



**Northeast
Utilities**

107 Seiden Street, Berlin, CT 06037

Northeast Utilities Service Company
P.O. Box 270
Hartford, CT 06141-0270
(860) 665-5000
www.nu.com

December 15, 2011

Mr. Robert Stein
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: Docket No. LIFE-CYCLE 2011 - LIFE-CYCLE 2011

Dear Mr. Stein:

This letter provides the response to requests for the information listed below.

Response to CSC-02 Interrogatories dated 10/21/2011
CSC-001, 003, 004

Response to OCC-01 Interrogatories dated 10/21/2011
OCC-001, 002, 006, 007, 008, 010

Very truly yours,

John Morissette
Manager
Transmission siting and Permitting
NUSCO
As Agent for CL&P

cc: Service List

Witness: Raymond L. Gagnon
Request from: Connecticut Siting Council

Question:

Does CL&P believe that its transmission line capital and construction costs are higher than other northeastern utilities?

Response:

CL&P does not believe that its cost of capital for transmission line projects is materially different than that of other northeastern utilities.

As for transmission line construction costs, it is very difficult to compare transmission line construction costs between utilities in the Northeast because project costs can vary widely depending upon, but not limited to, line routing, sub-soil obstructions, wetland impact avoidance and mitigation, EMF mitigation, circuit outage availability, seasonal impacts, work hour/day restrictions, and special permit conditions.

Northeast Utilities system operating companies experience very different costs of transmission line construction in Connecticut, New Hampshire and Western Massachusetts, with most of this difference due to the costs of construction and new rights-of-way. Engineering, Project Management and Material costs (apart from associated sales taxes and slight differences in the cost of living) are fairly consistent among these three states, however, the costs of constructing overhead lines in Connecticut tends to be higher for several key reasons:

1. Connecticut is a predominantly urban/suburban state, and therefore it is unusual for a line to run straight for miles, to not cross over highways and railroads, and to not have jogs in the route around previously developed areas. Some areas of the state have no room for additional lines on existing rights-of-way and are so densely developed that new rights-of-way cannot be acquired without extensive takings of residences. In Docket 272 (Middletown-Norwalk) and 292 (Glenbrook Cables) these circumstances resulted in extensive and expensive underground line construction. In the case of Docket 272, the extent of the underground line construction, and also EMF mitigation for overhead lines, was also influenced by P.A. 04-246, discussed below.
2. In New Hampshire and western Massachusetts, as in other states, it is possible to build underground lines alongside the road within the public right-of-way. This avoids the need to dig up the road, avoids some of the conflicts with other underground utilities, and allows longer work hours than Connecticut's Department of Transportation is permitting for work in state roads. In Connecticut, there is little extra right-of-way alongside state or local roads, and often there are other underground utilities within these roads. As a result, CL&P may be forced to place underground transmission cables under one lane of a road, or to place underground facilities on private property adjacent to the public right-of-way, either of which significantly increases the costs of construction.
3. The cost of living and, therefore, labor costs are higher in Connecticut than in many other areas of New England, including New Hampshire and western Massachusetts.

In general, we believe that CL&P's transmission line construction costs are higher than those of most other Northeastern utilities with transmission facilities in mainly rural areas, but similar to the costs experienced by those utilities which have similar constraints associated with building in a more urban/suburban environment.

We suspect CL&P's per mile cost for recently constructed 345-kV transmission lines to be higher than that of other utilities in the Northeast (excluding ConEd) because of the provisions of P.A. 04-246, which can

require underground line construction in conditions where utilities outside Connecticut would build overhead.

Provided that underground line construction is "technologically feasible," section 16-50p(i) of the General Statutes, as amended by P.A. 04-246 precludes the construction of 345-kV overhead lines in many places, including adjacent to "residential areas." As demonstrated in Docket No. 272, the practical effect of this statute was to require that underground construction be maximized to its technological limit on 345-kV line projects that are not in rural or agricultural areas. This requirement can dramatically increase the cost of construction because:

