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CONNECTICUT
SITING COUNCIL

December 12, 2005

Mr. S. Derek Phelps
Executive Director
Connecticut Siting Counsel
10 Franklin Square
New Britain, CT 06051

Re: Docket No. Connecticut Siting Council Life – Cycle 2006 Investigation into the Electric Transmission Line Lifecycle Cost

Dear Mr. Phelps:

The United Illuminating Company hereby submits an original and twenty (20) copies of its responses to the First Set of the Electric Transmission Line Lifecyle Cost Pre-Hearing Interrogatories CSC-1 through CSC-13. Copies have been sent to all persons on the service list as well as electronically filed with appropriate parties.

Very truly yours,

Michael A. Coretto
Director, Retail Access
and Regulatory Strategy

cc: Service List

Interrogatory CSC- 1

The United Illuminating Company
Docket: Life Cycle 2006

Witness: Richard Reed

Q-CSC-1: Provide all information documenting the United Illuminating Company's (UI) costs for operation and maintenance of existing transmission lines. Where possible, break these down by type of O & M expense, using cost categories that UI routinely uses. Please provide on a line-by-line basis, or by voltage category and type of line.

A-CSC-1: The Company currently reports its costs to operate and maintain its transmission facilities by FERC account. As a result, the Company does not record all of its transmission line operation and maintenance expenses on a line by line or voltage category and type of line basis. The operation and maintenance costs, as reported to FERC for 2004, are included below.

TRANSMISSION EXPENSES	**2004**
Operation	
(560) Operation Supervision and Engineering	1,513,033
(561) Load Dispatching	2,799,825
(562) Station Expenses	245,174
(563) Overhead Lines Expenses	4,053
(564) Underground Lines Expenses	33,330
(565) Transmission of Electricity by Others	21,732,852
(566) Miscellaneous Transmission Expenses	1,187,590
(567) Rents	807,916
TOTAL OPERATION	28,323,773
Maintenance	
(568) Maintenance Supervision and Engineering	84,214
(569) Maintenance of Structures	31,748
(570) Maintenance of Station Equipment	1,112,275
(571) Maintenance of Overhead Lines	367,814
(572) Maintenance of Underground Lines	34,001
(573) Maintenance of Miscellaneous Transmission Plant	
TOTAL Maintenance	1,630,052
TOTAL Transmission Expenses	29,953,825

Source FERC Form 1 - 2004

The Company's transmission lines by voltage, construction type, single or double circuit (including pole miles and line miles) are shown below.

