November 30, 2015

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

Re: Docket No. 461 - CSC 461 Greenwich Substation and Line Project

Dear Mr. Stein:

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

Response to FPET-03 Interrogatories dated 11/18/2015
FPET-001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 011, 012, 013

Very truly yours,

John Morissette
Project Manager
Siting
As Agent for CL&P
dba EversourceEnergy

cc: Service List

Witness: **Witness Panel**
Request from: **Field Point Estate Townhouses, Inc.**

Question:
According to my utility bill, the hottest summer billing month of 2015 was 0.1 of a degree hotter than the hottest summer billing month of 2013. Your company had predicted that a summer similar to 2013 would cause peak usage to be as high, if not higher, than 2013. Yet when comparing Greenwich's peak energy usage in 2015 to that of 2013, peak usage dropped from 130.5MVA (2013) to 114.8MVA (2015). Please explain why peak usage actually dropped contrary to your prediction.

Response:
The 2013 and 2015 peak temperatures were similar (91° vs 91.9°). However, the humidity (66% vs 50%) and heat index (106° vs 98.4°) were much higher in 2013 compared with 2015. Consequently this difference had a higher impact on the 2013 system peak demand. The higher humidity and heat index conditions persisted for five consecutive days in 2013 compared with only one day in 2015. This variation impacts the customer diversity demand adversely, thus causing a higher peak demand in 2013, the year with the extended heat wave.

Witness: **Witness Panel**
Request from: **Field Point Estate Townhouses, Inc.**

Question:
Table 1 which pairs Greenwich Peak energy usage (MVA) and Average Temperatures for Hottest Billing Month does not seem to indicate a strong relationship between peak energy usage and temperatures. Please explain why temperature and peak usage in Greenwich do not appear correlated.

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Peak MVA	125	116.1	112.1	107.7	119.7	121.8	128.2	130.5	107.7	114.8
Avg Temp for Hottest Billing Month	Not Available	74.3	76	72.7	77.6	77.4	76.6	76.2	73.8	76.6

Response:
Peak energy usage is a measure of MWh over some period of time such as a month or year, while peak demand load is a measure of MVA in an hour on a particular day. There is no correlation between the peak MVA demand during a particular month or a year and the average temperature of that period. Due to the significant effect of higher electricity consumption resulting from increased use of air conditioning during a heat wave, peak demand is directly correlated with peak temperature, peak humidity and peak heat index on the particular day that it occurs. Peak energy usage is the total energy that is consumed by the customers over the course of the total period considered such as a year (aggregate MWh consumed in each hour of each of the 365 days in that year) while peak demand (MVA) is the maximum combined usage of customers at a given time. That is why the peak demand occurs during days with extremely high temperatures and high humidity.

Witness: **Witness Panel**
Request from: **Field Point Estate Townhouses, Inc.**

Question:
Your company's energy projection of Greenwich summer peak usage (Table 2 sourced from Table E-1 from Connecticut Siting Council Application submitted June 2015) assumes that peak usage will rise and remain persistently above Cos Cob's 135MVA limit. Yet if we review Greenwich's peak energy usage history (Table 1), peak usage levels are hardly rising and are hardly persistent, where peak usage levels are succeeded by even higher peak levels. For example, 2015 peak usage is below 2006 and 2007 peak usage levels. 2007 is particularly interesting for the reason that temperatures were hotter in 2015 than in 2007, yet peak energy usage was a little less in 2015 than in 2007. Please explain why Greenwich's projected energy usage will rise consistently as in your predictions (Table 2) rather than follow the seemingly random, historical patterns of the last 10 years (Table 1).

Table 2 Summer Peak Load Levels

Cos Cob Substation 27.6 kV – Load in MVA

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total MVA	131	132	133	134.5	136	137	139	140	141	143	144

Response:
Eversource's Application refers to peak load demand in MVA in Table E-1. Please refer to Eversource's responses to FPET-03, Q-FPET-001, Q-FPET-002 and Q-FPET-004.

Witness: **Witness Panel**
Request from: **Field Point Estate Townhouses, Inc.**

Question:
According to the Connecticut Economic Resource Center, Inc. (CERC) , a nonprofit corporation and public-private partnership that provides economic development services that promote the state of CT's economic interests, Greenwich's population is not growing. (See Table 3.) Why should we accept your company's 1% annual growth rate in energy usage which you admit is based on the growing cities of Stamford and Norwalk?

