining potential cable movement during operation for the specific plan and profile of the cable route. Generally, if the slope is less than ten degrees, there would be little concern for possible cable damage due to cable movement down the slope as long as the installation includes the use of restraints in the splice casings to limit movement of the cable.

If the slope is greater than ten degrees, especially if the cable run is several thousand feet long and relatively straight with no significant bends, detailed analysis would determine whether special cable and accessory designs would have to be incorporated in the design to prevent cable damage from downhill movement. For example, cables with special stainless steel armor tapes might be specified, or the installation of an anchor joint at the top of the slope and a skid joint at the bottom of the slope might be specified to accommodate thermal movement. This type of installation is used in tunnel shafts as deep as several hundred feet; it is seldom, if ever, employed in city street installations.

In addition to the installation's degree of slope, the chance of cable damage also depends upon several other factors: the profile including the length of the sloped section; the number, length and degree of bends in both plan and profile; the spacing between splices; the design and support of the splices; and, the degree of temperature changes due to load cycling on the line. While there are installations with significant slopes that have experienced trouble-free operation, there have also been known instances (Grand Coulee Dam in Washington state and Northfield Mountain in Massachusetts) of cable movement.

Witness: Jay Williams
Request from: Connecticut Siting Council

Question:
Is there any difference in temperature given off by XLPE versus HPFF cables? What would be the maximum soil temperature one foot from the line? At five feet? At 10 feet? Would the operation of the lines result in any drying out of vegetation along the line in areas underlying plants?

Response:
At rated load current, the XLPE cables would have a slightly higher operating temperature (5 Centigrade degrees higher). Therefore the temperature profiles at the edge of the ductbank would be a few degrees higher than for HPFF cables. The difference would be smaller at distances farther away from the ductbank or HPFF pipes.

During the summer, if the HPFF cables were operating at their rated current for an extended a period of time, the approximate temperatures would be as follows: 60^{o}C one foot from edge of controlled backfill in the trench; 48^{o}C at five feet; and 42^{o}C at ten feet. Ambient soil temperatures are assumed to be 25^{o}C.

The soil immediately alongside the controlled backfill envelope would tend to dry after prolonged periods of high loading on the cable, especially during periods of low rainfall. This could affect vegetation in the immediate vicinity of the cables. Utilities try to avoid deep-rooted plants near cable systems because the plants pull moisture from the soil, causing the cables to operate at a higher temperature.

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Data Request CSC-01
Dated: 03/03/2004
Q- CSC-010

Witness: Dr. Bailey
Request from: Connecticut Siting Council

Question:
For the chart found in Table A-1 of the Appendix of Volume 6 of the application, discuss why the calculated magnetic field for the Connecticut Baptist Home would be higher under an average load compared to a peak load.

Response:
There are three transmission lines proposed for the corridor in proximity to the Connecticut Baptist Home. All three of these lines are proposed to be constructed in a vertical configuration. The line on the East Side of the right-of-way connects the proposed Beseck Switching Station in Wallingford to the Haddam Neck Substation in Haddam. The line in the center of the right-of-way connects the existing Scovill Rock Switching Station in Middletown to the East Shore Substation in New Haven. The line on the west side of the right-of-way connects the proposed Beseck Switching Station to the Southington Substation in Southington.

The three transmission lines will be phased to reduce magnetic fields as much as possible. It is important to look at what happens to the flows on the lines at both peak and average loading conditions. During almost all modeling scenarios, the line to the west side of the right-of-way has power flowing from the Beseck Switching Station towards the Southington Substation. This power is being fed by the new line between Oxbow Junction and Beseck and the line between Haddam Neck and Beseck. As load in Southwest Connecticut increases, the amount of power flowing towards Southington is reduced as the amount of power flowing towards Southwest Connecticut increases. The load changes are summarized in the table below. All loads are given in Amperes per phase.

Circuit	Average	Peak
East (Haddam Neck to Beseck)	285	745
Center (387: Scovill Rock to East Shore)	614	1215
West (Beseck to Southington)	711	553

Note the reduction in flows between average and peak loading for the West line which is closest to the Connecticut Baptist Home. Due to the higher flows of the closest line during average conditions rather than peak conditions, and the ratio of the flows on the other two circuits nearing each other, the magnetic profile will be reduced during peak conditions near the Connecticut Baptist Home from the levels experienced during average conditions.

Witness: **Roger C. Zaklukiewicz**
Request from: **Connecticut Siting Council**

Question:
Why would a spare cable be pulled in on the entire length of the line rather than simply providing an empty space duct with a spare length of cable available to be installed between manholes if needed? Explain.

