

March 19, 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.

This filing completes all the requested information for the TOWNS-02 set of interrogatories.

Response to TOWNS-02 Interrogatories dated 02/17/2004
TOWNS - 036 *, 037 , 038

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: Dr. Bailey
Request from: Connecticut Siting Council

Question:

Reference pages 23 and 24 of the Exponent EMF Assessment.

- a. Provide the workpapers and input and output data files, in Excel readable format, for the "15 GW Case" and the "27 GW Case" modeled by NU.
- b. Specify each of the assumptions made by NU concerning the availability of other transmission lines and the operability of generating facilities for this modeling.
- c. Specify which generators are assumed to be dispatched in the 15 GW and 27 GW cases modeled by NU.
- d. Specify the loadings in MVA of the proposed 345-kV line calculated in the 15 GW and the 27 GW cases.
- e. Specify the loads assumed in the 15 GW and the 27 GW cases for the Connecticut, Southwestern Connecticut and Norwalk-Stamford sub-areas of New England.
- f. Specify what CL&P and UI believe are reasonable estimates of future demand growth rates for New England for the years after 2007.
- g. Specify what CL&P and UI believe are reasonable estimates of future demand growth rates for the State of Connecticut for the years after 2007.
- h. Specify what CL&P and UI believe are reasonable estimates of future demand growth rates for Southwestern Connecticut for the years after 2007.
- i. Specify what CL&P and UI believe are reasonable estimates of future demand growth rates for the Norwalk-Stamford sub-area for the years after 2007.

Response:

The Companies have answered this response based on the revised EMF tables filed with the Connecticut Siting Council on March 15, 2004.

- a) Please see the attached spreadsheets (Attachment 1 and Attachment 2). Attachment 1 contains the input information regarding the conductors' vertical and horizontal positions within the rights of way. It also contains the loadings on each of the transmission circuits in amperes/phase. Attachment 2 contains the output data for electric and magnetic field profiles for the 15 GW and 27.7 GW Cases modeled by Exponent on behalf of the Companies.
- b) In all of the transmission system models used to support the Exponent EMF Assessment, all transmission lines

were assumed to be in service and all generation was available for dispatch. In the 27.7 GW case, a generation pattern was selected to maximize the flows into SWCT. In the 15 GW case, a generation pattern was assumed which has a moderate amount of generation in-service within SWCT, providing what may be classified as a reasonable dispatch for these conditions.

c) The generator dispatch assumed for the load flow calculations are listed below:

Generator Dispatch

15 GW Case		27.7 GW Case	
Generator	MW	Generator	27.7 GW Case
Beacon Falls	3.4	Beacon Falls	3.4
Campville	6	Campville	6
Lisbon	13.5	Lisbon	13.5
Rocky River	2.6	Rocky River	2.6
Exeter	26	Exeter	26
Shepaug	32	Shepaug	32
Bulls Bridge	5	Bulls Bridge	5
Windsor Locks	8	Windsor Locks	8
Forestville	13	Forestville	13
Dexter	38	AES Thames	180
Rocky River	25	Dexter	38
CDEC	50	CDEC	50
South Meadow	13	South Meadow	13
CRRA	32	CRRA	32
CRRA	32	CRRA	32
Middletown2	117	Devon 7	106
Millstone2	907	Devon 8	106
Millstone 3	1206	Middletown 2	117
Falls Village	7	Middletown 3	233
SCRRA	13.2	Middletown 4	400
Bridgeport Harbor 3	300	Montville 5	81
CRRRA	57	Montville 6	402
New Haven Harbor	350	Millstone 2	860
Bridgeport Energy	150	Millstone 3	1140
Bridgeport Energy	150	Middletown 10	17
Bridgeport Energy	159	Lake Road	280
Derby	7	Lake Road	280
		Lake Road	280
		Milford 1	280
		Meriden	195
		Meriden	195
		Meriden	196
		Falls Village	7
		SCRRA	13.2
		Tunnel	17
		Wallingford	6.4
		Bridgeport Harbor 3	375
		CRRRA	57
		New Haven Harbor	447
		Derby	7

d) The line loadings for the new 345-kV transmission line segments are tabulated below. These loadings are listed in MVA (MegaVolt-Amperes) for each circuit. The flow in amperes per phase can be obtained by multiplying these numbers by a factor of 1.6735.