Population					% Annual Change ('12-'20)
Town	2000	2010	2012	2020 (Projected)	
Greenwich	61,101	60,809	61,428	59,375	-0.4%
Norwalk	82,951	84,611	85,853	88,795	0.4%
Stamford	117,083	120,907	122,878	130,828	0.8%

Response:
Eversource validates its load growth forecast with ISO−New England Capacity, Energy, Loads, and Transmission (CELT) report. This CELT report uses Actual and Forecasted Energy and Peak Loads to determine the Compounded Annual Growth Rate (CAGR). For Southwest CT, the ISO-New England CAGR is 1.2% growth for 2013 to 2022. Eversource has decided to use a slightly lower growth rate and uses 1% to forecast the Greenwich area load growth.

Witness: **Witness Panel**
Request from: **Field Point Estate Townhouses, Inc.**

Question:
What ad hoc solutions such as emergency generators can be brought to bear to meet peak demand?

Response:
Although Eversource utilizes emergency generators for unexpected distribution interruptions, Eversource planning criteria does not use emergency generation to address permanent load additions. A large amount of generation would need to be available all the time to adequately mitigate the risk of overloads of Cos Cob Substation's power transformers, to accommodate an interruption of two of the 27.6-kV distribution feeders, and anytime the 27.6-kV feeders experience power flows above their normal rating.

Witness: **Witness Panel**
Request from: **Field Point Estate Townhouses, Inc.**

Question:
What augmentations to existing infrastructure could provide a modest 10-20MVA increase to capacity to meet peak energy needs? Batteries? Microgrid for emergency services?

Response:
The existing infrastructure is operating at capacity and cannot be increased 10-20 MVA. A detailed analysis of battery energy storage has not been conducted, however Eversource is interested in demonstration projects that would determine the cost effective applications of energy storage. The Connecticut Department of Energy and Environmental Protection just initiated a proceeding pursuant to Section 103, Public Act 15-5 which requires each Electric Distribution Company to submit proposals for demonstration projects to build, own, or operate grid-side system enhancements to integrate distributed energy resources, such as energy storage. The Company is participating in this proceeding, in part to better understand the efficiencies that could be realized from battery storage.

Refer to the Application section F.3.3 for the discussion on microgrids and why they are not a feasible technical solution.

Witness: **Witness Panel**
Request from: **Field Point Estate Townhouses, Inc.**

Question:
What conservation programs can be introduced to reduce energy usage during summer?

Response:
Utility administered conservation programs are already available to Greenwich customers. The programs are designed to meet the diverse needs of all customer classes including comprehensive energy savings offerings for residential customers, limited income customers, small businesses, municipalities, and large commercial and industrial customers (see http://www.energizect.com). There are no conservation programs that the Company has not yet implemented that would be capable of reducing energy usage to an extent sufficient to offset the need or defer the year of need for the Project.

Witness: **Witness Panel**
Request from: **Field Point Estate Townhouses, Inc.**

Question:
What conservation programs can be introduced to reduce the town's underlying energy usage, especially by type of customer, e.g., Bimbo Bakery, Town of Greenwich, retailers, residential users, etc.?

Response:
Refer to the response in FPET-03, Q-FPET-007.

Witness: **Witness Panel**
Request from: **Field Point Estate Townhouses, Inc.**

Question:
Given that peak energy usage spikes above 135MVA are likely to be sporadic rather than persistent as seen in Greenwich's historical peak energy usage, isn't it more fiscally prudent to service those peaks with ad hoc measures, e.g., emergency generators, rather than permanent substations where much of the substations' excess capacity will be unused?

Response:
Eversource's substation planning and design criteria takes in consideration the Company's load forecast for the Greenwich Project Area and validates that forecast with its forecast for southwest Connecticut Forecast Area and forecasts in the ISO−New England Capacity, Energy, Loads, and Transmission (CELT) report. This report, uses Actual and Forecasted Energy and Peak Loads to determine the Compounded Annual Growth Rate (CAGR). The CELT report's forecasted load growth for southwest Connecticut is 1.2% CAGR for 2013 - 2022.

The 135 MVA Cos Cob Substation's permissible load is a 2 hour rating based upon the loss of the largest element (the 50.4 MVA transformer). At this load level with the largest transformer out of service, the remaining two transformers (with a combined nameplate rating of 46.7MVA + 46.7MVA = 93.4MVA) would be operating at 145% of their combined nameplate rating. After two hours, the load must be reduced to the 22 hour rating of 124 MVA (133% of nameplate rating). Eversource maximizes the use of these emergency equipment ratings to address the infrequent or "sporadic" contingency conditions that can arise, and accepts the loss of remaining life on the equipment that will occur. However, Cos Cob bulk substation does not have any 27.6-kV electrical connection with any other bulk substation to which its 27.6-kV load could be transferred. Therefore, the Company cannot operate the substation (or the associated distribution feeder circuits for that matter) in their emergency ratings for extended periods of time without permanent damage to equipment. The 13.2-kV system from Cos Cob Substation has very limited options and is used to relieve 11 MVA to achieve the 22 hour rating on the substation's 27.6-kV transformers.

