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March 11, 2005

BY HAND AND ELECTRONIC MAIL
Chairman Pamela B. Katz
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

Re: Docket No. 272 - Joint Application of The Connecticut Light and Power Company and The United Illuminating Company for a Certificate of Environmental Compatibility and Public Need for a 345-kV Electric Transmission Line Facility and Associated Facilities Between Scovill Rock Switching Station in Middletown and Norwalk Substation in Norwalk

Dear Chairman Katz:

On behalf of ISO New England Inc. ("ISO"), we are filing herewith an original and 20 copies of ISO's Proposed Findings of Fact in the above-referenced docket. The Proposed Findings of Fact attached hereto are also being filed with the Connecticut Siting Council and distributed to the service list electronically.

Please contact Mr. Macleod or me if you have any questions or need additional information.

Sincerely,

John T. Shaban

cc: Matthew F. Goldberg, Esq.
Service List

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

NORTHEAST UTILITIES SERVICE COMPANY APPLICATION TO THE CONNECTICUT SITING COUNCIL FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED ("CERTIFICATE") FOR THE CONSTRUCTION OF A NEW 345-KV ELECTRIC TRANSMISSION LINE FACILITY AND ASSOCIATED FACILITIES BETWEEN SCOVILL ROCK SWITCHING STATION IN MIDDLETOWN AND NORWALK SUBSTATION IN NORWALK, INCLUDING THE RECONSTRUCTION OF PORTIONS OF EXISTING 115-KV AND 345-KV ELECTRIC TRANSMISSION LINES, THE CONSTRUCTION OF BESECK SWITCHING STATION IN WALLINGFORD, EAST DEVON SUBSTATION IN MILFORD, AND SINGER SUBSTATION IN BRIDGEPORT, MODIFICATIONS AT SCOVILL ROCK SWITCHING STATION AND NORWALK SUBSTATION, AND THE RECONFIGURATION OF CERTAIN INTERCONNECTIONS	**DOCKET NO. 272** **MARCH 11, 2005**

PROPOSED FINDINGS OF FACT OF ISO NEW ENGLAND INC.

ISO New England Inc. ("ISO") is not submitting a complete set of proposed Findings of Fact in the above-referenced docket, as it has not participated fully in all issues presented therein, but ISO instead proposes that the following Findings be included in the Council's Findings of Fact in this proceeding:

Project and Project Area

1. The electric system in the Southwest Connecticut sub-area ("SWCT") of the New England bulk power system consists of facilities in the following towns: Bridgeport, Darien, Easton, Fairfield, Greenwich, New Canaan, Norwalk, Redding, Ridgefield, Stamford, Weston, Westport, Wilton, Ansonia, Branford, Beacon Falls, Bethany, Bethel, Bridgewater, Brookfield, Cheshire, Danbury, Derby, East Haven, Hamden, Meriden, Middlebury, Milford, Monroe, Naugatuck, New Fairfield, New Milford, New Haven,

Newtown, North Branford, North Haven, Orange, Oxford, Prospect, Roxbury, Seymour, Shelton, Sherman, Southbury, Stratford, Trumbull, Wallingford, Waterbury, Watertown, West Haven, Woodbridge and Woodbury. Because the boundaries of the SWCT electric system are defined by electrical interfaces with other portions of the transmission system (as opposed to municipal boundaries), portions of some of the towns referenced above are outside of the SWCT electric system. (CSC Admin Notice 15, FF 20)

2. While the Application presented several alternatives, the preferred alternative proposed by the Applicants consists of a 69 mile long transmission facility, together with associated substation and equipment upgrades, consisting of 45 miles of overhead 345 kV transmission line in segments 1 and 2 between the Beseck and East Devon substations and 24 miles of underground cable in segments 3 and 4 between the East Devon and Norwalk substations (the "Project"). The cable technology originally proposed was HPFF, which has a higher capacitance than XLPE. Segments 1 and 2 will have a single overhead circuit and segments 3 and 4 will have two underground circuits. In proposing 24 miles of underground cable, the Applicants believed, at the time they submitted the Application, that they had proposed the maximum amount of cable that could be employed in the Project. (App. Ex 1; 4/20/04 Tr. 22-23)

Project Conformity to Long Range Plan for Expansion of Electric Power Grid

3. The SWCT area was self-sufficient of generating capacity up to 1970. Since 1970, electric power necessary to meet demands in the area must be transmitted from power sources outside the area. (CSC Admin Notice 15, FF 22; CSC Admin Notice 10, FF 26)

4. The SWCT transmission system is approaching maximum load capacity. The load growths of the early 1970's indicated a 345-kV loop would be necessary. However, the lower load growth experienced in the late 1970's and early 1980's could probably defer the need for a 345-kV supply into SWCT by the use of high capacity 115-kV lines through the late 1990's, after which the 345-kV line would need to be implemented. (CSC Admin Notice 15, FF 27;CSC Admin Notice 11, FF 27; CSC Admin Notice 12, FF 18; CSC Admin Notice 11, Opinion, p. 3; CSC Admin Notice 14, FF No. 15)

5. In July 2000, the DPUC rendered a decision in Docket No. 99-08-01, DPUC Investigation into Electric Capacity and Distribution identifying SWCT as having operational difficulties and a near term need to reinforce the transmission and distribution system. Since that time several electric events have threatened system reliability. Therefore, in March of 2002, the Connecticut legislative committee on Energy and Technology directed the DPUC to conduct an investigation into possible shortages of electricity in SWCT during summer periods of peak demand. The DPUC determined that the reliability to the SWCT area is vulnerable because of inadequate local generation and transmission capability. To reduce the possibility of outages, both the ISO-NE and local transmission and distribution companies must maximize, in the short term, conservation and load management and load response programs, implement emergency generation, and increase capacity to the local transmission and distribution system. (CSC Admin Notice 15, FF 28)

6. The 345-kV system is considered the "backbone" of the electric utility system grid of New England. The 345-kV system is used to efficiently transmit large amounts of electricity over long distances from major generating plants in New England, New York State, and Canada to 345/115-kV step down substations near load centers. In other regions of the United States, higher EHV voltages, such as 500-kV and 765-kV are used as the regional "backbone." (CSC Admin Notice 15, FF 30, 32; CSC Admin Notice 5, FF 9)

7. Electric energy on Extra High Voltage ("EHV" cables capable of transmitting 230,000 to 500,000 volts) lines, such as 345-kV, moves much more freely at high voltages and low currents than at lower voltages and higher currents. EHV lines are used to transport power efficiently for long distances, and to deliver that power to lower voltage lines, such as 115-kV, for local transmission. (CSC Admin Notice 15, FF 31).

