

March 3, 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 - 001 , 002 , 003 , 005 , 006 , 007 * , 008 , 009 * , 011 , 012 , 013 , 014 , 015 , 016 , 017 , 020 ,
022 * , 023 , 025 * , 029 *

Very truly yours,

Albert W. Cretella III
Project Manager - Transmission Business

AWC/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 TOWNS-01
Dated: 01/28/2004
Q- TOWNS-001
Page 1 of 2

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 3-1 reference is made to the extensive model of the NU system having been developed. Please provide, on CD in machine readable format, a copy of the model data as used with the ATP/EMTP to perform the transient and harmonic studies reflected in this report.

Response:

The ATP/EMTP model that was used in this analysis is proprietary material owned by General Electric ("GE"). Adjustments to the model to reflect specific cases are also proprietary and have not been provided to the Companies. (See the attached correspondence from GE) The Towns' counsel has been provided with a contact at GE to determine the terms under which GE will agree to provide copies of the model and associated cases to the Towns' expert. A narrative analysis of the cases is included in each GE report.



GE letter.pdf



Elizabeth R. Pratico
Consulting Engineer

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February 10, 2004

Mr. Brent Oberlin
Northeast Utilities
107 Selden Street
Berlin, CT 06037

Subject: ATP/EMTP Model Request

Dear Brent,

GE received a data request from Northeast Utilities (NU), which originated from the Connecticut Siting Council, "CL&P/UI Docket No. 272 Data Request TOWNS-01," dated 01/28/2004. In many of the questions, the request is to provide the ATP/EMTP model used to perform the studies and additionally all of the input data and study results. The referenced reports provide the input data that was used to develop the ATP/EMTP model in addition to detailed case descriptions that document the simulations that were performed and study results for all cases. All of these items in the reports are considered non-proprietary and have already been provided to NU in electronic format on CDs.

The ATP/EMTP models constitute GE proprietary information. Thus, they cannot be provided. They are considered GE proprietary information due to the engineering expertise and methods used in model development to represent NU's system for the purposes of these studies.

If you have any further questions pertaining to this matter, I refer you to our Intellectual Property Attorney, Buddy Cusick, who can be reached at 518-385-2725 or ernest.cusick@ps.ge.com.

Sincerely,

A handwritten signature in cursive script that reads "Elizabeth R. Pratico".

Elizabeth R. Pratico

cc: E. Cusick, M. Eitzmann, H. Elahi, R. Walling, R. Wilson

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Docket No. 272

Data Request TOWNS-01
Dated: 01/28/2004
Q- TOWNS-002
Page 1 of 1

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 2-1, reference is made to the 39 cases performed in the harmonic analysis. Please provide, on CD in machine readable format, the input data and the study results for each of these 39 cases.

Response:

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

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Docket No. 272

Data Request TOWNS-01
Dated: 01/28/2004
Q- TOWNS-003
Page 1 of 1

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 2-2 reference is made to the 22 simulation cases performed in the switching transient analysis. Please provide, on CD in machine readable format, the input data and the study results for each of these 22 cases.

Response:

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

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 4-7, reference is made to the fact that changes in system configuration could move the resonance below 2nd harmonic.

- a. Could changes in system configuration move the resonance further above 2nd harmonic? If not, please explain in detail why not.
- b. If so, please describe what types of changes would be likely to have what type of effect.
- c. Have such changes been studied, and if so, please provide a copy of such studies and results.
- d. If such changes have not been studied, please describe why not.

Response:

- a) Yes, a change in the power system could move the resonance further above the 2nd harmonic.
- b) Primarily, there are two methods which could move the resonance further above the 2nd harmonic. The first is to strengthen the system. This is done through the addition of more generation or transmission lines in the area. The second is to reduce the amount of charging capacitance in the area. This can be accomplished by changing the design (installing more overhead), the type of cables currently planned or the number of switched capacitor banks in the area.
- c) No, the Companies did not perform these sensitivity studies.
- d) This project does not propose the addition of more generation in the area, and it is assumed that the addition of more overhead circuits would result in further public concern. The Companies do not believe that other cable technologies, such as XLPE, are mature enough to be installed at this length.

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Data Request TOWNS-01
Dated: 01/28/2004
Q- TOWNS-006
Page 1 of 1

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

Question:

On Page E-1 of the "Connecticut Cable Transient and Harmonic Feasibility Study" Final Report dated March 2003, it states that "...a long distance EHV AC transmission cable system is unprecedented."

- a. What is the longest EHV AC cable system of which respondents are aware?
- b. Please provide the voltage, the length, and location, and the operating utility of the system named in a) above.

