November 18, 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.

Response to CSC-05 Interrogatories dated 10/22/2004
CSC - 091 *, 092 , 093 , 094

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.

CL&P/UI
Docket No. 272

Data Request CSC-05
Dated: 10/22/2004
Q- CSC-091

Witness: **Anne Bartosewicz; John J. Prete**
Request from: **Connecticut Siting Council**

Question:
Identify using an appropriate format, houses, private or public schools, licensed child day care facilities, licensed youth camps, and public playgrounds located adjacent to the right-of-way for the proposed overhead construction in segments 1 and 2, that would be within a transmission line magnetic field calculated to be 6 milliguass (mG) or more, using 15 and 27.7 gigawatt (GW) current loading (amps) assumptions and the low magnetic field designs previously presented to the Council.

Response:
The attached files identify the houses, private or public schools, licensed child day care facilities, licensed youth camps, and public playgrounds shown on the previously submitted aerial photographs, which are located adjacent to the right-of-way for the proposed overhead construction in segments 1 and 2, that would be within a transmission line magnetic field calculated to be 6 milliGauss (mG) or more, using 15 and 27.7 gigawatt (GW) current loading (amps) assumptions and the low magnetic field designs.

Please refer to the Companies' response to CSC-05, A-CSC-092 for a table describing the location of houses at or above 6 mG applying the "as proposes: low EMF design options.

Please note that the Companies do not support the adoption of a "buffer zone" criterion based on milliGauss. <u>See</u> "Applicants' Response to Council's Interrogatory Concerning 'Buffer Zones' Determination Pursuant to Public Act 04-246," dated July 19, 2004.

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

CSC Interrogatory 91 Response_27GW-111004.pdf CSC Interrogatory 91 Response_15GW-111204.pdf

Witness: **Anne Bartosewicz; John J. Prete**
Request from: **Connecticut Siting Council**

Question:
Also, for the 15 GW case, identify additional field reduction strategies that could be employed to reduce the magnetic field at the locations identified in Question 91 to less than 6 mG.

Response:
The attached shows the reduction strategies to reduce the magnetic field at the location identified in CSC-05, Q-CSC-091.

Mitigation analysis Cross Section 2 and 3 CSC Response 92.xls

The number of houses at or above 6 mG applying "as proposed" low magnetic field design options (see answer to Siting Council Pre-Hearing Question Set 5, Question 91) is 30, as shown below:

Number of houses at or above 6mG applying "As Proposed" low MF design options

Town	CSC Set 5 Question #91 Response	Cross Section	Houses at 6mG or Greater @ 15GW System Loading	Low Magnetic Field Mitigation Description
Durham	Figure 1	2	3	Composite 345 kV / 115 kV (As Proposed typical pole height of 105')
Durham	Figure 2	2	1	
Durham	Figure 3	2	1	
Durham	Figure 4	2	1	
Durham	Figure 7	2	6	
Durham	Figure 8	2	3	
Total			**15**	
Meriden	Figure 5	3	3	345 kV Vertical (As Proposed typical pole height 140')
Meriden	Figure 6	3	5	
Total			**8**	
Wallingford	Figure 9	2	7	Composite 345 kV / 115 kV (As Proposed typical pole height 105')
Total			**7**	
Totals			**30**	

For the 30 houses at or above 6 mG applying "as proposed" low magnetic field design options, the magnetic field levels can be mitigated by moving th poles longitudinally (in the right-of-way) and/or vertically (increasing the conductor height, which may require increasing the pole height). By raising the conductor height by 55' (Cross Section 2), and shifting poles in the right-of-way to the east (Cross Section 3), the number of houses at 6 mG or above would be reduced from 30 to 12, as shown in the table below.

Number of houses at or above 6mG applying site specific mitigation options,
"Pole placement within transmission right-of-way, increasing pole height, or applying conductor heights based on PLS CADD"

Town	CSC Set 5 Question #91 Response	Cross Section	Houses at 6mG or Greater @ 15GW System Loading	Low Magnetic Field Mitigation Description
Durham	Figure 1	2	1	Composite 345 kV / 115 kV (Increasing conductor height by 55')
Durham	Figure 2	2	1	
Durham	Figure 3	2	1	
Durham	Figure 4	2	1	
Durham	Figure 7	2	4	
Durham	Figure 8	2	1	
Total			**9**	
Meriden	Figure 5	3	0	Shifting Poles in Right-of-Way, split phase and increase pole height by 20' on N/W circuit
Meriden	Figure 6	3	0	
Total			**0**	
Wallingford	Figure 9	2	3	Composite 345 kV / 115 kV (Applying site specific conductor heights from PLS CADD)
Total			**3**	
Totals			**12**	

Further site-specific mitigation is possible to reduce to less than 12 the number of houses at 6 mG or greater. This further mitigation could include increasing pole heights, split-phasing and/or site-specific right-of-way expansion. The Companies believe that split-phasing the 345-kV line with increased pole height and burying the existing 115-kV lines for approximately 5 miles would reduce to zero the number of houses at 6 mG or greater.

Please note that the Companies do not support the adoption of a "buffer zone" criterion based on milliGauss. See "Applicants' Response to Council's Interrogatory Concerning 'Buffer Zones' Determination Pursuant to Public Act 04-246," dated July 19, 2004.

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Data Request CSC-05
Dated: 10/22/2004
Q- CSC-093

Witness: **Anne Bartosewicz; John J. Prete**
Request from: **Connecticut Siting Council**

Question:
Provide typical tower height for each transmission right-of-way cross section in segments 1 and 2 to maintain existing magnetic fields at edge of right-of-way (no net increase).