8. CL&P's existing 345-kV facilities include three transmission lines that connect to other utilities serving New England and New York State. The three transmission ties are the 347 circuit between the Lake Road Generating substation in Killingly and the Sherman Road substation in Rhode Island connecting with the New England Power Company grid; the 395 circuit between the Manchester substation in Manchester and the Ludlow substation in Massachusetts connecting with the Western Massachusetts Electric Company grid (a subsidiary of NU), and the 398 circuit between Long Mountain switching station and Pleasant Valley substation in New York connecting to the ConEdison company grid. (CSC Admin Notice 15, FF 33)

9. Southwest Connecticut is the most critical load pocket in New England. The Regional Transmission Expansion Plan issued in October, 2001 ("RTEP01") identified the system in Southwest Connecticut as having severe reliability problems whenever the largest single generation source in the SWCT sub-area is unavailable. RTEP02 recommended proceeding with 345 kV Phases I and II transmission upgrades to SWCT (*Id.* at Section 1.3.1, p. 14), and the Executive Summary of RTEP03 indicated that in spite of recent local improvements, the most urgent system reliability need in New England continues to be in the SWCT and Nor-Stam sub-areas (RTEP03, Section 5.4.5, p.32), again warning that the existing transmission system in Southwest Connecticut can neither provide for significant generation expansion nor fully utilize the area's generating resources during times of need. RTEP03 expressed support for the approval of a 345 kV line from Middletown to Norwalk. (ISO Ex. 1, pp. 10, 12; ISO Admin Notice 9, pp. 9; CSC Admin Notice 30, p.7; ISO Admin Notice 10, pp. 14-16)

10. In 2003, the Council approved a 345 kV transmission upgrade between CL&P's Plumtree substation in Bethel and its Norwalk substation. (CSC Admin Notice 15)

11. In its Connecticut Energy Plan Framework: Recommended Solutions and Actions for the State of Connecticut, January 4, 2005 (Report to Connecticut Energy Advisory Board), ISO has reported to the CEAB that the Project, along with the Phase I upgrade approved in Docket No. 217, is identified by RTEP04 as the long-term solution to the

reliability problems and the growing electricity demand in Southwest Connecticut. (CSC Admin Notice 30, p. 18)

12. Significant delays in the transmission upgrades, beyond the 2004-2007 period when the Southwest Connecticut RFP resources are available, will result in a serious shortfall of resources necessary to reliably meet increasing demand for electricity. (CSC Admin Notice 30, p.7)

Reliability

13. Before the deregulation of the electric industry in 1998, the Applicants were responsible for both generation and transmission of electricity. Now, as then, transmission reliability must meet standards set by the North American Electric Reliability Council (NERC), Northeast Power Coordinating Council (NPCC) and New England Power Pool (NEPOOL). Such tests for transmission contingencies include various dispatch scenarios, including multiple generation units and/or transmission lines being unavailable in a local area, thereby stressing area transmission interfaces to a greater degree. (CSC Admin Notice 15, FF 34)

14. Reinforcements of the existing 115-kv system in SWCT have increased capacity and reliability in SWCT and thereby deferred extension of the 345-kV system into SWCT. Between the mid-70's and 2002, there have been over 30 transmission line projects within the SWCT area that have increased several existing transmission line current carrying capabilities via increased clearances and larger conductors. Substation work included upgrading or replacement of breakers, capacitors or adding reactors. (CSC Admin Notice 15, FF 35, 36)

15. ISO was established to be the Independent System Operator of the New England bulk power grid on July 1, 1997. <u>New England Power Pool, Order Conditionally Authorizing Establishment of an Independent System Operator and Disposition of Control Over Jurisdictional Facilities</u>, 79 FERC ¶ 61,374 (1997). In June, 2001, FERC conferred authority on ISO to be responsible for the regional transmission planning process. <u>ISO New England Inc. & New England Power Pool, Order On Rehearing Requests and Compliance Filings</u>, 95 FERC ¶ 61384 (2001). In June 2003, FERC confirmed ISO's authority to approve planning for upgrades and changes to supply and demand-side resources. <u>New England Power Pool & ISO New England Inc.</u>, 103 FERC ¶ 61,304 (2003) (accepting October 2001 compliance filing as to the directive regarding Sections 18.4 and 18.5 of the Restated NEPOOL Agreement, and stating that "[w]e are persuaded by ISO-NE's arguments that it is the appropriate authority to approve planning for transmission upgrades and changes to supply and demand-side resources."). (ISO Ex 1, p. 5; ISO Admin Notice 2; ISO Admin Notice 4; ISO Admin Notice 5)

16. ISO is responsible for managing the New England region's bulk electric power system and conducting centralized system planning and its responsibilities include independently operating and maintaining a highly reliable bulk transmission system. ISO must maintain a level of system reliability that meets criteria established by NEPOOL,

the Northeast Power Coordinating Council ("NPCC") and the North American Electric Reliability Council ("NERC"). (ISO Ex 1, p.6; ISO Admin Notice 2; ISO Admin Notice 4; 3/23/04 Tr. 116-117)

17. ISO considers electricity service in the southwestern region of Connecticut to be unreliable because under current assumptions about electric demand growth and available generation in the area, the existing transmission system is incapable of importing sufficient amount of electricity into and moving it reliably within the region. As a result, there are an unacceptable number of violations of the NEPOOL Reliability Standards when the system is tested and modeled in accordance with those Standards. Transmission system inadequacies could also hamper new generation from addressing growing load in the region. Transmission system reinforcements are required to enable consumers of electricity in that part of the state to receive reliable electricity service in accordance with regional reliability standards. (ISO Ex. 1, pp. 3, 13-14)

18. ISO's concerns regarding the reliability of the SWCT system include thermal overloading of transmission lines, poor voltage performance, potential voltage collapse, and high short circuit current levels. (ISO Ex. 1, p. 21; 3/23/04 Tr. 125)

19. The massive outage which struck the North American electric power system on August 14, 2003, caused the loss of approximately 2,500 MW of load in New England, including much of Southwest Connecticut, which was blacked out for up to twelve hours. No other part of the New England system was affected as seriously or lost so much load. (ISO Ex. 1, pp. 7, 16)