Response:
The Companies do not propose to install a spare cable for the length of any line.

The proposed 345-kV HPFF system would not be installed in ducts. Rather it would consist of two 8 inch pipes each containing 3 cables. Each of these cable circuits would effectively carry half the current. This design is required to supply the ampacity needed for the high-pressure fluid-filled cable design. See Cross Section Figure 9 in Volume 9 of the Application.

For the Supported Change in Cheshire, the 115-kV XLPE cables would be installed in ducts. No spare cable or duct would be installed. See Cross Section Figure 7B in Volume 9 of the Application.

Witness: Peter T. Brandien
Request from: Connecticut Siting Council

Question:
Discuss and describe (including potential costs and benefits) the possibility of extending a high capacity tie (345-kV or DC from Norwalk to either Northport or to the Con Ed system (e.g. Sprain Brook or another location) or to both. Has ISO-New England or ISO-New York suggested such a tie?

Response:

The Companies have no knowledge of a new interconnection between SWCT and New York proposed by ISO-NE or the New York ISO.

Assuming the 345-kV loop is completed, the construction of a 345-kV Alternating Current (AC) or High Voltage Direct Current (HVDC) transmission line is highly unlikely. A new inter-regional tie-line between SWCT and New York would likely be extremely difficult to site. The Companies do support the construction of new inter-state tie-lines to promote reliability of the interconnected grid.

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Docket No. 272

Data Request CSC-01
Dated: 03/03/2004
Q- CSC-020

Witness: Peter T. Brandien
Request from: Connecticut Siting Council

Question:
Identify limit of concurrent operation of the existing electric generation as listed on page F-20, Table F-3 of the application volume 1 for the existing transmission system, with Phase I and with Phase II.

Response:

Existing Transmission System:
The primary locations where dispatch restrictions exist are with the generation connected to the 115-kV buses at the Norwalk Harbor, Devon and Pequonnock substations. The 115-kV transmission system interconnecting the three substations forms a triangle with generation at each point. The transmission legs that join each substation are weak and cannot accept the full output of the interconnecting generating units or from adjoining stations due to transmission line current carrying restrictions during normal and contingency conditions.

Bethel to Norwalk Project:
Following the construction of the Bethel to Norwalk Project, the interdependence of generation output stated above for the existing transmission system still exists. This project has minimal impact on the interdependency of the generating units interconnected to the three substations.

Middletown to Norwalk Project:
Following the construction of the Middletown to Norwalk Project, the electrical configuration at the Devon and Pequonnock substations will change dramatically and allow the concurrent dispatch of the generating units interconnected to Devon, East Devon, Singer, and Pequonnock substations.

CL&P/UI
Docket No. 272

Data Request CSC-01
Dated: 03/03/2004
Q- CSC-021

Witness: Roger C. Zaklukiewicz
Request from: Connecticut Siting Council

Question:
Describe the event of a fallen wire within a high voltage electric transmission right-of-way in the Town of Milford in the year 2003.

Response:
In January 2004, a shield wire fell in the vicinity of Haystack Road in Milford. The shield wire, which is non-energized, acts to protect the transmission line against lightning strikes.

Inspection of the shield wire showed it had been previously damaged, possibly by a lightning strike, which exposed the steel core. When damaged, copperweld has the undesirable characteristic of galvanically sacrificing the exposed steel core to the copper cladding. Over time, the corrosion weakened the shield wire. The combined effect of corrosion and high tension caused by the very cold weather resulted in a tensile failure of the shield wire.

CL&P no longer uses copperweld shield wire on new construction, but rather shield wire composed of aluminum clad strands which have better corrosion characteristics. The 1640 Line is one of the 115-kV transmission lines proposed to be rebuilt, with new conductor and new shield wire, as part of Docket No. 272.

Witness: **Peter T. Brandien**
Request from: **Connecticut Siting Council**

Question:
Describe the existing connection between Chestnut Junction and Oxbow Junction and why it is not part of the application.