DESIGNATION				LENGTH		
From (a)	To (b)	Voltage	Structure	(Pole Miles)	Circuits	Cir.Miles
East Shore Substa., NH	Totoket Jct (CL&P), No. Bfd	345	Steel Pole	6.1	1	6.1
Glen Lake Jct (CL&P), Wdbrg	Mix Ave. Substa., Hamden	115	H. Frame-Wood	2.9	1	2.9
Mix Aven Substa., Hamden	Sackett Subst., No. Haven	115	Underground	2.32	1	2.32
Sackett Substa., No. Haven	Grand Ave Substa., NH	115	Steel Pole	4.2	1	4.2
Pequonnock Substa., Bpt.	Barnum Aven-c/o Seaview	115	Underground	1.41	2	2.82
Barnum Aven-c/o Seaview	Trumbull Jct (CL&P), Trumb	115	Metal Tower	3.87	2	7.74
Derby Jct (CL&P), Shelton	Indian Well Substa., Derby	115	Metal Tower	1.47	1	1.47
Indian Well Substa., Derby	Ansonia Substa., Ansonia	115	Metal Tower	2.61	1	2.61
Derby Jct (CL&P), Shelton	Ansonia Substa., Ansonia	115	Metal Tower	4.08	1	4.08
Pease Rd Jct (CL&P), Wdbrg	June St. Substa., Wdbrg	115	Steel Pole	0.77	2	1.54
Grand Ave Substa., NH	W. River Switching Station	115	Underground	2.81	2	5.62
W. River Switching Station	Pequonnock Substa., Bpt.	115	S. Cat Tower	16.67	2	33.34
Bridgeport Harbor Sta. 1	Pequonnock Substa., Bpt.	115	Metal Tower	0.1	1	0.1
Pequonnock Substa., Bpt.	Ash Creek Substa., Bpt	115	S. Cat Tower	3.36	1	3.36
Ash Creek Substa., Bpt.	Westport Town Line (CL&P)	115	S. Cat Tower	4.06	1	4.06
W. River Switching Station	Water St. Substa., NH	115	Underground	1.53	1	1.53
Water St. Substa., NH	Grand Ave Substa., NH	115	Underground	1.45	1	1.45
Grand Ave Substa., NH	Ceder Hill Jct. NH	115	Steel Pole	0.05	1	0.05
Ceder Hill Jct. NH	Quinnipiac Substa., NH	115	Steel Pole	1.04	2	2.08
Ceder Hill Jct. NH	No. Haven Sub., No. Haven	115	Steel Pole	7.15	1	7.15
No. Haven Sub., No. Haven	Wharton Brook Substa., NH	115	Steel Pole	1.67	2	3.34
New Haven Harbor Station	East Shore Substa., NH	115	Steel Pole	0.3	1	0.3
East Shore Substa., NH	Grand Ave Substa., NH	115	Steel Pole	1.53	1	1.53
Pequonnock Substa., Bpt.	Westport Town Line (CL&P)	115	Metal Tower	6.84	2	13.68
Mill River Substa., NH	Broadway, NH	115	Underground	1.66	1	1.66
Broadway Substa., NH	Water Street, NH	115	Underground	1.49	1	1.49
				81.44		116.52

The table below summarizes the Company's transmission lines by voltage, construction type, and single or double circuit.

Voltage	Structure	(Pole Miles)	Circuits	Cir.Miles
345	Steel Pole	6.1	1	6.1
115	H. Frame-Wood	2.9	1	2.9
115	Metal Tower	10.71	2	21.42
115	Metal Tower	8.26	1	8.26
115	S Cat Tower	7.42	1	7.42
115	S Cat Tower	16.67	2	33.34
115	Steel Pole	3.48	2	6.96
115	Steel Pole	13.23	1	13.23
115	Underground	8.45	1	8.45
115	Underground	4.22	2	8.44
		81.44		116.52

Interrogatory CSC-2

The United Illuminating Company
Docket: Life Cycle 2006

Witness: Richard Reed
Page 1 of 1

Q-CSC-2: Provide the overhead transmission line capital costs ($/mile) that UI uses to compare alternative single circuit line structures and designs for 115kV and 345kV lines of the following types:

- Wood pole
- Steel pole
- Steel towers

If possible, break these costs into the following categories:

- Conductors
- Towers/supporting structures
- Insulation costs
- Other (please specify)

A-CSC-2: The Company and CL&P have collaborated on transmission line estimates as part of the Middletown to Norwalk Project. Please see CL&P's response to the Siting Council Interrogatories for this information.

Interrogatory CSC-3

The United Illuminating Company
Docket: Life Cycle 2006

Witness: Richard Reed
Page 1 of 1

Q-CSC-3: Provide the same information requested in the previous question for double circuit structures and lines.

A-CSC-3: The Company's transmission line design criteria defines the loss of both lines on a double circuit structure as a single contingency event. Therefore, from a strategic perspective, UI would not recommend constructing double circuit structures in the future, and has no plans to construct double circuit structures.

Interrogatory CSC-4

The United Illuminating Company
Docket: Life Cycle 2006

Witness: Richard Reed

Q-CSC-4: Provide the underground transmission line capital costs ($/mile) that UI uses to compare alternative 115 kV and 345 kV lines of the following types:

- High pressure fluid filled (HPFF)
- Cross-linked polyethylene (XLPE)

If possible, provide break these costs into the following categories:

- Cable costs
- Piping and associated supporting structures
- Conduit costs
- Other supporting structures
- Land costs
- Installation costs
- Other (please specify)

If the costs ate not available for all of these categories, provide them in as much detail as possible for the categories UI routinely uses.