Response:

See data request D-W-01 Q-D-W-019.

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Data Request TOWNS-01
Dated: 01/28/2004
Q- TOWNS-007
Page 1 of 1

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 4-7, footnote 2 makes reference to a paper from the Proceedings of 8th International Conference on Harmonics and Quality of Power. Please provide a copy of the referenced paper.

Response:

The requested document is copyrighted material published by the Institute of Electrical and Electronics Engineers, Inc. (IEEE), and therefore the Companies are not permitted to distribute copies of this document. The Companies have paid the necessary fee to IEEE to obtain one copy of this document, which is provided to the Siting Council as an attachment to this data request. Parties and intervenors may obtain their own copies of this document by contacting the IEEE directly at:

IEEE Standards Department
445 Hoes Lane, P.O. Box 1331
Piscataway, NJ 08855-1331

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

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 4-7, reference is made to the planned Glenbrook Statcom.

- a. In the switching transient analysis in this study, what was the status of the Glenbrook Statcom.
- b. If no switching transient studies were performed with this Statcom in service, please describe why not.
- c. Was the effect of one or more Statcoms installed in different locations from Glenbrook on switching transients studied? If so, please provide a copy of the studies, input data and results.
- d. If no switching transient studies were performed with one or more Statcoms in service in different locations, please describe why not.

Response:

- a) The impact of the Glenbrook STATCOM on transient performance is dominated by the capacitor banks included in that installation. These capacitor banks were included in the evaluations, but the power electronics of the STATCOM were not explicitly represented. At the transient frequencies relevant to the switching behavior studied, the STATCOM's power electronics were judged by General Electric (GE) to have little impact.
- b) A STATCOM cannot react in time to eliminate the effect of transients. The response time of a STATCOM control system is in the range of .03 seconds; transients can have frequencies in the tens of thousands of cycles per second (hundreds of times faster than a STATCOM can react). A STATCOM is unable to respond with the speed required to mitigate power system transients. The GE study results are primarily influenced by the amount of capacitance associated with the 345-kV cable system and substation switchable capacitor banks and their interaction with a predominately reactive overhead transmission system. Therefore, the capacitors associated with the STATCOM were modeled, but the STATCOM itself was not.
- c) Additional STATCOM's were not considered.
- d) See response to Sub-part b) above.

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Data Request TOWNS-01
Dated: 01/28/2004
Q- TOWNS-009
Page 1 of 1

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, footnote 1 makes reference to a paper from the IEEE Transactions on Power Delivery. Please provide a copy of the referenced paper.

Response:

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445 Hoes Lane, P.O. Box 1331
Piscataway, NJ 08855-1331

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Data Request TOWNS-01
Dated: 01/28/2004
Q- TOWNS-011
Page 1 of 1

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 20 Mile Cable Option (MIN-P2), Final Report" dated December, 2003, on page 3-1 reference is made to the extensive model of the NU system having been developed. Please provide, on CD in machine readable format, a copy of the model data as used with the ATP/EMTP to perform the transient and harmonic studies reflected in this report.

Response:

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

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Data Request TOWNS-01
Dated: 01/28/2004
Q- TOWNS-012
Page 1 of 1

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 20 Mile Cable Option (MIN-P2), Final Report" dated December 2003, on page 2-1, reference is made to the 39 cases performed in the harmonic analysis. Please provide, on CD in machine readable format, the input data and the study results for each of these 39 cases.

Response:

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

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Data Request TOWNS-01
Dated: 01/28/2004
Q- TOWNS-013
Page 1 of 1

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 20 Mile Cable Option (MIN-P2), Final Report" dated December 2003, on page 2-2 reference is made to the more than 90 simulation cases performed in the switching transient analysis. Please provide, on CD in machine readable format, the input data and the study results for each of these cases.

Response:

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

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Data Request TOWNS-01
Dated: 01/28/2004
Q- TOWNS-014
Page 1 of 1

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 20 Mile Cable Option (MIN-P2), Final Report" dated December 2003, on page 4-8, reference is made to the planned Glenbrook Statcom.

- a. In the switching transient analysis in this study, what was the status of the Glenbrook Statcom.
- b. If no switching transient studies were performed with this Statcom in service, please describe why not.
- c. Was the effect of one or more Statcoms installed in different locations from Glenbrook on switching transients studied? If so, please provide a copy of the studies, input data and results.
- d. If no switching transient studies were performed with one or more Statcoms in service in different locations, please describe why not.

Response:

See response to data request TOWNS-01 Q-TOWNS-008.

