

March 9, 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 TOWNS-01 Interrogatories dated 01/28/2004
TOWNS - 004 , 010 , 018 , 019 , 024 , 026

Very truly yours,

Anne B. Bartosewicz
Project Director - Transmission Business

ABB/tms
cc: Service List

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

Question:

Regarding the GE report "Connecticut Cable Transient and Harmonic Study for Middletown to Norwalk Project, East Devon – Beseck 40 Mile Cable Option (MIN-P1), Final Report" dated November, 2003, on page 4-6, reference is made to transformers being the most significant source of 2nd harmonic stimulus.

- a. Would harmonic filtering on transformers reduce this problem? If the answer is no, please explain in detail why not.
- b. What would such filtering cost on a 100 MVA 115 kV primary power transformer?

Response:

a) Harmonic filters at each substation (within SWCT and even for some substations beyond SWCT) could be added to address this situation. Second harmonic filters are generally expensive and large installations. Sizing of these filters must incorporate the energy that may come from other equipment on the system as well as the transformers where you are attempting to install filters. This can happen from other transformers inrushing at the same time. Quite often this is the cause for failure of 2nd harmonic filters. Therefore, multiple filter bank installations may be required, even at remote locations away from the Middletown to Norwalk Project.

The installation of a second harmonic filter may create operating problems. Further detailed studies are required for each installation.

b) A second harmonic filter on a 100 MVA, 115-kV primary power transformer would cost approximately \$1,000,000. This does not include the cost for land acquisition that may be required at many locations and potential noise abatement measures.

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

Question:

Regarding the GE report "Connecticut Cable Transient and Harmonic Study for Middletown to Norwalk Project, East Devon – Beseck 40 Mile Cable Option (MIN-P1), Final Report" dated November, 2003, on page E-2, footnote 2 makes reference to 2nd harmonic distortion, caused by a geomagnetic disturbance, causing a blackout in Quebec in 1989. Please describe what corrective action Hydro Quebec took to prevent a similar future reoccurrence.

Response:

The primary cause of the 1989 blackout was due to a geomagnetic disturbance leading to misoperation of the shunt var compensators. The shunt var compensators were installed to maintain the 735-kV transmission voltages within acceptable limits. The failure of the shunt var compensators caused violent voltage swings, which tripped transmission lines resulting in a total blackout of the Province of Quebec.

Hydro Quebec has installed series var compensators. The control schemes on the shunt var compensators were changed to prevent their misoperation during the most severe geomagnetic storm. Lastly, when geomagnetic storms are predicted to occur, HQ alters their dispatch to reduce power flows on the long 735-kV transmission lines.

CL&P/UI
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Data Request TOWNS-01
Dated: 01/28/2004
Q- TOWNS-018
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Witness: Peter T. Brandien
Request from: Connecticut Siting Council

Question:

Regarding the GE report "Connecticut Cable Transient and Harmonic Study for Middletown to Norwalk Project, East Devon – Beseck 40 Mile Cable Option (MIN-P1), Final Report" dated November, 2003, on page E-3, this report states that "(a)ttempts to avoid the 2nd harmonic resonance by adding 2nd harmonic filters would not be practical."

- a. Please provide any and all studies, reports, analyses or other information on which this statement is based.
- b. Would the use of harmonic filters to avoid 2nd harmonic resonance be technically possible, and if so, at what cost?
- c. Please provide any and all studies, reports, analyses or other information on which the response to the above request segment (b) is based.

Response:

See response to data request TOWNS-01 Q-TOWNS-004.

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

Question:

Regarding the GE report "Connecticut Cable Transient and Harmonic Study for Middletown to Norwalk Project, East Devon – Beseck 40 Mile Cable Option (MIN-P1), Final Report" dated November, 2003, on page E-3, this report states that "(c)onversion of existing 115 kV capacitor banks into 2nd harmonic filters would require increased size and cost on the order of about two to three times the replacement costs of the existing capacitor banks."

- a. Please provide any and all studies, reports, analyses or other information on which this statement is based.
- b. What were the effects on 2nd harmonic resonance of converting existing 115 kV capacitor banks into 2nd harmonic filters?
- c. Please provide any and all studies, reports, analyses or other information on which the response to the above request segment (b) is based.
- d. Which existing 115 kV capacitor banks were specifically being addressed in the above statement?
- e. Please provide any and all studies, reports, analyses or other information which address potential space limitations at the locations of the existing 115 kV capacitor banks referred to in the above statement.

Response:

- a) This information was based upon the expertise of General Electric (GE) in 2nd harmonic analysis and mitigation.
- b & c) The conversion of existing 115-kV capacitor banks to 2nd harmonic filters is not being considered because a capacitor bank conversion to 2nd harmonic filters not only involves the addition of reactors, but also would require substantial equipment replacement with a much higher voltage and thermal rating to withstand the electric system stresses imposed upon a 2nd harmonic filter.
- d & e) Virtually every capacitor bank within and in close electrical proximity to SWCT would have to be modified. Therefore, no specific capacitor bank installations were studied for conversion to 2nd harmonic filters due to substation space limitations and potential cost.

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

Question:

Reference page 4 of the December 16, 2003 Supplemental Filing:

- a. Provide copies of the studies, analyses, evaluations, and reports prepared by or for each of the cable consulting experts retained by CL&P and/or UI "to assess the viability of various undergrounding options for the 345-kV facilities."
- b. Provide copies of the correspondence between CL&P and/or UI and each of these experts related to the assessment of "the viability of various undergrounding options for the 345-kV facilities."

Response:

The Companies have retained consulting experts at General Electric (GE) to perform transient switching and harmonic studies for the Middletown - Norwalk Project including analysis of alternative underground options. The Companies have provided copies of GE reports through the Supplemental Filings and other interrogatory data requests. See also the answer to Towns-01, Q TOWNS-025 and the draft Burns & McDonald report and letter from Stephen Lambert, P.E. produced in response thereto. Providing miscellaneous correspondence will not assist the Siting Council in determining whether the statutory criteria for granting a certificate of environmental compatibility and public need have been met in this proceeding.

CL&P/UI
Docket No. 272

Data Request TOWNS-01
Dated: 01/28/2004
Q- TOWNS-026
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Witness: Peter T. Brandien
Request from: Connecticut Siting Council

Question:

Reference page 5 of the December 16, 2003 Supplemental Filing. Please provide copies of the correspondence between CL&P and/or UI and GE related to studies that GE was being asked to undertake.

Response:

This interrogatory is overly broad and goes beyond reasonable discovery and long-standing practice in Siting Council proceedings. Under the Uniform Administrative Procedure Act, a party has the opportunity to "inspect and copy relevant and material records, papers and documents not in the possession of the party or such agency, except as otherwise provided by federal law or any other provision of the general statutes..." Conn. Gen. Stat. § 4-177c(1) (emphasis added). CL&P and UI object to this interrogatory to the extent that the interrogatory does not seek relevant and material information. Accordingly, CL&P and UI are answering this interrogatory to the extent the interrogatory seeks information that will assist the Siting Council in determining whether the statutory criteria for granting a certificate of environmental compatibility and public need have been met in this proceeding.

The Companies have provided copies of all the GE reports through the Supplemental Filing and other data requests. Providing miscellaneous correspondence will not assist the Siting Council in determining whether the statutory criteria for granting a certificate of environmental compatibility and public need have been met in this proceeding.