Response:
The existing connection between Chestnut Junction and Oxbow Junction consists of 345-kV overhead line on a right of way that is 200 feet wide. This section of line will not be needed when the Middletown to Norwalk project is completed for the reasons discussed below:

ISO-NE and the Southwest Connecticut Working Group determined, through power flow analyses, that Beseck would be the best location to establish an electrical hub that would be part of an overall solution to serve the electrical needs in southwest Connecticut. The investigation to interconnect the multiple transmission resources in the Middletown area required planners to look at the most efficient design to integrate multiple transmission loops, to diversify transmission sources, diversify generation resources, enhance reliability with regional interconnection, and optimize transmission capabilities using higher voltages. The Millstone to Southington 345-kV line was a prime candidate to tap because of its electrical strength from Millstone. Due to Beseck's physical location southwest of Scovill Rock, planners recognized that the Millstone - Southington 345-kV line ran north from Oxbow Junction to Chestnut Hill Junction rather than eastward and closer to Beseck. Planners determined to break the eastern leg of the Millstone line at Oxbow Junction and extend the line westward, in existing ROW, to Beseck. Correspondingly, the western leg from Southington was extended from Chestnut Hill Junction, eastward to Scovill Rock. This reconfiguration reinforced Southington and Scovill Rock with interconnections to Beseck. The 345-kV reconfiguration in the Middletown area met the desired results, as described above, and created an electrical hub with strong ties to Southington, Millstone, Haddam Neck and Scovill Rock (through Haddam Neck).

This design integrates multiple 345-kV sources in the Middletown area. It will leave the 345-kV facilities between Oxbow and Chestnut Hill junctions unused. This transmission corridor and expansion opportunities still play an important transmission planning role. As loads continue to grow and generation expansions or retirements occur, the transmission system will evolve over time and may require an additional reinforcement into Beseck from Scovill Rock or Haddam Neck. At that time this small portion of line between Oxbow and Chestnut Hill may be utilized for this purpose.

Witness: Peter T. Brandien
Request from: Connecticut Siting Council

Question:
Can more terminal stations be used? Explain

Response:
Additional terminal stations (substations or switching stations) can be added but would increase the costs of the Project without providing any significant additional reliability benefits. The ISO-NE Southwest Connecticut Working Group determined, through power flow analyses, that the five interconnecting stations of Scovill Rock, Beseck, East Devon, Singer and Norwalk that make up the Middletown to Norwalk Project, are sufficient to provide the desired level of reliability benefits for SWCT loads. The analysis determined that additional substations are not required at this time.

Witness: Peter T. Brandien
Request from: Connecticut Siting Council

Question:
Can less terminal stations be used? Explain

Response:
Fewer terminal (substations or switching stations) could be used. However, reducing the number of stations would result in a project that meets fewer of the system alternative goals outlined on page G-1 of Volume 1 of the Application, which are listed below.

- Eliminate thermal overloads during periods of the high loads, and following the loss of transmission facilities and/or generation.
- Eliminate circuit breaker and other electrical equipment short circuit duty problems.
- Provide a safe work environment for the Companies' workforce.
- Eliminate the possibility of a system voltage collapse following cascading outages.
- Be capable of maintaining system stability following contingencies.
- Allow the economic dispatch of generation within SWCT irrespective of customer energy demands.
- Permit the interconnection of additional generation in SWCT.
- Allow the building of needed facilities without undue risk of interrupting customer service.
- Minimize system losses.
- Minimize congestion costs while constructing new or modifying existing substation and transmission line facilities.
- Minimize right of way expansion and land acquisition.
- Minimize adverse environmental effects.
- Provide needed improvements at reasonable cost.

For instance, the line could be terminated at Scovill Rock Switching Station instead of establishing a new Beseck Switching Station. However, that would make the line dependent on a weaker source. See the direct testimony of

Roger Zaklukiewicz in support of the need for the Middletown to Norwalk Project dated March 9, 2004 on page 11 for a discussion on the need for Beseck and its associated 345-kV interconnections including Scovill Rock.

The East Devon and Singer substations are necessary to eliminate thermal, voltage and short-circuit limitations as well as conditional generation dependencies in the Milford and Bridgeport areas.

The Norwalk Substation is necessary to complete the 345-kV loop into SWCT including the Norwalk - Stamford area.

Accordingly, the five interconnecting substations are necessary to provide the desired level of reliability.

Witness: Richard J. Reed; Roger C. Zaklukiewicz
Request from: Connecticut Siting Council

Question:
Provide names and dates of telephone contacts, emails, and correspondence with the Connecticut Department of Transportation.

Response:
The attached table lists the contacts of which the Companies' Project Directors are aware. There may have been some additional unrecorded contacts between the Companies and CDOT.