Circuit Section	Proposed Line Load		Alternative A Line Load		Alternative B Line Load	
	15 GW Case	27.7 GW Case	15 GW Case	27.7 GW Case	15 GW Case	27.7 GW Case
Scovill Rock S/S to Chestnut Junction	345.9	372.8	354.9	682.8	359.6	690.2
Oxbow Junction to Beseck S/S	509.2	756.3	498.9	746.4	502.4	739.7
Black Pond Junction to Beseck S/S (East)	170.3	445.0	166.9	433.3	152.7	417.0
Black Pond Junction to Beseck S/S (West)	425.0	330.5	456.8	393.8	478.7	399.0
Beseck S/S to East Devon S/S	254.2	896.3	217.9	850.7	192.8	772.2
East Devon S/S to Singer S/S	340.2	837.8	160.6	740.2	133.0	640.7
Singer S/S to Norwalk S/S	795.2	706.4	544.0	564.4	466.7	471.3

e) The assumed loads for Connecticut, Southwest Connecticut (SWCT) and the Norwalk-Stamford Sub-areas of New England are tabulated below.

Area	Load in 27 GW Model	Load in 15 GW Model
Connecticut	7370 MW	3956 MW
SWCT	3882 MW	1929 MW
Norwalk-Stamford	1300 MW	664 MW

f) Estimates of New England load (or demand) are the responsibility of ISO New England. Accordingly, the Companies do not estimate future demand growth rates for New England. The latest forecast prepared by ISO-NE is the NEPOOL 2003-2012 Forecast Report of Capacity, Energy, Loads and Transmission ("CELT Report"). The CELT Report can be found on the ISO-NE web site at: http://www.iso-ne.com/Historical_Data/CELT_Report/2003_CELT_Report/

g) The Connecticut Siting Council, pursuant to CGS Section 16-50r (a), produces a "Review of the Connecticut Electric Utilities' Ten-Year Forecasts of Loads and Resources" which compiles and analyzes load growth forecasts of the states' electric utilities. The Companies provide the CSC with information for their own service territories and the CSC compiles the information, with information additional to produce a report for the entire state. The 2003 version of this report, issued on December 23, 2003, contains forecasted load information for the state of Connecticut through the year 2012. This report is available on the CSC web site at: http://www.ct.gov/csc/lib/csc/19021_loads_and_resources.pdf.

h) The Companies do not routinely estimate specific demand growth rates for Southwestern Connecticut ("SWCT"). However, based on the individual forecasts of each of the utilities serving SWCT, the Companies estimate that peak load growth in SWCT could be as high as 2% per year over the next ten years, assuming normal weather conditions. Extreme weather conditions occur in any given year could add roughly 10% to that years peak demand.

i) The Companies do not routinely estimate specific demand growth rates for the Norwalk-Stamford Sub-area and do not currently have available the necessary information to make such an estimate.

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



Attachment 2 to TOWNS-036.xls



Attachment 1 to TOWNS-036.xls

Witness: Dr. Bailey
Request from: Connecticut Siting Council

Question:

Reference Table 5 in the Exponent EMF Assessment. Provide the proposed magnetic fields for the East/South ROW and the West/North ROW in each Cross Section under the assumption that the proposed 345-kV line is loaded at 80 percent of its normal MVA rating.

