Q-CSC-1: Provide updated costs for operation and maintenance of The United Illuminating Company's (UI) existing transmission lines (FERC Accounts 563, 564, 571, and 572). Also provide an updated breakdown of UI's existing transmission facilities by voltage, construction type, and single/double circuit

A-CSC-1: The operation and maintenance costs, as reported to FERC for 2010, are included below.

UI Transmission Expenses	2010
OPERATIONS EXPENSE	
(563) Overhead Lines Expenses	$57,686
(564) Underground Lines Expenses	$23,250
MAINTENANCE EXPENSE	
(571) Maintenance of Overhead Lines	$1,198,229
(572) Maintenance of Underground Lines	$36,452

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

Designation		Voltage (kV)	Structure	Circuit Type	2010 Circuit Miles
From (a)	To (b)				
East Shore Substa., NH	Totoket Jct (CL&P), No. Bfd	345	Steel Pole	Double	6.10
Singer Substation	UI / NU Jct	345	Underground	Double	11.20
East Shore 387 Line Tap	Halvarsson (UI) [387-4]	345	Metal Tower	Single	0.13
East Shore Substa., NH	Totoket Jct (CL&P), No. Bfd	115	Steel Pole	Double	6.30
Glen Lake Jct (CL&P), Wdbrg	Mix Ave Substa., Hamden	115	H Frame-Wood	Single	2.90
Mix Aven Substa., Hamden	Sackett Substa., No. Haven	115	Underground	Single	2.32
Sackett Substa., No. Haven	Grand Ave Substa., NH	115	Steel Pole	Double	4.20
Pequonnock Substa., Bpt.	Barnum Ave-c/o Seaview	115	Underground	Double	2.82
Barnum Ave-c/o Seaview	Trumbull Substation	115	Metal Tower	Double	7.74
Derby Jct (CL&P), Shelton	Indian Well Substa., Derby	115	Metal Tower	Double	1.47
Indian Well Substa., Derby	Ansonia Substa., Ansonia	115	Metal Tower	Double	2.61
Derby Jct (CL&P), Shelton	Ansonia Substa., Ansonia	115	Metal Tower	Double	4.08
Pease Rd jct (CL&P), Wdbrg	June St Substa., Wdbrg	115	Steel Pole	Double	1.54
Grand Ave Substa., NH	W. River Switching Station	115	Underground	Double	5.38
W. River Switching Station	Congress Substation, Bpt	115	S Cat Tower	Double	31.22
Pequonnock Substa., Bpt	Congress Substation, Bpt	115	S Cat Tower	Double	1.40
Pequonnock Substa., Bpt	Ash Creek Substa., Bpt	115	S Cat Tower	Single	3.36
Ash Creek Substa., Bpt	Westport Town Line (CL&P)	115	S Cat Tower	Single	4.06
W. River Switching Station	Water St Substa., NH	115	Underground	Single	1.53
Water St. Substa., NH	Grand Ave., NH	115	Underground	Single	1.45
Grand Ave Substa., NH	Cedar Hill Junction	115	Steel Pole	Double	1.30
Cedar Hil Jct, NH	Quinnipiac Substa., NH	115	Steel Pole	Double	2.08
Cedar Hill Jct, NH	Sackett to No. Haven Sub.,	115	Steel Pole	Double/Single	7.15
North Haven Substa., NH	Wharton Brook Junction	115	Steel Pole	Double	3.34
East Shore Substa., NH	Grand Ave Substa., NH	115	Steel Pole	Double	3.06
Pequonnock Substa.	Westport town line (CL&P)	115	Metal Tower	Single	6.84
Mill River Substa., NH	Broadway, NH	115	Underground	Single	1.66
Broadway Substa., NH	Water Street, NH	115	Underground	Single	1.49
Singer Substation	Pequonnock	115	Underground	Single	0.43
Singer Substation	Bridgeport Energy	115	Underground	Single	0.17
Devon Tie (UI)	Devon (NU) [1780 ; 1790]	115	Metal Tower	Double	0.20
					129.53

Voltage	Structure	2010 Circuit Miles
115	Steel Pole	28.97
345	Steel Pole	6.10
115	H Frame-Wood	2.90
115	Underground	17.25
345	Underground	11.20
115	Metal Tower	23.07
115	S Cat Tower	40.04
Total		129.53

Total OH	101.08
Total UG	28.45

Q-CSC-2: In the 2006 CSC Interrogatories, UI referenced CL&P's response to CSC-2. Provide any updates to the overhead transmission line capital costs ($/mile) that UI uses to compare alternative single circuit line structures and designs for 115 kV and 345 kV lines of the following types:

- Wood pole
- Steel pole
- Steel towers

If possible, break these costs into the following categories:

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

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

A-CSC-2: Since the Company and CL&P have collaborated on transmission line estimates as part of the Middletown to Norwalk Project, UI references again the CL&P's response to CSC-2.

Q-CSC-3: Confirm that UI still has no plans to construct double circuit structures.

