Northeast
Utilities System

107 Selden Street, Berlin, CT 06037

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

April 25, 2005

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

Re: Docket No. F-05 - Connecticut Siting Council Review of 2005 Forecasts of Electric Loads and Resources

Dear Mr. Phelps:

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

Response to CSC-01 Interrogatories dated 04/04/2005
CSC - 001 , 002 *, 003 , 004 , 005 , 006

Very truly yours,

Janet R. Palmer
Manager
Regulatory Policy - CT
NUSCO
As Agent for CL&P

JRP/dd
cc: Service List

* Due to the bulk nature of this material, 2 copies are being provided to the CSC only.

SERVICE LIST
Docket: F-05

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

Ms. Cindy Jacobs
Department of Public Utility Control
10 Franklin Square
New Britain, CT 06051

Mr. Michael A. Coretto
United Illuminating Company
P. O. Box 1564
New Haven, CT 06506-0901

Atty. Linda L. Randell
Wiggin and Dana
One Century Tower-P.O. Box 1832
New Haven, CT 06510

Mr. Maurice Scully
Executive Director
Conn. Municipal Electric Energy Coop.
30 Stott Avenue
Norwich, CT 06360

Mr. J. Alan Price
Site Vice President - Millstone
Millstone Power Station
Rope Ferry Road
Waterford, CT 06385

Ms. Lillian M. Cuoco
Senior Counsel
Dominion Resources Services Inc.
Rope Ferry Road
Waterford, CT 06385

Mr. Kenneth C. Baldwin
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103-3597

Mr. James T. Carlton Jr.
General Manager
Lake Road Generating Company LP
56 Alexander Parkway
Dayville, CT 06241

Atty. Lawrence J. Golden
Pullman & Comley LLC
90 State House Square
Hartford, CT 06103-3702

Mr. Brad Porlier
General Manager
Bridgeport Energy LLC
10 Atlantic St.
Bridgeport, CT 06604

Mr. Harold W. Borden
Vice President & General Counsel
PSEG Power LLC
80 Park Plaza
Newark, NJ 07102

Ms. Judith Lagano
NRG Energy Inc.
Manresa Island Road
South Norwalk, CT 06854

Atty. Frederic Lee Klein
Assistant General Counsel
Northeast Utilities Service Co.
P. O. Box 270
Hartford, CT 06141-0270

Mr. Christopher J. Fancher
Facilities Engineer
Connecticut Resources Recovery
Authority
100 Constitution Plaza, 17th Floor
Hartford, CT 06103-1722

Mr. Joel M. Rinebold
CT Center for Advanced Technology
Energy Program
111 Founders Plaza, Suite 1002
East Hartford, CT 06108

Mr. Steve Gibelli
Northeast Utilities Service Company
P. O. Box 270
Hartford, CT 06141-0270

Mr. Christopher Bernard
Northeast Utilities Service Company
P. O. Box 270
Hartford, CT 06141-0270

Witness: Charles R. Goodwin
Request from: Connecticut Siting Council

Question:
Compare and discuss the historical 10-year change to the ten-year forecast for both the system requirements and peaks.

Response:
Please refer to the exhibits in Q-CSC-004, which show output and peak loads normalized for weather. Output is closely related to economic conditions, but peak load is much more volatile and highly impacted by the weather. Historic peak growth rates can vary depending on the period over which they are calculated. As an example, the 5 year growth rate in normalized summer peak load for 1999 - 2004 is 2.4%, while the corresponding 10 year growth rate for 1994 - 2004 is 1.6%. In the Company's forecast models, the forecasted peak load growth rate is closely related to the output forecasted growth.

The 10-year forecasted growth rate for weather normalized output is 2.0%, which is a little higher than the historical normalized growth rate of 1.1% for 1994-2004. This is primarily due to two forecast assumptions that: 1) the use of electronic gadgets will continue to increase and 2) the impact of conservation program activity will decrease as the measures installed reach the end of their projected measure lives.

Witness: **John H. Mutchler**
Request from: **Connecticut Siting Council**

Question:
Describe how Conservation and Load Management programs would be funded and implemented.

Response:
The Connecticut Light and Power Company's (CL&P) Conservation and Load Management Programs (C&LM Programs) are funded through the Conservation and Load Management Fund (C&LM Fund). The C&LM Fund was created by the State Legislature in accordance with CGS § 16- 245m, An Act Concerning Electric Restructuring, to provide cost-effective energy conservation programs and market transformation initiatives. Customers of CL&P and UI contribute to the C&LM Fund through a conservation surcharge on their monthly electric bills. CL&P's 2005 C&LM program budget, as approved by the Department of Public Utility Control, is $58,196,302.

Development of a comprehensive and cost-effective C&LM implementation plan is accomplished with advice and assistance from The Energy Conservation Management Board, as per Sec 33(d), PA 98-28, An Act Concerning Utility Restructuring. CL&P implements quality energy conservation programs in a cost-effective manner in accordance with its Plan filed with, and approved by, the Connecticut Department of Public Utility Control (DPUC). The CL&P C&LM Plan for 2005 (Docket 04-11-01) was filed with the DPUC on 11/22/04 and is provided as a bulk attachment to this filing.