20. Peak demand in SWCT significantly exceeds the total amount of local generation. As a result, this region of Connecticut is highly dependent on power imports and is critically dependent on a 138-kV transmission line from Long Island, New York in the event of severe demands for electricity. This 138-kV line has, however, been unavailable for prolonged periods of time. The amount of electricity that the existing transmission system can import from other areas and transmit within the southwestern region of Connecticut is limited, creating an unacceptable risk of failure under NEPOOL Reliability Standards. (ISO Ex. 1, pp. 3, 13-15)

21. SWCT currently faces a potential shortage of up to 300 MW. Because the proposed Project is not scheduled for completion until December 2007 or later, ISO has taken other actions to address SWCT reliability concerns in the interim, including the issuance of a Gap RFP in December 2003 for 300 MW of generation resources, demand response resources or peak-load reducing Conservation and Load Management projects for up to four and possibly five years to provide temporary relief until the 345-kV project is complete. Without these emergency actions, Southwest Connecticut would be short of capacity today. (CSC Admin Notice 30, p.7; ISO Ex. 1, p. 32; 3/23/04 Tr. 122)

22. For reliability purposes, the integrated 345-kV system is constructed in a series of "loops," so that if interruption occurs on one of the lines to an area served by a loop system, service can still be provided to the area from the other end of the loop.

Accordingly, the existing 345-kV system includes several interconnected loops within Connecticut, and portions of loops that extend beyond Connecticut into Rhode Island, Massachusetts, and New York. Most of the load centers and generation in the eastern and central parts of Connecticut are connected to loops on the 345-kV transmission grid, which consists of approximately 400 miles of overhead 345-kV transmission lines. (CSC Admin Notice 15, FF 39)

23. The proposed Project, along with the 345 kV transmission upgrade approved in Docket No. 217, constitutes a full 345 kV transmission upgrade loop designed to increase the ability to import power into Southwest Connecticut to levels adequate to meet demand and reserve requirements and accommodate generation expansion in Southwest Connecticut. The Bethel-Norwalk line approved in Docket No. 217 and the Middletown-Norwalk Line proposed in this docket are sometimes referred to, respectively, as Phase I and Phase II of the full 345 k V loop. (CSC Admin Notice 30, p.7)

24. All the generation located in SWCT cannot be operated at the same time because of the inadequacy of the 115-kV transmission system. The 345-kV loop will "unlock" this generation. A 345-kV loop will allow generation to be taken off the 115-kV system, thereby reducing short-circuit duty and power flows on that system and allowing the addition of more generation. (CSC Admin Notice 15, FF 43)

25. Completion of the full 345 kV loop is necessary to address the reliability problems in this area and addresses those problems more completely than other transmission or non-transmission alternatives studied by ISO. (ISO Ex. 1, p. 4)

26. Without the 345 kV Loop, bulk system reliability criteria cannot be met, cascading blackouts could occur, and system operators will need to resort to "pre-cautionary" load shedding to maintain overall grid stability. (ISO Ex. 13, p.2; 1/11/05 Tr. 23-24.)

27. ISO identified the 27,700 MW New England load level as a reasonable load level to use in planning the 345 kV full loop transmission additions. The New England peak load has increased by 20 percent over the last ten years, and if it grows as expected at a compound annual growth rate of 1.5 to 2.0 percent per year, a 27,700 MW peak would be reached between 2006 and 2008. (CSC Admin Notice 15, FF 41; ISO Ex 1, 21)

28. The Southwestern Connecticut Reliability Study, a series of SWCT system reports and analyses conducted from January 2002 through February, 2004, indicated that while system performance improves at the design peak load level of 27,700 MW with the installation of the 345 kV line from Bethel to Norwalk, significant thermal overloads and voltage violations continue to exist following construction of this line. The Phase I Report therefore concludes that even after installation of the Bethel to Norwalk upgrade, the SWCT electric power system would not meet regional reliability performance standards as modeling indicates that 276 contingency overloads would occur on 40 lines and there would be 17 non-convergent contingencies. A non-convergent contingency is

one for which there is no mathematical solution, and it signals the potential for voltage collapse. The results of the system modeling are summarized below:

Case	Normal Overloads	Contingency Overloads	Voltage Violations	Nonconvergent Contingencies
Base	36	82	31	54
With CL&P Phase I 345-kV Line	4	40	0	17

(ISO Ex. 1, pp. 18-19; CSC Admin Notice 15, FF 40; ISO Ex. 5, p. 9, Tables 6-7; 3/23/04 Tr. 106-107)

29. The Southwestern Connecticut Reliability Study (Comparison Study), which assumed an overhead project with no underground lines, showed no voltage violations when the Phase I line was modeled as part of a full 345 kV loop which would continue from Norwalk to Middletown, but that Study assumed an overhead project with no underground lines so its conclusions do not necessarily apply to a combination overhead/underground loop from Bethel to Norwalk to Middletown. (ISO Ex. 1, p. 19; ISO Ex. 5, p. 9, Tables 6-7; ISO Ex. 8, pp. 4-5; 3/23/04 Tr. 106-107; 6/17/04 Tr. 37-39)

30. There is consensus on the need to build the transmission facility from Middletown to Norwalk to ensure the continued provision of reliable electric service to Connecticut customers. (CSC Ex. 24, p. 7)

Costs

31. Since 1997, the cost of transmission facilities in New England deemed to provide a regional benefit has been paid for on a New England-wide basis. (CSC Admin Notice 15, FF 47)

32. Cost allocation treatments for various categories of upgrades are now set forth in Schedule 12 of Section II of the Tariff. These categories include RTEP02 Upgrades and Regional Benefit Upgrades. The Project is identified as an RTEP02 Upgrade in Schedule 12B of Section II of the Tariff, but to qualify for regional cost support as an RTEP02 Upgrade, the Project would need to be in service by December 20, 2007. Alternatively, the Project may qualify for regional cost support as a Regional Benefit Upgrade, as defined in Section II.1.117 of the Tariff if it is not in service until after December 20, 2007. (ISO Admin Notice 12, Section II.1.117, Section II, Schedules 12 and 12B; 3/23/04 Tr. 128-129)