A-CSC-4: The Company and CL&P have collaborated on transmission line estimates as part of the Middletown to Norwalk Project. Please see CL&P's response to the Siting Council Interrogatories for this information.

Interrogatory CSC-5

The United Illuminating Company
Docket: Life Cycle 2006

Witness: Richard Reed

Q-CSC-5: The 2001 Acres Report also states that, "Transmission lines are built to provide safe reliable performance over a life of 35 to 40 years." Is that estimated lifespan still used for transmission life-cost analysis?

A-CSC-5: For transmission line life-cost analysis, UI's estimated lifespan for transmission lines is 40 years.

Interrogatory CSC-6

The United Illuminating Company
Docket: Life Cycle 2006

Witness:Richard Reed

Q-CSC-6: The July 1996 Life-Cycle Report by Acres International Corp. (1996 Acres Report) on page C-29, states that (for 115-kV transmission) the following life expectancies exist for the following transmission lines:

- Wood Pole	40 years
- Steel Pole	60 years
- Underground Cable	35 to 40 years

a. Does UI agree with these life expectancies?
b. If not, what typical life expectancies would UI use for each of these transmission types?
c. Provide similar life expectancies for 345 kV transmission lines of the same types.
d. Provide the life expectancies for both 115 kV and 345 kV underground lines using both HPFF and XLPE cable.

A-CSC-6:

a. UI agrees with these life expectancies.
b. N/A
c. UI expects similar life expectancies for similar 345 kV transmission line construction.
d. UI expects 40 year operational life for both 115 kV and 345 kV HPFF and XLPE underground cable.

Interrogatory CSC-7

The United Illuminating Company
Docket: Life Cycle 2006

Witness: Richard Reed

Q-CSC-7: Are polymer insulators the preferred type of insulators? Have they largely replaced porcelain or glass insulators?

A-CSC-7: No. The Company's current construction standards call for the use of porcelain insulators for overhead 345 and 115 kV construction. The Company is currently monitoring results from the use of polymer insulators by other companies in the industry and has implemented polymer insulators on a short section of 115 kV transmission line to gather first hand data on the performance and operating characteristics of polymer insulators.

Interrogatory CSC-8

The United Illuminating Company
Docket: Life Cycle 2006

Witness: Richard Reed

Q-CSC-8: Describe how leak prevention and containment measures used on high-pressure fluid-filled cable systems could impact life-cycle costs.

A-CSC-8: Leak prevention and containment measures can reduce life-cycle costs by reducing the likelihood of a leak or by reducing the impact of a leak that does occur. The cost relationship will depend on the cost of the leak prevention and containment measures and the cost of the leak repair and remediation measures that would be required if a leak were to occur.

To date, the Company has not suffered any leaks on its high pressure fluid-filled cable systems. A fluid leak, if not prevented, will require isolation of the leaking section by freezing the fluid using liquid nitrogen, followed by costly repairs including the remediation of the environmental contamination caused by the leak. The benefit of a leak prevention and containment system is derived from the reduction of the environmental clean-up resulting from such leaks. The life-cycle cost impact would be heavily dependent on the initial cost of the containment system, the probability, severity and location assumptions for the leaks, and the environment in which the cable is installed.

Interrogatory CSC-9

The United Illuminating Company
Docket: Life Cycle 2006

Witness: Richard Reed

Q-CSC-9: Has UI researched or evaluated the use of composite conductors for transmission lines to increase line capacity? If so, what is estimated life cycle cost impact? Break into first cost and ongoing cost elements.