Response:
The attached has the typical pole heights for Cross Sections 1-8 with showing "No Net Increase" in magnetic field at edge of right-of-way.

No Net Increase Analysis CSC response 93-111604.pdf

Middletown Norwalk Project
Docket 272 Connecticut Siting Council Pre-Hearing Question Set Six
Response to Question #93

Typical Pole Height for Cross Sections 1-8 in Segments 1 and 2 to Achieve "No Net Increase" in Magnetic Fields at the Edge of Right-of-Way @ 15GW System Loading								
					Magnetic Field (mG)			
					S/E Edge of ROW		N/W Edge of ROW	
Cross Section	Application Volume 9 Segment	Configuration	Typical pole height (ft) required for "No Net Increase" 345kV / 115kV	ROW Width (ft)	MF Mitigation	Existing	MF Mitigation	Existing
1	1-3	345kV Delta	**85(1)**	335(2)	6.2	32.6	28.8	33.8
2	4-10	Composite 345kV/115kV	**175**	125	9.2	9.2	7.4	13.9
3	11-12	345kV Vertical	**208(3)**	275	2.0	12.2	4.7	4.7
4	12-13	345kV Vertical	**140(1)**	320	5.0	6.1	10.1	11.9
5	14-19	Reconstructed ROW (Vertical Construction)	**130(1)**	275	4.3	5.2	1.9	24.7
6E	19-20	345kV Split Phase / 115kV Vertical	**311 / 286(3)**	200	0.2	0.2	0.2	1.2
6W	20-21	Composite 345kV/115kV	**601(3)**	200	0.3	0.3	0.3	2.4
7	21-23	345kV Split Phase	**281(3)**	200	0.4	0.4	0.2	4.4
7B	23-24	345kV Split Phase offset on ROW Both 115kV circuits underground	**241(3)**	200	0.4	0.4	0.6	4.4
8A	24	345kV Split Phase / 115kV Vertical One 115kV circuit underground	**139 / 114**	165	0.7	6.2	2.7	2.8
8N	24-31	345kV Split Phase / 115kV Double circuit vertical	**140 / 115**	165	0.8	4.7	2.6	2.6
8M	31-33	345kV Split Phase / 115kV Double circuit vertical	**137 / 112**	165	0.9	6.2	2.7	2.8
8S	33-45	345kV Split Phase / 115kV Double circuit vertical	**163 / 138**	165	0.4	3.9	1.6	1.6

Notes:

(1) Same design as low-magnetic field option submitted to the Connecticut Siting Council in Exhibit 158.

(2) ROW width after expansion. Existing ROW width is 250 feet.

(3) Federal Aviation Administration rules may require permits for structures of 200' or above. The Companies do not recommend typical pole heights of 200' or above.

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Data Request CSC-05
Dated: 10/22/2004
Q- CSC-094

Witness: Anne Bartosewicz; John J. Prete
Request from: Connecticut Siting Council

Question:
Describe the extent of clearing in a right-of-way when tower height is 130 feet or greater. Could the right-of-way become less in width if conductors are equal to tree height or higher (assume 75 feet for tree height). Explain.

Response:
The extent of clearing when the tower height is 130 feet or greater will depend more on the structure configuration than on structure height. Unless the conductors in each span, and therefore the supporting structures, are purposely increased in height above ground by an increment equal to the mature height of the trees (upwards of 100 feet), such tree species cannot be allowed to remain. (Note: Seventy-five feet for maximum tree heights in southern Connecticut is not the maximum as there are several species that can grow to heights between seventy-five and one hundred feet.)

There are three area-specific types of clearing required for transmission lines. The areas are:

Area A). The area under and immediately adjacent to the conductors.
Area B). The zones to either side of Area A toward each edge of right-of-way.
Area C). Area outside of Area B, which may extend beyond the right-of-way boundaries.

Clearing needs in each area are as follows:

Area A) At a minimum, the right-of-way must be cleared of all tall- and short-maturing tree species within an area directly under the conductors and to a distance of fifteen feet beyond the two outermost conductors of a transmission line. If construction is of single-circuit vertical configuration, the right-of-way area to be cleared of trees will be fifteen feet from the conductors in both directions. If conductors are configured horizontally, Area A grows to also include the zone between the outermost conductors. This area is referred to as the “primary clearing area” in NU's construction specifications, and the “wire zone” in NU's vegetation maintenance specifications. Shrub species will generally remain in this area, except within access roads and areas needed for structure construction and maintenance.

Area B) Along both sides of this area, clearing of tall-maturing tree species is required for an additional 11 feet (115-kV lines) or 15 feet (345-kV lines) to comply with ISO-NE Operating Procedures. Low-maturing tree species such as Dogwoods can remain in these zones.

Area C) Clearing and/or trimming is required for tall "danger trees" in this area which have the potential to fall and contact the conductors.

The right-of-way width cannot be reduced, even if the width of clearing was reduced. Legal rights would be necessary within the width defined by A-C above to remove any tree that was found to exceed the "design tree height". The number of trees outside of the legal right-of-way requiring trimming or removal would increase, and monitoring tree growth under such conditions would be extremely difficult. Also, legal rights are necessary in any event to prevent the construction of a tall building or other object that would be closer to line conductors, when blown by strong winds, than is permitted under the National Electrical Safety Code.