- The first costs of installing a 345-kV underground line, on a per mile basis, are a multiple of the costs for the same length of overhead line.
- Expensive line transition stations are required for each segment of 345-kV underground line that does not end at an existing substation.
- Where a segment of underground line must be installed to avoid adjacency of an overhead line to a residential area or to other so-called "statutory facilities", the transmission right-of-way terrain is often not suitable for an installation of underground cables. In such a case, an underground segment that leaves and then returns to the right-of-way along highway rights-of-way must be constructed. Such a segment will increase the overall length, and therefore the cost, of the line.
- The VAR-management and system-resonance frequency issues that can be associated with maximizing the underground construction of new 345-kV transmission lines can require use of the more costly of the two 345-kV underground cable technologies, i.e., XLPE cables.
- Finally, the VAR-management and system-resonance frequency issues that can be associated with maximizing the underground construction of new 345-kV transmission lines can require more costly substation equipment and expensive modifications to other portions of the existing transmission system. For example, in Docket No. 272, the replacement and uprating of hundreds of surge arresters was found to be necessary for these reasons. Other situations could require more drastic and costly system modifications.

Fortunately, since the Docket 272 proceeding, the General Assembly further amended section 16-50p(i) by June Sp. Session P.A. 07-04, which requires that in determining whether underground line construction is technologically infeasible, "the council shall consider the effect of burying the facility on the reliability of the electric transmission system of the state and whether the cost of any contemplated technology or design configuration may result in an unreasonable economic burden on the ratepayers of the state." As demonstrated in Docket 370 (Greater Springfield Reliability Project), this amendment has reduced the upward pressure on Connecticut 345-kV transmission line costs.

The Connecticut Light and Power Company
Docket No. LIFE-CYCLE 2011

Data Request CSC-02
Dated: 10/21/2011
Q-CSC-003
Page 1 of 1

Witness: Raymond L. Gagnon, Michael B. McKinnon
Request from: Connecticut Siting Council

Question:

Does CL&P believe that its transmission line operating and maintenance (O&M) costs are similar to other northeastern utilities?

Response:

CL&P estimates that its transmission line operating and maintenance costs are within the range experienced by other Northeastern utilities. Cost differences among companies may typically be attributed to differences in the density and types of existing right-of-way vegetation, line structures (wood pole, steel pole and lattice steel), age of plant, rural versus urban location and local labor markets.

Witness: Michael B. McKinnon
Request from: Connecticut Siting Council

Question:

Are there any additional factors not discussed in the 2006 Council interrogatory responses that have impacted CL&P's O&M costs for transmission lines? If so, please identify these factors and the impacts they have on transmission line life-cycle costs.

Response:

Please see CL&P's response to CSC-02, Q-CSC-012 for information about vegetation management changes that have affected CL&P's O&M costs for overhead transmission lines since 2006. In addition, several new factors have impacted CL&P's O&M costs for transmission lines since 2006. Besides increases in O&M costs solely associated with new lines and substations entering service, CL&P has since modified its inspection and maintenance program for both underground and overhead lines in the following ways:

Modifications to CL&P's overhead facilities and programs include:

- Infrared inspections are now completed twice per year, prior to summer and winter peak loads (prior frequency had been annual)
- Aircraft warning light inspections were changed from annually to monthly, and installation of constant monitoring equipment is scheduled for completion by year end 2011
- Initiated subterranean steel-tower foundation inspections
- Implementation of a bare-hand* line maintenance program required additional employee training and increased O&M costs for the acquisition and maintenance of insulated line vehicles and equipment
- Implemented a design modification for OPGW (Optical Ground Wire) splice can grounding
- Guy-wire guards are being installed on rights-of-way (public safety initiative)
- Environmental regulations require more frequent use of access way matting
- Foot-patrol inspections of transmission lines now require identification and inspections of culverts
- Additional staff to support bare hand program
- One time repair to down ground attachments on wood structures

Modifications to CL&P's underground facilities and programs include:

- Increased vault inspection cycle due to modified inspection and maintenance program revisions; additional vaults placed in-service
- HPFF cable pump house modifications

*Bare hand line work is the practice by which a lineman bonds on to the energized conductor which results in the lineman being energized to the same voltage as the conductor.

Please note that infrequently encountered UG cable failures have the potential to significantly increase life cycle costs of individual cables that experience such failures. Please see CL&P's responses to CSC-01, Q-CSC-001 and OCC-01, Q-OCC-007 for information on the differences.