A-CSC-9: Composite conductors or other high temperature, low sag alternatives (HTLS) can be considered a possible solution in situations where there is a need for additional transmission line capacity but where the potential for structure modifications or additional conductor sag is constrained. HTLS conductors can cost as much as 3 to 30 times more than conventional conductors, so there must be other economic benefits that offset the higher conductor cost.

Typical conventional conductors used on the Company's system are limited to operating temperatures of 140°C. This maximum operating temperature governs the load the conductor can carry. HTLS conductors work by maintaining stable physical and electrical properties even after exposure to operating temperatures as high as 250°C and sagging less than standard conductors at these high temperatures.

The most economic use of HTLS conductors exists when a capacity upgrade is required on an existing line, and the line requires that structures be upgraded to support the increased mechanical loads of larger conventional conductors or the sags of the existing conventional conductors operating at higher temperatures. In existing lines, replacing the ordinary ACSR conductors with an HTLS conductor of the same size can typically increase the rating of the line by at least 30% over present line ratings with ACSR (Aluminum Conductor Steel Reinforced).

In new lines, the advantage of using HTLS conductors is less certain. The cost premium for HTLS conductor over standard conductor and the cost of electrical losses are important factors in determining whether HTLS conductors should be used in new lines.

Other considerations when evaluating the lifecycle cost of HTLS conductors include assessing the ratings of the terminal equipment on the line. These ratings may limit the capacity benefit that reconductoring with HTLS can provide. The major ongoing cost element to incorporate into the lifecycle analysis is the increased losses (I^2R) inherent when the current on a line with equivalent resistance is increased.

HTLS conductors and associated connectors and hardware will be subject to much higher operating temperatures than ACSR. Historically, certain problems associated with the introduction of new types of transmission conductor have occurred only after extensive utilization at varying load levels and years of exposure to the relatively harsh environment. Problems caused by these factors would almost certainly eliminate any lifecycle savings derived. Accordingly, the Company is evaluating industry trials, research and use of HTLS conductors cautiously.

Interrogatory CSC-10

The United Illuminating Company
Docket: Life Cycle 2006

Witness: Richard Reed

Q-CSC-10: Has UI experienced, in the last five years, issues with construction or maintenance of transmission lines in locations that required special processes or procedures due to environmental sensitivity? If so, describe the situations and the cost impacts.

A-CSC-10: No, in the last five years there have been no issues with construction of transmission lines in locations that required special processes or procedures due to environmental sensitivity, nor has the company had material issues with maintenance of transmission lines in locations that required special processes or procedures due to environmental sensitivity.

Interrogatory CSC-11

The United Illuminating Company
Docket: Life Cycle 2006

Witness: Richard Reed

Q-CSC-11: ISO-New England (ISO-NE) has issued planning and operating standards for design and operation of transmission facilities. One standard prescribes transmission line ratings for normal conditions, short-term emergency and long-term emergency conditions. Does UI expect the standards to impact transmission line life-cycle costs, and if so, to what extent?

A-CSC-11: No, UI does not expect any ISO-NE planning and operating standards for design and operations of transmission facilities to impact transmission line life cycle costs.

Interrogatory CSC-12

The United Illuminating Company
Docket: Life Cycle 2006

Witness: Richard Reed

Q-CSC-12: Has UI Identified other ISO-NE policies or operating procedures that are anticipated to impact transmission line life-cycle costs? If so, what are they and what is the anticipated impact?

A-CSC-12: No, UI does not anticipate other ISO-NE policies or operating procedures to impact transmission line life cycle costs.

Interrogatory CSC-13

The United Illuminating Company
Docket: Life Cycle 2006

Witness: Richard Reed

Q-CSC-13: Under what conditions would UI consider using high voltage direct current (HVDC) lines for long-distance power transfers? How would the life cycle costs of HVDC lines compare to alternating current (AC) transmission lines?

A-CSC-13: UI would consider HVDC lines for long distance power transfers if the recommended HVDC proposal meets the system reliability and operational needs cost-effectively. Each transmission line planned for long distance power transfer would need to be evaluated individually, as each of these factors would vary.