* Due to the bulk nature of this material, two copies are being provided to the CSC only.

Witness: **Allen W. Scarfone**
Request from: **Connecticut Siting Council**

Question:
List the technologies that Connecticut Light & Power has in place to monitor and communicate voltage fluctuations? Identify transmission system conditions and actions to maintain and protect the grid and customers.

Response:

CL&P has the following technologies in place to monitor and communicate voltage fluctuations:

- Voltages throughout the transmission system are measured by potential transformers and capacitively coupled voltage transformers at substations. The measured voltage data is communicated to CONVEX system operators via a Supervisory Control and Data Acquisition (SCADA) System. The SCADA technology uses Remote Terminal Units (RTUs) at substations to collect the data and to communicate the data via dedicated communication links (usually fiber optic and/or microwave channels) to the CONVEX Energy Management System computers. SCADA system software automatically alarms the CONVEX operators if the voltage at any measurement location has fluctuated above or below pre-set limits.

- Digital Fault Recorders (DFRs) are also installed at selected CL&P substations throughout Connecticut. These devices store a graphical record of the three-phase currents and voltages immediately before, during and after a disturbance or an abnormal voltage fluctuation. DFRs record and plot the magnitudes of the voltages and currents on a millisecond time scale. The DFRs can be accessed locally or remotely by computer using a commercial communications link.

CONVEX monitors virtually every transmission and distribution high voltage substations in Connecticut and Western Massachusetts. The use of real-time and off-line load-flow analysis provides the CONVEX operators with insight into potential contingencies which could have an adverse impact on the transmission system. Having this insight, the CONVEX operators can control s tatic (capacitor banks and load tap-changing transformers) and dynamic sources (generators, STATCOMs) to provide the necessary voltage support to maintain system security.

In conjunction with ISO-NE, CONVEX ensures that the generation dispatch is sufficient to keep actual power transfers into the state of Connecticut below the transfer limit so as to avoid unacceptable voltage fluctuations following the failure of the most limiting part of the system.

There are two types of voltage fluctuations; transient and steady state. Transient fluctuations last for fractions of a second. Due to their short duration, the CONVEX operator must configure the system prior to this type of disturbance in order to ensure system security. As a Satellite of ISO-NE, CONVEX is charged with the responsibility of dispatching reactive resources (e.g., substation capacitor banks, STATCOMs, and generator reactive output). CONVEX operators energize or de-energize substation capacitor banks to maintain reactive reserve on generators, so that the amount of compensation generators can provide to the system during and immediately following a contingency is maximized.

Steady-state voltage fluctuations are mitigated by CONVEX by pre-positioning the transmission system to be able to withstand the contingency. CONVEX operators monitor system conditions following any unscheduled event; if steady-state voltage levels fluctuate above or below pre-set limits, the CONVEX operators can energize or de-energize substation capacitor banks, call for changes in a generator reactive output, and coordinate with ISO-NE to change Connecticut's imports or exports to re-establish voltage levels within acceptable limits.

Witness: **Charles R. Goodwin**
Request from: **Connecticut Siting Council**

Question:
Are Tables II-1 and II-2 weather normalized? If no, provide these exhibits as weather normalized.

Response:
The attached file contains Tables II-1 and II-2, normalized for weather.

TABLE II-1
NORTHEAST UTILITIES SYSTEM
2004 LONG-RUN FORECAST
CONNECTICUT LIGHT AND POWER COMPANY

TOTAL FRANCHISE NET ELECTRICAL ENERGY OUTPUT REQUIREMENTS AND PEAK LOADS REFERENCE PLAN WEATHER NORMALIZED HISTORY 2000 - 2004 FORECAST 2005 - 2014

	NET ELECTRICAL ENERGY OUTPUT REQUIREMENTS (1)		SUMMER PEAK		
YEAR	OUTPUT GWH	ANNUAL CHANGE (%)	PEAK MW	ANNUAL CHANGE (%)	LOAD FACTOR (2)
HISTORY - WEATHER NORMALIZED					
2000	24253		4767		0.579
2001	24429	0.7%	4729	-0.8%	0.590
2002	24806	1.5%	4988	5.5%	0.568
2003	25077	1.1%	5092	2.1%	0.562
2004	25578	2.0%	5020	-1.4%	0.580
NORMALIZED COMPOUND RATES OF GROWTH (%) 2000-2004	1.3%		1.3%		
FORECAST					
2005	25947	1.4%	5288	5.3%	0.560
2006	26368	1.6%	5407	2.3%	0.557
2007	26738	1.4%	5481	1.4%	0.557
2008	27226	1.8%	5562	1.5%	0.557
2009	27636	1.5%	5667	1.9%	0.557
2010	28247	2.2%	5787	2.1%	0.557
2011	28887	2.3%	5919	2.3%	0.557
2012	29657	2.7%	6064	2.4%	0.557
2013	30303	2.2%	6209	2.4%	0.557
2014	31054	2.5%	6344	2.2%	0.559
NORMALIZED COMPOUND RATE OF GROWTH (%) 2004-2014	2.0%		2.4%		