Response:

The assumption in this interrogatory is unrealistic because the transfer capabilities of the system preclude loading of the new 345-kV line to 80% of the thermal ratings of its conductors. The load carrying capacity of a line is limited not just by its thermal rating, but also by the transfer capabilities of the system of which it is a part. In addition, the conductor size specified for the new 345-kV line is larger than required for the thermal loadings the line will experience, in order to minimize audible noise and radio interference. In the load flow modeling of the 27.7 GW case for this Project using Dispatch 2, in which the system is stressed to its maximum transfer capabilities, with little generation on in Southwest Connecticut, the loads on the new 345-kV line, expressed as a percentage of the normal thermal rating of its conductors, are as follows:

Line Segments Line Segment	Cross Section	Loading		Ratings	
		MVA	Amperes/f	Normal Rating (Amps)	% of Normal Rating
Scovill Rock S/S to Southington	1	672.8	1126	3410	33.0
Haddam/Millstone to Beseck S/S	2	756.3	1266	3410	37.1
Beseck S/S to Haddam Neck S/S	1, 3, 4	445	745	3410	21.8
Beseck to Southington/Meriden	3, 4	330.5	553	3410	16.2
Beseck to East Devon	5 through 8	896.3	1500	3410	44.0
East Devon to Singer	9	837.8	1401	2115	66.2
Singer to Norwalk	9	706.4	1182	2115	55.9

These are the maximum loads that could be expected on this line under normal (pre-contingency) conditions.

Nevertheless, in order to comply with this data request, the Companies have calculated what the magnetic field values would be if it were possible to load all of the overhead lines on the rights-of-way that are proposed to be used for the Project and the proposed underground segments of the new 345-kV line, to 80% of their normal ratings. To provide a basis for comparison, the Companies have also calculated what the fields along the right of way would be if it were possible to load the existing lines to 80% of their normal capacity. The Companies have answered this response based on the revised EMF tables filed with the Connecticut Siting Council on March 15, 2004.



Q-TOWNS-037.doc

Note: Assumptions on which this table is based are not realistic. See preceding response. Q-TOWNS-037-Page 2 of 2

Cross Section	Existing Transmission Lines (mG)		Proposed Transmission Lines (mG)	
	East/South* ROW	West/North** ROW	East/South ROW	West/North ROW
Proposed 345 kV Overhead Routes				
1	106.1	106.1	139.1	110.6
2	36.7	59.7	94.6	46.1
3	39.8	15.0	76.8	56.4
4	21.1	58.5	39.1	37.3
5	16.3	81.3	89.2	108.0
6	6.7	55.0	43.2	155.1
7 and 7B	9.6	72.8	81.0	92.4
8 and 8A	53.4	66.4	122.9	105.1
"Supported Changes" – 345-kV Overhead and Relocation of 115-kV to Underground				
7B (25')***	9.6	72.8	41.5	158.1
8A (-20')****	53.4	66.4	34.9	95.3
8A (-400')****	53.4	66.4	17.1	94.8
Proposed and Alternative Underground Line Routes ⁺				
9 (East Devon to Norwalk)	- na -	- na -	0.3	0.3
9A (Alternative A) (East Devon to Hawthorn)	- na -	- na -	8.8	7.9
10 (Alternative B) (Signer to Seaview)	- na -	- na -	17.4	7.8
Alternative 345 kV Overhead Line Routes				
11 (Alternative B)	6.1	20.6	24.1	33.1
12 (Alternative B)	79.9	62.9	109.9	102.0
13 (Alternative B)	40.2	53.1	46.1	94.6
14 (Alternative B)	41.1	2.2	125.2	17.4
15 (Alternative B)	62.7	62.7	125.2	38.2
16 (Alternative B)	120.7	99.1	46.1	94.6
17 Alternative A&B)	69.5	69.5	46.1	94.6
18 (Alternative A&B)	52.2	91.5	167.0	163.9
19 (Alternative A&B)	107.6	201.1	127.3	127.3
20 (Alternative A&B)	74.5	104.1	399.8	139.4
21 (Alternative A&B)	49.2	111.0	222.8	139.4
22 (Alternative A&B)	158.5	127.2	399.8	139.4

- * Identified in documentation as left ROW
- ** Identified in documentation as right ROW
- *** Distance from edge of ROW. +25' indicates 25' outside of the right (West/North) ROW.
- **** Distance from edge of ROW. -20' indicates 20' outside of the left (East/South) ROW
- + ROW edge taken as -20' left (East/South) ROW and +20' right (West/North) ROW.