33. Under Section II.1.117 of the Tariff, a Regional Benefit Upgrade may be either a Reliability Transmission Upgrade or a Market Efficiency Transmission Upgrade. Under Section II.1.125 of the Tariff, a Reliability Transmission Upgrade is a transmission

upgrade not required by the interconnection of a generator that is nonetheless necessary to ensure the continued reliability of the New England Transmission System, taking into account load growth and known resource changes, and including an upgrade necessary to provide acceptable stability response, short circuit capability and system voltage levels, and those facilities required to provide adequate thermal capability and local voltage levels that cannot otherwise be achieved with reasonable assumptions for certain amounts of generation being unavailable (due to maintenance or forced outages) for purposes of long-term planning studies. Good Utility Practice, applicable reliability principles, guidelines, criteria, rules, procedures and standards of NERC and NPCC, applicable local reliability criteria, and the ISO System Rules will be used to define the system facilities required to maintain reliability in evaluating proposed Reliability Transmission Upgrades. (ISO Admin Notice 12, Sections II.1.117, II.1.125)

34. Assets that are determined to qualify as Pool Transmission Facilities (PTF) qualify for regional cost support as pool-supported PTF. Under the current rules, Connecticut customers will pay approximately 27% of the project to the extent that it qualifies for regional cost support from all wholesale customers in New England. (CSC Admin Notice 15, FF 47, 51; ISO Admin Notice 12, Schedule 12).

35. Even if the Project qualifies for regional cost support, Localized Costs would not be included in the Pool-Supported PTF costs recoverable under the Tariff. The entity or entities causing or subject to Localized Costs related to any RTEP02 Upgrades and any Regional Benefit Upgrades would be responsible for such Localized Costs. The ISO, in accordance with Schedule 12C of Section II of the Tariff, must review RTEP02 Upgrades and Regional Benefit Upgrades and identify any Localized Costs associated with them. The Project has not yet been submitted to the ISO for determination regarding costs under the Schedule 12 or Schedule 12C (ISO Admin Notice 12, Section II, Schedule 12; 3/23/04 Tr. 147; 6/17/04 Tr. 37)

36. Section II.1.63 of the Tariff defines "Localized Costs" as "the incremental costs resulting from a RTEP02 Upgrade or a Regional Benefit Upgrade that exceeds those requirements that the ISO deems reasonable and consistent with Good Utility Practice and the current engineering design and construction practices in the area in which the Transmission Upgrade is built." Prior to any recovery of costs under the Tariff associated with an RTEP02 Upgrade or a Regional Benefit Upgrade, the ISO, with appropriate advisory input from the NEPOOL Reliability Committee, shall review such Transmission Upgrade, and determine whether there are any Localized Costs resulting from such Transmission Upgrade. Section II.1.63 further provides that in determining whether Localized Costs exist, the ISO will consider, in accordance with Schedule 12C of the Tariff, the reasonableness of the proposed engineering design and construction method with respect to alternate feasible Transmission Upgrades and the relative costs, operation, timing of implementation, efficiency and reliability of the proposed Transmission Upgrade. (ISO Admin Notice 12, Section II, Schedule 12C)

37. There is a risk that the proposed line's entire cost will not be "socialized" over all New England customers if the line is not built overhead, as described in RTEP02, or if it

exceeds those requirements the ISO deems reasonable and consistent with Good Utility Practice, as defined in Section II.1.35 of the Tariff. Socialized treatment has in the past been approved in New England for the costs of putting transmission facilities underground in urban areas where overhead facilities are more costly or not feasible. (CSC Admin Notice 15, FF 52; ISO Admin Notice 12, Section II.1.35; 3/23/04 Tr. 140-141, 144)

38. The SWCT area lacks major 345-kV transmission resources that can meet the expected peak demands. The SWCT area is a "load pocket," which is isolated from approximately 400 miles of 345-kV transmission facilities in the state and much of the available lower cost power generated from within the state and the surrounding region. In order to maintain a reliable power supply, the limited generation resources in the SWCT area must run under many system operating conditions, while other lower cost generators inside and outside of Southwestern Connecticut cannot operate because of limitations on the 115-kV transmission system. (CSC Admin Notice 15, FF 55)

39. There are several different kinds of direct costs and other economic penalties associated with transmission constraints, including the following: "reliability must run" ("RMR") contracts, by which less efficient plants are guaranteed an above-market return in exchange for their commitment to run when required for reliability purposes; costs of procuring emergency peak reduction measures and temporary generating capacity to cover a gap between resources and anticipated peak demand, through a Gap RFP; congestion costs; and higher costs of running uneconomic generating units within a constrained area than would be paid to competitive out-of-area generators. Annual transmission inefficiency costs for Connecticut for 2005 are estimated to be:

RMR Agreements (in effect and pending):	$240 Million*
Gap RFP:	33 Million
Congestion:	4 Million
Running uneconomic generators:	31 Million
Total:	$308 Million

(CSC Admin Notice 15, FF 58; ISO Ex. 13, p.3; 1/11/05 Tr. 24-26)

40. Many, but not all, of the transmission inefficiency costs would be eliminated if the Project were installed. Further transmission upgrades, including the Southern New England Reliability Project, which will enhance Connecticut's import capability, will be needed in the future to address remaining transmission problems elsewhere in Connecticut. (2/17/05 Tr. 86-88).

41. Applicants estimate that the cost to construct the proposed Project pursuant to Case 5 (24 miles of underground cable in segments 3 and 4) will range from $837 million to $993 million. These are preliminary estimates based only on conceptual engineering plans and on an imperfect knowledge of field conditions. These costs do not include

costs to upgrade surge arrestors, which could range from $7 to $10 million. (App. Ex. 172, pp. 2-5)

Generation

42. Constraints on the existing 115-kV system do not allow the concurrent operation of all existing generation units in SWCT. Units in Milford and Devon cannot currently operate at the same time because of transmission inadequacies. (CSC Admin Notice 15, FF 89; 3/23/04 Tr. 123-124; 6/17/04 Tr. 35)

43. The age and condition of generators in the SWCT area is a concern, and financial considerations may result in retirement of generating units. (ISO Ex. 1, 29)

44. The ability to connect new generation to the existing 115-kV system in this area is severely limited by a combination of thermal, voltage, stability and short-circuit constraints. There would have to be significant modifications and upgrades to the transmission infrastructure to add additional generation. (CSC Admin Notice 15, FF 90).

45. The current excess supply of generation in New England has made it difficult for developers of generation plants to obtain financing for the construction of new plants. This difficulty in obtaining financing would also hinder the ability of developers to acquire existing plants in Norwalk-Stamford and build new plants on the sites. (CSC Admin Notice 15, FF 93)

46. Even if new generation plants were to be built, the construction of new generation, without transmission upgrades, is not a complete alternative to the 345 kV loop (CSC Admin Notice 15, FF 91).