1. SALES PLUS LOSSES AND COMPANY USE.
2. LOAD FACTOR = OUTPUT (MWH) / (8760 HOURS X SEASON PEAK (MW)).

Forecasted Reference Plan Peaks are based on normal peak day weather :
Peak Day Mean Daily Temperature = 83° F
Day Before Mean Daily Temperature = 81° F
Temperature Humidity Index = 83° F

Temperature Humidity Index = 0.4 * (dry bulb temperature + wet bulb temperature) + 15°

TABLE II-2
NORTHEAST UTILITIES SYSTEM
2004 LONG-RUN FORECAST
CONNECTICUT LIGHT AND POWER COMPANY

SUMMER PEAK VULNERABILITY DUE TO WEATHER
WEATHER NORMALIZED HISTORY 2000 - 2004
FORECAST 2005 - 2014

	SUMMER REFERENCE PLAN			SUMMER PEAK VULNERABILITY DUE TO WEATHER							
				HIGH				LOW			
Year	Peak MW	Annual Change (%)	Load Factor (1)	Peak MW	Annual Change (%)	Change from Ref MW	Change from Ref (%)	Peak MW	Annual Change (%)	Change from Ref MW	Change from Ref (%)
WEATHER NORMALIZED HISTORY											
2000	4767		0.579								
2001	4729	-0.8%	0.590								
2002	4988	5.5%	0.568								
2003	5092	2.1%	0.562								
2004	5020	-1.4%	0.580								
NORMALIZED COMPOUND RATES OF GROWTH (%) 2000-2004	1.3%										
:CAST											
2005	5288	5.3%	0.560	5723	14.0%	435	8.2%	4913	-2.1%	-375	-7.1%
2006	5407	2.3%	0.557	5852	2.2%	445	8.2%	5024	2.3%	-383	-7.1%
2007	5481	1.4%	0.557	5935	1.4%	454	8.3%	5090	1.3%	-391	-7.1%
2008	5562	1.5%	0.557	6026	1.5%	464	8.3%	5163	1.4%	-399	-7.2%
2009	5667	1.9%	0.557	6140	1.9%	473	8.3%	5260	1.9%	-407	-7.2%
2010	5787	2.1%	0.557	6270	2.1%	483	8.3%	5372	2.1%	-415	-7.2%
2011	5919	2.3%	0.557	6411	2.3%	492	8.3%	5495	2.3%	-424	-7.2%
2012	6064	2.4%	0.557	6566	2.4%	502	8.3%	5632	2.5%	-432	-7.1%
2013	6209	2.4%	0.557	6720	2.4%	511	8.2%	5769	2.4%	-440	-7.1%
2014	6344	2.2%	0.559	6864	2.1%	520	8.2%	5896	2.2%	-448	-7.1%
NORMALIZED COMPOUND RATE OF GROWTH (%) 2004-2014	2.4%			3.2%				1.6%			

1. LOAD FACTOR = OUTPUT (MWH) / (8760 HOURS X SEASON PEAK (MW)).

Forecasted High Peaks are based on the weather that occurred on the 2001 peak day:
Peak Day Mean Daily Temperature = 88° F
Day Before Mean Daily Temperature = 86° F
Temperature Humidity Index = 87° F

Forecasted Low Peaks are based on the weather that occurred on the 2000 peak day:
Peak Day Mean Daily Temperature = 76° F
Day Before Mean Daily Temperature = 79° F
Temperature Humidity Index = 81° F

Temperature Humidity Index = 0.4 * (dry bulb temperature + wet bulb temperature) + 15°

The Connecticut Light and Power Company
Docket No. F-05

Data Request CSC-01
Dated: 04/04/2005
Q- CSC-005

Witness: **Charles R. Goodwin**
Request from: **Connecticut Siting Council**

Question:
In Table II-2, is the summer reference plan forecast based on a 50/50 scenario (i.e. the peak forecast has a 50 percent chance of being exceeded)? Explain.

Response:
Yes. The reference case is based on normal peak producing weather so it has a 50% chance of being exceeded due to hotter than normal weather. However it is equally likely that the weather will be cooler than normal, in which case the actual peak may be lower than forecast.

Witness: **Charles R. Goodwin**
Request from: **Connecticut Siting Council**

Question:
In Table II-2, is the summer extreme weather forecast based on a 90/10 scenario (i.e. the peak forecast has a 10 percent chance of being exceeded)? Explain.

Response:
The extreme weather scenarios are based on the hottest and coolest peak day weather that has occurred in the last 30 years. In a 90/10 scenario, the probability that the forecasted peak will be exceeded is 10%. In the high extreme weather scenario, this probability is somewhat lower, perhaps less than 1%, although the possibility exists that some year, the weather will be even hotter than the hottest so far. Please note that the extreme weather scenarios are based on the same economic and other non-weather assumptions as the reference plan. If the economy is stronger than projected and the weather is extremely hot, the probability of exceeding the forecast could increase.