Attach to Q-CSC-030.xls

Name of Contact	Contact With	CDOT Branch Contacted	Dates of Contact	Type of Contact
David Labossiere Division Chief	Mohammad Pasha (UI)	Property Management Division Rights of Way	06/30/2003	Telephone
David Labossiere Division Chief	John Prete (UI)	Property Management Division Rights of Way	06/30/2003	Letter
Julie Georges Project Manager	Peter Novak (NU) and others	Bridge design	07/08/2003	Meeting
Andy Przybylowicz Project Engineer	Peter Novak (NU) and others	Bridge design	07/08/2003	Meeting
David Labossiere Division Chief	John Prete (UI)	Property Management Division Rights of Way	07/31/2003	Letter
David Labossiere Division Chief	John Prete (UI)	Property Management Division Rights of Way	08/06/2003	Letter
Michelle Lynch	Peter Novak (NU) and others	Bridge design	09/2003	Meeting
Andy Mysliwiec Utilities Section	Mohammad Pasha (UI)	Bureau of Engineering and Highway Operations	11/01/2003	Telephone
Sohrab Afrazi Project Manager	Peter Novak (NU) and others	Utilities Section	various	Telephone, meetings, emails
Andrzej Mysliwiec Derek Brown Ronald Tellier Gregg Hendrickson Carl Rosa	Peter Novak (NU)	Utilities Section Utilities Section State Design - Highways Utilities Section Office of Rails, Metro-North corridor	01/12/2004	meeting
Vinnie Hanchuruck	Chris Soderman (NU)	District 3 Mapping right-of-way	01/04-02/04	Telephone, meeting
Bob Zaffetti	Sue Giansanti (NU)	Bridge safety, engrg drawings	01/04-02/04	Telephone, meetings
Carmine Cavallaro Transportation Supervisor	George Davenport(UI) and others	Highways Operations-Entry Permits	2/25/2004-03/04/04	Meeting and Telephone

Witness: Roger C. Zaklukiewicz
Request from: Connecticut Siting Council

Question:
Describe how existing wood and steel structures and foundations would be removed.

Response:
Existing wood and steel structures would be removed in a similar manner. The initial step is to de-energize the line and connect the conductors to an earth ground for safety. Conductors and shield wires are freed from support attachments and the tension is slowly released using winches. Conductors and shield wires are then removed.

For wood pole structures, overhead cranes are used to secure the structure and the pole is usually cut off at the ground line. Poles can be removed below the ground line by excavating around the pole and making the cut below grade. Poles can also be totally removed by pulling them out of the ground. Structures are hauled away for re-use, or cut up for either salvage or proper disposal.

For steel poles and lattice steel towers, overhead cranes are used to secure the structure before it is disconnected from the foundation. Structures are then removed from the foundations. For larger structures, starting at the top, the structure is dismantled in smaller, manageable pieces. Foundations are left in place or can be removed to a depth one to three feet below grade. It is possible to completely remove shallow foundations, like spread footings, although it is usually not done. Drilled shafts (piers or caissons) are rarely removed in their entirety because of the large equipment required, the size of the required excavation, and the degree of difficulty associated with removal. Structures are hauled away for re-use, or cut up for either salvage or proper disposal.

CL&P/UI
Docket No. 272

Data Request CSC-01
Dated: 03/03/2004
Q- CSC-032

Witness: Anthony W. Johnson III
Request from: Connecticut Siting Council

Question:
What is integrated vegetative management? How do the applicants propose to use this technique?

Response:
Integrated vegetation management is the practice of using multiple methods of vegetation control in combinations to achieve the optimal control of undesirable vegetation. Methods of vegetation control include manual cutting, mechanical cutting (mowing), chemical control methods (herbicide applications), biological methods (grazing animals if and when practical) and cultural methods in a combined and coordinated manner. No one method is used exclusively.

CL&P uses integrated vegetation management to control growth on its ROWs. Its primary vegetation control technique is the cutting of brush and woody trees with a follow up herbicide application. Where herbicides cannot be used, cutting or mowing is the preferred method. By eliminating undesirable tree and invasive shrub species, the areas are left open for the native low-growing vegetation to develop, thereby reducing the ability of the undesirable plant species to sprout and become established requiring future maintenance. This is one aspect of the cultural control objective – using native plant communities to compete for sun, soil, water and nutrients with the undesirable species resulting in the development of a natural, low-growing and low-maintenance vegetated community.

Another aspect of the cultural method is the total removal of existing vegetation and the seeding or planting of desirable or alternative plants such as grasses and/or low-growing shrub species. This is a more costly option and not always successful in completely eliminating future maintenance needs, but is sometimes used in seriously overgrown or sensitive areas.

Biological control options (e.g. grazing animals) are not practical in Connecticut.