A-CSC-3: United Illuminating's transmission line design criteria along with ISO-NE Planning Procedure 3 (PP3) define 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 immediate plans to construct double circuit structures.

Q-CSC-4: In the 2006 CSC Interrogatories, UI referenced CL&P's response to CSC-4. Provide any updates to 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 are not available for all of these categories, provide them in as much detail as possible for the categories UI routinely uses

A-CSC-4: Since the Company and CL&P have collaborated on transmission line estimates as part of the Middletown to Norwalk Project, UI references again the CL&P's response to CSC-4.

Q-CSC-5: Provide an estimate of the total operating and maintenance (O&M) costs per circuit-mile for overhead and underground 115 kV and 345 kV transmission facilities as applicable for the years 2006 through 2010.

A-CSC-5: The total operating and maintenance costs per circuit mile for the years 2006 through 2010 are noted below:

Voltage: 115kV & 345kV	2006	2007	2008	2009	2010
O&M Cost per Circuit Mile OH (Accounts 563 &571)	$5,493	$5,956	$5,375	$10,725	$12,425
O&M Cost per Circuit Mile UG (Accounts 564 & 572)	$1,725	$3,452	$1,788	$1,554	$2,111

Q-CSC-6: Does UI use wood poles treated with pentachlorophenol (Penta) for transmission line construction?

a) Does UI plan to continue to use Penta or is UI exploring other alternative treatments and/or pole materials for future transmission line construction?
b) How would these alternatives affect the life-cycle costs for transmission lines?

A-CSC-6: UI does not use pentachlorophenol (Penta) for its transmission line construction.

Q-CSC-7: In the 2006 CSC Interrogatories, UI stated that for transmission line life-cycle cost analysis, the estimated lifespan for transmission is 40 years. Is that estimated lifespan still used for transmission life-cycle cost analysis?

A-CSC-7: Yes, for transmission line life-cycle cost analysis, UI's estimated lifespan for transmission lines is 40 years.

Q-CSC-8: In the 2006 CSC Interrogatories, UI indicated they agreed with the following life expectancies for 115 kV transmission facilities from the 1996 Acres Report:

- 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 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 cables.

A-CSC-8:

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.

Q-CSC-9: Are porcelain insulators still the standard for overhead 115 kV and 345 kV construction? Has UI begun using polymer or glass insulators?

A-CSC-9: Yes, UI still uses porcelain insulators as its standard for overhead 115 kV and 345 kV construction. UI does not use glass insulators. UI has a short section of 115 kV overhead transmission line that utilizes polymer insulators. In addition, UI has started using the polymer insulators in certain special applications in limited numbers.

Q-CSC-10: Has UI performed any more research, evaluation, or possibly even installation, of composite conductors on any of your transmission facilities? If so, what is the estimated life cycle cost impact? Break into first cost and O&M cost elements.

A-CSC-10: UI has not installed any composite conductor on its transmission system. However, UI has been studying the application of composite conductors and talking to the composite conductor manufacturers. UI may consider the use of composite conductors for its future re-conductoring projects for overhead lines. Currently, UI has not evaluated any estimated life cycle impact for use of these types of conductors. Any proposed future re-conductoring project may include this type of analysis.

Q-CSC-11: 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-11: During the construction of the 345 kV underground portion of the Middletown/Norwalk Transmission Project in Bridgeport and Stratford, UI encountered soil and water contamination that required specific environmental considerations for treatment, processing and disposal. The cost for remediation was approximately $14.6 million.

During maintenance repair of transmission towers on the North Bridgeport overhead 115 kV line in May 2009, UI needed to build an access road in order to avoid wetlands. The cost for this was approximately $100,000.

Q-CSC-12: Would UI say the ISO-NE planning and operating standards for design and operations of transmission facilities have had an impact on UI transmission line life cycle costs and if so, to what extent?

A-CSC-12: 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.

Q-CSC-13: Has UI identified any other ISO-NE policies or operating procedures that impact transmission line life cycle costs since responding to the previous interrogatories? If so, what are they and what is the anticipated impact?

A-CSC-13: No, UI does not anticipate other ISO-NE policies or operating procedures to impact transmission line life cycle costs.

Q-CSC-14: Provide any updates to UI's consideration of using high voltage direct current (HVDC) lines and the impacts to life-cycle costs as compared to alternating current (AC) transmission lines?

A-CSC-14: UI's considerations of utilizing high voltage direct current (HVDC) lines have not changed. HVDC lines are typically used for transfer of power over long distances. If a transmission line is planned over a long distance, HVDC would be evaluated to determine if the proposal would meet the system reliability and operational needs in a cost effective manner. UI has no updates to the life cycle costs of HVDC as compared to alternating current (AC) transmission lines.

Q-CSC-15: Provide any comments and/or suggestions regarding how the Council's *Life Cycle 2007* report could be improved.

A-CSC-15: UI does not have any comments or suggestions at this time.