47. As the load increases in the SWCT, reliance on any particular local generator precludes reliance on other local generators due to constraints on the transmission facilities, and this situation worsens with load growth to the point at which nearly any and every combination of local area generation outputs and power imports results in violations of NEPOOL Reliability Standards. This can result in an unacceptable likelihood of load being shed in order to avoid equipment damage or a possible cascading outage that results in a significant blackout. (ISO Ex. 1, p. 30)

Proposed Transmission Alternatives

HVDC

48. The use of Voltage Source Converter-HVDC ("VSC-HVDC") in Southwest Connecticut would require an unprecedented number of converter stations in one portion of a system, converter stations of a size not yet used anywhere, and control technologies that are still in their infancy and that have never been employed in the middle of a 3,500 MW load center with limited transmission infrastructure and capacity. It would also demand extremely complex and impractical operating procedures given the complexities

of power flow on the AC system in Southwest Connecticut. (App. Ex. 164, p. 8; 1/13/05 Tr. 231)

49. There are 13 system reliability and operability criteria that the Project must meet, and the VSC-HVDC proposal does not meet many of them. (App. Ex. 164, pp. 9-13)

50. In addition to the unacceptable operating complexity introduced by HVDC, the ISO's modeling of conventional HVDC between Beseck and East Devon indicates unacceptable thermal conditions for such a project, as three contingency overloads that occurred for the HVDC plan that did not occur for the Applicants' Proposal. An all-lines-in transfer limit analysis for identical generation conditions favored the Applicants' Proposal by 225 MW, suggesting a 3 to 4 year shorter lifetime for the HVDC Plan, and ISO's line-out transfer limit analysis demonstrated that the Applicants' Proposal had transfer limits that were 700 to 2200 MW higher than the HVDC Plan, most notably when 345kV lines in the Southington area were not in service. (ISO Ex. 12, p. 3)

51. Conventional HVDC could also worsen harmonic resonance problems in SWCT because the filtering systems of the converter stations for conventional HVDC technology would add more capacitance to the system while at the same time failing to increase system strength. (ISO Ex. 12, pp. 3-4)

52. HVDC is not readily expandable for either the integration of load stations or versatility in generation interconnection and operation. (ISO Ex. 12, p. 4)

53. The use of VSC HVDC technology would not be technologically feasible for the Project because it would add unacceptable complexity to the system, require reliance on unproven operating procedures and control technology, prohibit the installation of new merchant generation unless VSC HVDC terminals were incorporated into the generator lead, limit future expansion of the electric grid to serve customer load, and render the backbone of the SWCT transmission system dependent on new technology available only from one source. Moreover, the Applicants estimate that the full cost of the VSC HVDC proposal would be approximately double the cost of the Applicants' proposed Project alternative (Case 5 with XLPE). Finally, because HVDC operates differently than AC facilities, the design would face great challenges from NEPOOL Participants with respect to receiving regional cost support. (CSC Ex. 24, pp. 6-7; App. Ex. 176, p. 9)

54. There is no adequate assurance that system control scheme software programs, which would need to be used to implement security-constrained dispatch, can be designed, engineered and constructed with the ability to respond to outages on either the VSC HVDC or AC system in a timely manner and effect changes to the system such that it is secure for any possible subsequent event. The operational complexity is huge; the consequences of a problem are significant; and the reliability risk to SWCT is too great. (App. Ex. 176, p. 31; 1/13/05 Tr. 71, 240-242, 244-245)

Gas Insulated Lines

55. Although gas insulated transmission line ("GIL") underground technology has been in existence for over thirty years, utilities have not adopted it for common use in long distance transmission lines, and there is no utility experience or established industry database on its use in such an application. It is used primarily for short tie lines and distances of two miles or less in circumstances where access can be controlled. GIL would not be an appropriate substitute for the proposed line or any portions of it that would be accessible by the public. It is not considered a viable option for this Project. (CSC Ex. 25, p. 3; 2/17/05 tr. 65; CSC Admin Notice 15, FF 127)

East Shore Alternative

56. The East Shore Alternative is not an acceptable substitute to the proposed Project because it does not meet NERC, NPCC, or NEPOOL criteria. It does not strengthen the power supply into SWCT by introducing a new source; it simply connects the load in SWCT to an already heavily loaded 387 line. Even with reconductoring of the limiting portion of the 387 line, the line continues to overload. In addition, an extended outage of this line yields substantial overloads on the remaining corridors serving SWCT and the 345-kV across the state. (ISO Ex. 1, pp. 31-32)

General Reliability Concerns and Considerations

57. ISO expressed reliability-based concern over the amount of cable proposed for the Project in March, 2004, at which time the Applicants and ISO were still working on resolving capacitance and harmonics issues related to the Project as proposed. In June, ISO indicated that these concerns had not been satisfactorily resolved and that it could not support a project which caused the system to operate below the third harmonic level unless practical and effective mitigation measures were available. (ISO Ex. 1, pp. 20, 26-27; 3/23/04 Tr. 153-156; ISO Ex. 8, pp. 6, 11-12; 6/17/04 Tr. 52)

58. In June, 2004, the Applicants and ISO formed the Reliability and Operability Committee ("ROC") to study modifications to the Project that would maximize the linear length of underground cable along the route but still enable the Project to meet operability and reliability requirements and system need and be supported by the ISO in the approval process under Section 18.4 of the Restated NEPOOL Agreement, recognizing that such support would not be a guarantee of approval under said process. Section 18.4 is now Section I.3.9 of the Transmission, Markets and Services Tariff, FERC Electric Tariff No. 3 (the "Tariff"). (App. Ex. 147; ISO Admin Notice 12, Section I.3.9)

59. Under Section I.3.9 of the Transmission, Markets and Services Tariff, FERC Electric Tariff No. 3, (the "Tariff") (formerly Section 18.4 of the Restated NEPOOL