Witness: Dr. Bailey
Request from: Connecticut Siting Council

Question:

Reference Table 5 in the Exponent EMF Assessment. Provide the proposed magnetic fields for the East/South ROW and the West/North ROW in each Cross Section under the assumption that the proposed 345-kV line is loaded at 100 percent of its normal MVA rating.

Response:

The assumption in this interrogatory is unrealistic because the transfer capabilities of the system preclude loading of the new 345-kV line to 100% of the thermal ratings of its conductors. The load carrying capacity of a line is limited not just by its thermal rating, but also by the transfer capabilities of the system of which it is a part. In addition, the conductor size specified for the new 345-kV line is larger than required for the thermal loadings the line will experience, in order to minimize audible noise and radio interference. In the load flow modeling of the 27.7 GW case for this Project using Dispatch 2, in which the system is stressed to its maximum transfer capabilities, with little generation on in Southwest Connecticut, the loads on the new 345-kV line, expressed as a percentage of the normal thermal rating of its conductors, are as follows:

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		MVA	Amperes/f	Normal Rating (Amps)	% of Normal Rating
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These are the maximum loads that could be expected on this line under normal (pre-contingency) conditions.

Nevertheless, in order to comply with this data request, the Companies have calculated what the magnetic field values would be if it were possible to load all of the overhead lines on the rights-of-way that are proposed to be used for the Project and the proposed underground segments of the new 345-kV line, to 100% of their normal ratings. To provide a basis for comparison, the Companies have also calculated what the fields along the right of way would be if it were possible to load the existing lines to 100% of their normal capacity. The Companies have answered this response based on the revised EMF tables filed with the Connecticut Siting Council on March 15, 2004.



Q-TOWNS-038.doc

Note: Assumptions on which this table is based are not realistic. See preceding response. Q-TOWNS-038-Page 2 of 2

Cross Section	Existing Magnetic Field (mG)		Proposed Magnetic Field (mG)	
	East/South* ROW	West/North** ROW	East/South ROW	West/North ROW
Proposed 345 kV Overhead Routes				
1	132.8	132.8	174.0	138.4
2	45.9	74.7	118.4	57.7
3	49.8	18.7	96.1	70.6
4	26.4	73.2	48.9	46.6
5	20.4	101.7	111.6	135.2
6	8.3	69.0	54.1	194.0
7 and 7B	12.0	91.1	101.4	115.7
8 and 8A	66.8	83.2	153.5	131.5
"Supported Changes" – 345-kV Overhead and Relocation of 115-kV to Underground				
7B (25')***	12.0	91.1	52.0	197.7
8A (-20')****	66.8	83.2	43.7	119.3
8A (-400')****	66.8	83.2	21.5	118.7
Proposed and Alternative Underground Line Routes ⁺				
9 (East Devon to Norwalk)	- na -	- na -	0.3	0.3
9A (Alternative A) (East Devon to Hawthorn)	- na -	- na -	11.0	9.9
10 (Alternative B) (Singer to Seaview)	- na -	- na -	19.5	7.2
Alternative 345 kV Overhead Line Routes				
11 (Alternative B)	7.7	25.8	30.1	41.5
12 (Alternative B)	100.0	78.8	137.4	127.8
13 (Alternative B)	50.3	66.5	57.7	118.4
14 (Alternative B)	51.3	2.7	156.5	21.7
15 (Alternative B)	78.3	78.3	156.5	47.8
16 (Alternative B)	150.8	123.9	57.7	118.4
17 Alternative A&B)	87.0	87.0	57.7	118.4
18 (Alternative A&B)	65.3	114.5	208.8	205.0
19 (Alternative A&B)	134.7	251.7	159.3	159.3
20 (Alternative A&B)	93.2	130.3	500.2	174.4
21 (Alternative A&B)	61.6	139.0	278.8	174.4
22 (Alternative A&B)	198.0	159.2	500.2	174.4

* Identified in documentation as left ROW
 ** Identified in documentation as right ROW
 *** Distance from edge of ROW. +25' indicates 25' outside of the right (West/North) ROW.
 **** Distance from edge of ROW. -20' indicates 20' outside of the left (East/South) ROW
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