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Docket No. 272

Data Request TOWNS-01
Dated: 01/28/2004
Q- TOWNS-015
Page 1 of 1

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

Question:

Regarding the GE report "Connecticut Cable Transient and Harmonic Feasibility Study, Final Report" dated March, 2003, on page 2-1 reference is made to the model of the NU transmission system having been developed. Please provide, on CD in machine readable format, a copy of the model data as used with the ATP/EMTP to perform the transient and harmonic studies reflected in this report.

Response:

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

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Data Request TOWNS-01
Dated: 01/28/2004
Q- TOWNS-016
Page 1 of 1

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

Question:

Regarding the GE report "Connecticut Cable Transient and Harmonic Feasibility Study, Final Report" dated March 2003, on page 2-2, reference is made to the 30 cases performed in the transient analysis. Please provide, on CD in machine readable format, the input data and the study results for each of these 30 cases.

Response:

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

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Docket No. 272

Data Request TOWNS-01
Dated: 01/28/2004
Q- TOWNS-017
Page 1 of 1

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

Question:

Regarding the GE report "Connecticut Cable Transient and Harmonic Feasibility Study, Final Report" dated March 2003, on page 2-2 reference is made to the 15 cases plus 24 cases performed in the harmonic analysis. Please provide, on CD in machine readable format, the input data and the study results for each of these cases.

Response:

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

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Data Request TOWNS-01
Dated: 01/28/2004
Q- TOWNS-020
Page 1 of 1

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, the system model depicted in Figure 3, page 3-2, does not include all of the breakers, equipment locations, or substations referred to in Table 5-1, which lists the switching transient cases studied. Please provide a more detailed system diagram that does include all the breakers, equipment locations, and substations referred to in Table 5.1.

Response:

Figure 3-1 on page 3-2 is a diagram that only shows what had been changed from the proposed project. The remainder of the system can be found in the GE report "Connecticut Cable Transient and Harmonic Study for Phase 2" dated November, 2003), as Figure 3-2 on page 3-3. (See the attachment provided in response to TOWNS-01 Q-TOWNS-025).

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Data Request TOWNS-01
Dated: 01/28/2004
Q- TOWNS-022
Page 1 of 1

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

Question:

Regarding the PowerGem Study dated December 31, 2003 that is part of CL&P's Addendum #1 To Supplemental Filing, please provide on CD, in machine readable format, copies of the four base cases supplied by UI, as referred to on page 5 of the study. Please provide in .RAW format and in .SAV format.

Response:

The attached cd contains the base cases used in the PowerGem Study in PTI format.

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

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Docket No. 272

Data Request TOWNS-01
Dated: 01/28/2004
Q- TOWNS-023
Page 1 of 1

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

Question:

Regarding the PowerGem Study dated December 31, 2003 that is part of CL&P's Addendum #1 To Supplemental Filing, please provide on CD, in machine readable format, copies of the saved cases that reflect the changes made by PowerGem to the base cases supplied by UI, as referred to on page 5 of the study.

Response:

See response to data request TOWNS-01 Q-TOWNS-022.

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

Question:

Reference page 5 of the December 16, 2003 Supplemental Filing.

- a. Provide copies of any studies, analyses, evaluations and draft or final reports prepared by Burns & McDonnell related to its switching study of the underground segments of the Project.
- b. Provide copies of the correspondence between CL&P and/or UI and Burns & McDonnell related to this switching study.

Response:

To the extent that this question seeks correspondence with Burns & McDonnell, it is objected to as seeking information that is not relevant or material to the Council's decision. See response to D-W-01, Q-D-W-001 dated 10/24/03. As stated in the Supplemental filing, the Burns & McDonnell switching study of the Middletown to Norwalk Project, as proposed in the Application, was never completed based on the Companies' decision that GE's greater expertise was required to undertake a more comprehensive analysis. (See the attached GE Connecticut Cable Transient and Harmonic Study for Phase 2 - Final Report, November 2003).

The Companies have not relied upon the incomplete Burns & McDonnell switching study. However, since the Companies expected that the study would be completed and used at the time when it was referenced during the municipal consultation period, the Companies are providing herewith the latest draft prepared by Burns & McDonnell before the work was shifted to GE. Also attached is a letter of Stephen Lambert, P.E., a leading expert in transient and harmonic analysis in which he summarizes his review of the draft Burns & McDonnell study and his review of an earlier GE study.

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

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Data Request TOWNS-01
Dated: 01/28/2004
Q- TOWNS-029
Page 1 of 1

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

Question:

Regarding the GE report "Connecticut Cable Transient and Harmonic Design Study for Phase 1, Final Report" dated June, 2003, on page 4-5, reference is made to IEEE 519 and the limits recommended therein. Please provide a copy of IEEE 519.

Response:

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