Agreement), each Transmission Owner shall submit to the ISO any new or materially changed plan for additions to, or changes in, the capacity of any transmission facilities rated 69 kV or above subject to control of such Transmission Owner which may have a significant effect on the stability, reliability or operating characteristics of the Transmission Owner's transmission facilities, the transmission facilities of another Transmission Owner, or the system of a Market Participant. No significant action (other than preliminary engineering action) leading toward implementation of the plan shall be taken for up to ninety days after the plan has been submitted to the ISO. Unless ISO notifies the Transmission Owner in writing that implementation of the plan will have a significant adverse effect upon the reliability or operating characteristics of the Transmission Owner's transmission facilities, the transmission facilities of another Transmission Owner, or the system of a Market Participant, the Transmission Owner shall be free to proceed. The approval required under Section I.3.9 of the Tariff, which became effective when ISO became a Regional Transmission Organization on February 1, 2005, is the same approval that had previously required under Section 18.4 of the Restated NEPOOL Agreement to assure that no proposed major system upgrade would have an adverse impact on the bulk power grid. (ISO Admin Notice 12, Section I.3.9; App. Ex. 147; 3/23/04 Tr. 139)

60. Under Section I.3.10. of the Tariff (formerly Section 18.5 of the Restated NEPOOL Agreement), if the ISO gives notice pursuant to Section I.3.9 that implementation of a Transmission Owner's plan has been determined to have a significant adverse effect upon the reliability or operating characteristics of the Transmission Owner's transmission facilities, the transmission facilities of another Transmission Owner, or the system of one or more Market Participants, the Transmission Owner shall not implement such plan unless the Transmission Owner takes such action or constructs at its expense such facilities as the ISO determines to be reasonably necessary to avoid such adverse effect. (ISO Admin Notice 12, Section I.3.10)

61. Under Section I.3.2 of the Tariff, each Market Participant shall, to the fullest extent practicable, cause all of the Assets it owns or operates to be designed, constructed, maintained and operated in accordance with Good Utility Practice and the provisions of this Tariff, the ISO New England Operating Procedures, and the ISO New England Planning Procedures. (ISO Admin Notice 12, Section I.3.2)

62. "Good Utility Practice" is defined in Section II.1.35 of the Tariff as "[A]ny of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the Proposed Project decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather includes all acceptable practices, methods, or acts generally accepted in the region." (ISO Admin Notice 12, Section II.1.35)

63. Good Utility Practice and applicable reliability criteria of NERC, NPCC and ISO System Rules are used to define the system facilities required to maintain reliability in evaluating proposed Reliability Transmission Upgrades. (ISO Admin Notice 12, Sections II.1.117, II.1.125)

SWCT System and System Characteristics

64. System strength is a measure of short-circuit capacity. Strong systems have lots of generators and tightly interconnected grid (low impedance). Weak systems have fewer generators and longer isolated transmission paths (high impedance). (App. Ex. 109, p. 5; App. Ex. 176, pp.14-15)

65. SWCT has an electrically weak system. There are relatively few generation resources in the immediate vicinity where the load is concentrated, and there are fewer strong transmission paths from outside sources to the area of load concentration. (App. Ex. 176, pp.14-15; 3/23/04 Tr. 125)

66. Capacitance is the property of storing electric charge. Capacitance of cable is much larger than overhead line, and capacitance increases as the length of underground cable increases. Typically, 345 kV overhead line has 0.9 MVAR per mile. HPFF cable has 18 to 21 MVAR per mile and XLPE cable has 10 to 12 MVAR per mile. (CSC Ex. 9, p. 7; App. Ex. 110, p. 3; CSC Admin Notice 15, FF 137, 138)

67. Connecticut's existing transmission system is already a high capacitance system. Power imports necessitated by the combined effect of generation retirements, generation shutdowns and load growth in the 1990s caused losses and voltage drops on the transmission system. The principal limitation on Connecticut import limits was voltage, and to address these voltage limitations and increase Connecticut import limits, the Applicants installed a significant number of fixed shunt capacitors at substations throughout the state and additional capacitors in SWCT to "prop up" the SWCT transfer limits to maintain the Connecticut import limits. (App. Ex. 44, CSC-28, pp. 3-4; App. Ex. 176, pp. 14-15)

68. Connecticut's existing transmission system has a far greater amount of capacitance relative to the strength of the bulk power system than all other power systems in the region, even before adding any capacitance associated with the underground cables to be installed on the Bethel to Norwalk Project approved in Docket No. 217 and the Middletown to Norwalk Project proposed in this Docket. (App. Ex. 44, CSC-28, pp. 3-4)

69. Assuming construction of the Plumtree-Norwalk 345 kV transmission upgrade approved in Docket No. 217, the SWCT system would operate below the third harmonic level at times when capacitor banks are on. The addition of large amounts of cable to the weak CT system will move resonances toward the second harmonic, increasing the risk of sustained overvoltages. (App. Ex. 44, CSC-28, p. 5; App. Ex. 110, p. 8; 6/15/04 Tr. 27)

Harmonics and Transients Issues

70. GE Power Systems Energy Consulting ("GE") has performed several switching transient and harmonic studies of the Northeast Utilities (NU) Phase I and Phase II 345 kV transmission cable project that is proposed in southwestern Connecticut. (App. Ex 25.f, pp. 1-1)

71. High capacitance in a relatively weak system is of great concern because of its effect on harmonics. (App. Ex. 44, CSC-28, pp. 3-4)

72. Sixty cycles per second (Hz) is the normal operating frequency for electricity in the United States. The 60 cycle frequency is known as the "fundamental frequency". Power system harmonics are multiples of the fundamental frequency. For example, the second harmonic has a frequency of 120 Hz and the third harmonic has a frequency of 180 Hz. Power systems generally have resonances above the fifth harmonic, so there is usually little risk that lower order (e.g., second to fifth) harmonic frequencies will be amplified to the detriment of customer and utility equipment. (App. Ex. 44 CSC-28, pp. 3-4; App. Ex. 109; App. Ex. 176, p. 14)

73. Harmonic screening studies performed by GE in its Connecticut Cable Transient and Harmonic Feasibility Study Final Report, March 2003, indicate that the large shunt charging capacitance of the 345 kV cable system in SWCT, interacting with the system inductances, inherently results in resonances at low-order harmonic frequencies which can potentially amplify the ambient distortion to unacceptable levels. Resonances below the third harmonic are seen throughout the Project area. Harmonic currents may also add to the heating of the cable, and potentially constrain cable loadability. (App. Ex. 7, Att. B, p. E-1; App. Ex 25.f, pp. 2-6, 4-1, 4-4)

74. Resonances at low-order harmonics are of particular concern because substantial harmonic currents typically exist at these lower orders, primarily resulting from normal switching events, but also injected into the system by ordinary nonlinear loads such as discharge lighting, consumer computers and electronic equipment, and industrial drive systems. These resonances will shift around with varying system strength, greatly enhancing the probability that the system resonant frequencies will from time to time coincide with the low order harmonic frequencies existing in the SWCT system. Resonances coincident with a driven harmonic result in significant amplification of harmonic voltage and current distortion. (App. Ex. 7, Att. B, pp. E-1, E-2, 6-1; App. Ex. 44 CSC-28, pp. 3-4; App. Ex. 109)