Refer to the Application section F.3 for the discussion on non-transmission alternatives and why they are not a feasible technical solution to address the need for the Project.

Witness: **Witness Panel**
Request from: **Field Point Estate Townhouses, Inc.**

Question:
Please explain the financial wisdom (from a rate payer's perspective) of removing 67.1MVA of capacity at Byram and Prospect St. substations when your company is concerned with Greenwich not having enough capacity to meet its peak energy needs?

Response:
The Prospect and Byram substations are supplied at 27.6 kV and are subject to the substation capacity issue at Cos Cob Substation and the 27.6-kV distribution circuit reliability issues on the feeders supplied from Cos Cob Substation. The proposed Greenwich Substation would address the substation capacity issue at Cos Cob Substation, mitigate the distribution circuit reliability issues on the 27.6-kV distribution circuits, remove the overload conditions on the 27.6-kV circuits experienced during July of 2015 and also replace the need for the 13.2-kV transformation at Prospect and Byram substations. Prospect Substation was built in 1934 and the Bryam Substation was built in 1955 and both substations serve customers at 13.2 kV. The transformers in Prospect Substation that are being removed are more than 40 years old, the switchgear associated with these transformers is obsolete, and the substation is located in a flood zone. To replace the switchgear would cost $8-$10 million. Byram Substation's transformers are of the same vintage and are obsolete as well. Instead of replacing these 6 obsolete transformer units with smaller transformers, it is more cost effective to replace them with the 3 larger units proposed for the new Greenwich Substation. These new transformers would be fed directly from two transmission lines, which would be much more reliable than the existing 27.6-kV distribution lines that feed the Prospect Substation and Byram Substation transformers.

Witness: **Witness Panel**
Request from: **Field Point Estate Townhouses, Inc.**

Question:
Please confirm that your $140mm substation proposal would still be deemed an accurate, good faith estimate under ISO-NE PP4 if the substation were completed for an actual cost of $210 million.

Response:
The range is verifiable under the ISO-NE PP-4 cost structure for a concept project (-25%+50%). Actual costs only are placed into rate base. ISO-NE reviews these costs under the Transmission Cost Allocation process. ISO-NE reviews all costs to be included in the regional rate pursuant to the ISO Tariff.

Please see response CSC-01, Q-CSC-011 and OCC-01, Q-OCC-005 for descriptions of Project cost allocations.

ISO-NE Planning Procedure NO.4 (PP-4) is a procedure for Pooled-Supported PTF Cost Review under section I.3.9 of the Tariff. It covers the $12 million of Pool Transmission Facility ("PTF") costs allocated through Regional Network Service ("RNS") rates under Schedule 9 of the ISO-NE Transmission, Markets and Services Tariff ("Tariff") associated with this Project.

The Local System Plan process covers the $107 million of non-PTF costs allocated through Local Network Service ("LNS") rates under Schedule 21-NU, Category A of the ISO-NE Tariff. Distribution costs are not reviewed by ISO-NE.

Witness: **Witness Panel**
Request from: **Field Point Estate Townhouses, Inc.**

Question:
In testimony, your company stated that there were three contingencies in July where you may have had to interrupt service to Greenwich customers. How did this occur when peak usage was no higher than 114.8MVA (much lower than the substation's rated 135MVA)? Are your existing equipment and transmission lines performing up to their rated specifications?

Response:
135 MVA is the capacity rating for Cos Cob Substation's 27.6-kV transformers. The July events were due to loss of 27.6-kV distribution feeders from Cos Cob Substation, which were unrelated to the peak demand. Eversource chose to accept cable loss of life on the 27.6-kV feeders that remained in service at the time of the event to avoid customer interruptions during the July 2015 events.

Witness: **Witness Panel**
Request from: **Field Point Estate Townhouses, Inc.**

Question:
Please explain why accepting your substation proposal is a prudent choice for Greenwich residents and rate payers given (1) that peak energy usage spikes above 135MVA are likely to be sporadic rather than persistent and (2) that the proposal potentially introduces long-term environmental hazards to Greenwich, e.g., the bentonite slurry being released into Greenwich water ways and the Long Island Sound

Response:

Please see section ES.2, E.1, and E.4 of the Greenwich Substation and Line Project Application for information concerning the need for and benefits of the Project. The proposed Project would provide 135 MVA of capacity at an estimated cost of $140 million, or approximately $1 million per MVA which is a prudent and cost effective payment to serve the long-term needs of the electric customers in Town of Greenwich.

Please see the Company's responses to CSC-02, Q-CSC-009 and OCC-03, Q-OCC-039 for information concerning dielectric fluid and bentonite slurry.