75. Voltage distortion could propagate down to the consumer level, having a detrimental effect on power quality. Harmonic currents and voltages amplified by resonances can damage utility equipment and cause misoperation. Thus, power system designers seek to avoid resonance at lower order harmonic frequencies. (App. Ex. 7, Att. B, pp. E-1, E-2, 6-1; App. Ex. 44 CSC-28, pp. 3-4; ISO Ex. 10, p. 21)

76. Operation below the third harmonic level is undesirable because it can create power quality problems, voltage instability, including voltage spikes, can damage customer and utility equipment and can lead to voltage collapse and outages. (App. Ex. 109; ISO Ex. 10, pp. 10-11)

77. Harmonics below the third harmonic are difficult to mitigate as they result in impractical complex and large filter design. Means of reducing the capacitance on the system and therefore increasing the frequency at which resonance occurs to higher order harmonics which can be filtered should be considered. (ISO Ex. 10, p. 10)

78. Underground transmission cable has different electric characteristics and much larger capacitance than overhead transmission line. As the length of underground cable increases, so do the variables that must be considered. Studies show high sensitivity to load levels, load types, amounts of capacitance, generation and other factors, demonstrating highly volatile and unpredictable results. (ISO Ex.1, p. 26-27; ISO Ex. 13, p. 8; 3/23/04 Tr. 156-157; 1/11/05 Tr. 31; 2/17/05 Tr. 21)

79. High capacitance creates operability issues with respect to switching transients, voltage control and spikes, transfer limit limitations and stability and increased risk that contingencies or slight operator error could result in system collapse, equipment damage, or both. (App. Ex 1, Vol. 1, pp. H-8, H-9; App. Ex 44, CSC-28, p.3)

80. Adding capacitance to a weak system tends to cause lower harmonic frequencies on the system and increases the risk of low order harmonic problems on the system, and the weakness of the Southwest Connecticut system limits the amount of underground cable that can be used. (ISO Ex. 13, p.8; 1/11/05 Tr. 32; 1/13/05 Tr. 43; App. Ex. 44, CSC-28, pp. 3-4; App. Ex 109)

81. The capacitance associated with underground cables increases the potential for temporary overvoltages ("TOVs"). A TOV is a sustained overvoltage lasting more than two cycles. (App. Ex. 176, pp. 3-4, 16)

82. In a weak system, increased capacitance inherent in increased use of 345 kV cable presents higher risk of sustained overvoltages that could harm customer and utility equipment. (App. Ex. 110, p. 4; 1/13/05 Tr. 101-102)

83. Underground AC cables have been typically applied for short distances in urban environments, which characteristically have high short-circuit levels. (App. Ex. 7, Att. B, p. E-1)

84. The implementation of a large amount of EHV transmission cable into a system like southwest Connecticut could result in unprecedented system characteristics. Resonant and harmonic behavior is unpredictable because it is impossible to analyze all different configurations and scenarios. (App. Ex. 110, p. 18)

85. Cables present switching transient issues associated with transformer energization and magnetic inrush, fault clearing and geomagnetic disturbances. Abrupt disturbances

such as these drive lower-frequency resonances harder than higher-frequency resonances. Extended-duration second harmonic injection from transformers during these events is greater than any other harmonic. Second harmonic distortion can result in complex interactions with protracted overvoltages and severe distortion persisting for several seconds. (6/15/04 Tr. 32-34; App. Ex 7, Att. D, p.2-2; App. Ex. 25.f, p. 4-4; App. Ex. 110, p. 15)

86. Sustained overvoltages are generally worse in a weaker system and are worse if system resonance is below the third harmonic. They can cause failure of arrestors, equipment insulation, and customer equipment. If a large transformer is damaged by a transient event, the time to procure and install a replacement could take more than a year, during which time the system would be in a compromised level of security. Such an event can also cause consequential failures elsewhere in the system. (6/15/04 Tr. 16-17; App. Ex. 110, p. 17)

87. Switching transient analysis performed by GE indicated the potential for severe transient overvoltages and TOVs. While surge arrestors can limit the magnitude of the overvoltages, it is expected that the severity of the transients may exceed the capability of normally-rated surge arrestors to survive the event. The voltage transients caused by routine cable switching are likely to permeate to the customer level, creating potential power quality issues. (App. Ex. 7, Att. B, pp. E-2, 6-1)

88. GE's Connecticut Cable Transient and Harmonic Study for Phase 2, Final Report, November 2003 analyzed switching transients and harmonic characteristics and identified situations where Phase II operation would impose duties outside of the rated capabilities of 362 kV circuit breakers. Critical fault clearing cases, with sustained voltage across the breaker contacts near 750 kV, exceeded test values defined in ANSI C37.06. These cases indicate the need for a higher TOV capability required for the breaker or could possibly be a driver for a higher circuit breaker voltage rating if the manufacturer cannot provide the capability with a 362 kV breaker. (App. Ex 25.f, pp. E-1, E-2)

89. Sustained and distorted overvoltages, resulting from routine cable and transformer switching, are not acceptable when considering power quality throughout the system. Equipment must be able to withstand TOVs, and circuit breakers must be capable of successfully interrupting under contingencies such as faults and equipment failures. (App. Ex. 25.f, p. 5-1)

Technologically Feasible Use of Underground Cable

90. The ROC conducted extensive studies to determine maximum amount of underground cable that would be technologically feasible to use in the Project. (App. Ex 1471/11/05 Tr. 23; App. Ex. 176, pp. 38-40; App. Ex. 178; App. Ex. 179)

91. ROC studies included load flow analyses, harmonic frequency screens, transient network analyses which were prepared by or with the assistance of a number of international consulting experts. KEMA, engaged as the Council's consulting expert, analyzed the ROC reports and background studies. (App. Ex 147; 1/11/05 Tr. 29-30)

92. KEMA conducted a study of harmonic impedances and initially reached the preliminary conclusion that up to 10 to 20 further miles of underground cable might be technologically feasible for the Project, if passive C-type Filters tuned to the third harmonic were used to mitigate low harmonic resonances. KEMA stated, however, that this conclusion was conditioned on satisfactory results from further testing, including transient network analyses. (App. Ex. 176, p.3; 12/14/04 Tr. 155, 180-182; 2/17/05 Tr. 71-72)

93. The ROC began its investigation by studying over a dozen configurations or "cases" to determine the feasibility of placing at least 24 linear miles of underground cable from the Norwalk Substation through Singer Substation in Bridgeport to the East Devon Substation in Milford. If results from initial harmonic frequency screenings and thermal, voltage and stability tests of a 24 mile underground configuration were encouraging, the ROC intended to study the possibility of adding further underground cable to the Project. (App. Ex 147)

94. Harmonic frequency screening (also called frequency domain screening) studies are designed to provide information about a system characteristic -- its impedance at each of the harmonic frequencies -- that can result in overvoltages on substation and other switching equipment when currents at those frequencies are produced. (App. Ex. 176, p. 14)

95. The ROC's initial report, submitted on August 16, 2004, indicated that 24 miles of underground cable might be achieved through the use of multiple STATCOMs, as described in "Case 7" in the ROC study. However, the ROC cautioned that the results of the frequency scans were marginally acceptable and that the Case 7 project modifications were undesirably complex. (App. Ex. 147; App. Ex. 164, p.4)

96. Case 7, involving the use of STATCOMs, is described in the ROC Report as follows:

> *Case 7: Start with the M-N proposed Project, replace both 345-kV HPFF cables between East Devon and Singer with XLPE, replace both 345-kV HPFF cables between Singer and Norwalk with XLPE, remove one of the 345-kV HPFF cables in the Bethel to Norwalk Project from service, remove the 115-kV capacitors at Plumtree from service, reduce the capacitors at Glenbrook to 75 Mvar, and reduce the capacitors at Frost Bridge to 205 Mvar in the "all caps in" cases, and investigate fixed capacitor replacements with dynamic reactive control devices.* (App. Ex. 147; App. Ex. 164, p. 4)

97. Control of a large number of STATCOMs in close electrical proximity could represent additional design, reliability, application and operational challenges. STATCOM technology is not a mature, reliable technology for this and that there are serious availability problems with large STATCOMs, as envisioned by Case 7. STATCOMs in use today are generally small in scale or have been used in conjunction

with other technologies, such as mechanically switched capacitors, to provide reactive injection/absorption. STATCOMs are also susceptible to being put out of service during adverse voltage conditions, because they require external power sources. The use of such a large number of STATCOMs in such a small area would be unprecedented. (App. Ex. 147, pp. 24-25; App. Ex. 164, p. 5-6)

98. Based on design complexity, operating concerns, and limited availability, ROC concluded that a multiple STATCOM solution in close electrical proximity would not result in a reliable solution. (App. Ex 164, p. 6)

99. A major problem associated with low first resonant frequencies is the potential for severe overvoltages. While harmonic frequency scans provide a guide regarding the potential impact of low resonant frequencies resulting from transient disturbances, a transient network analysis ("TNA") is necessary when low resonant frequencies are observed to understand the full potential for overvoltages on the system. (App. Ex 164, pp. 3-4)

100. To investigate the extent to which the Project could be constructed with underground 345-kV cable, the ROC conducted extensive TNAs to study the potential for TOVs that could result from the introduction of such cable into the weak SWCT transmission system. Such studies are particularly concerned with very short term overvoltages (TOVs) lasting from a few cycles (each cycle is one 60th of a second) to seconds. The ROC analyzed the results and considered how the potential overvoltages could be mitigated. (App. Ex. 176, pp. 3, 16)

101. The ROC, utilizing realistic rather than conservative assumptions, examined the magnitude of TOVs in thousands of cases, with varying combinations of overhead and underground transmission lines and varying cable and electrical equipment technologies (including possible mitigative measures such as STATCOMs, synchronous condensers, pre-insertion resistors, C-Type filters, surge arrestor upgrades, and the use of XLPE rather than HPFF cable) under varying operating scenarios and load assumptions with underground cable in linear lengths ranging from 4 to 44 miles, including the 24 miles originally proposed and underground additions of 2, 5, 10 and 20 miles. (App. Ex 176, pp. 3-5, 24-25; 1/11/05 Tr. 94-96; 1/13/05 Tr. 33-35, 46)

102. Because the Project segments west of East Devon require only two circuits, while the Project segments east of East Devon require three circuits, maximizing linear length of underground cable logically starts with the portion of the Project between East Devon and Norwalk. (App. Ex 176, p. 4)

103. Alternatives A and B in the Application to the Council are technologically feasible, and the ROC would support either of these configurations. In the list of studies undertaken by the ROC Group, the Alternative A route was studied in Case 2. As studied, it includes the use of 13.3 linear miles (26.6 circuit miles) of underground XLPE cable rather than high pressure fluid-filled HPFF cable, as had originally been proposed, between East Devon Substation (in Milford) and Singer Substation (in Bridgeport) and

Hawthorne Transition station (in Fairfield). Alternative B includes the use of 4.2 linear miles (8.4 circuit miles) of underground XLPE cable. (App. Ex 176, pp. 2-3)

104. "Case 5," which includes 24 linear miles (48 circuit miles) of underground cable from East Devon Substation (in Milford) to Singer Substation (in Bridgeport), and then from Singer Substation to the Norwalk Substation, is described in the ROC Report as follows:

> *Case 5: Start with the M-N Project, replace both 345-kV HPFF cables between East Devon and Singer with XLPE, replace both 345-kV HPFF cables between Singer and Norwalk with XLPE, and remove one of the 345-kV HPFF cables in the Bethel to Norwalk Project from service.*

As noted in the ROC Report in August, the Case 5 study model removed one of the 345-kV HPFF cables in the Bethel to Norwalk Project from service to reflect the electric performance of the system if both Bethel to Norwalk cables are installed, and only one is energized. (App. Ex 164, p.3)

105. While the ROC initially rejected Case 5 in its August report based on the results of harmonic frequency scans, the ROC determined to conduct a TNA study of Case 5. The TNA on case 5 indicated that in many individual case scenarios, combinations of system operating conditions such as location of generation in service, transmission equipment in service, line outages and fault duration resulted in voltages that exceeded the equipment rating, in some cases rising above 600-kV on 345-kV equipment, and that these overvoltages are sustained for a significant number of cycles. (App. Ex. 164, pp. 3-4)

106. The ROC also commissioned a TNA screening study of a system configuration with underground cable, with and without C-Type filters tuned to the third harmonic as suggested by KEMA. The study included contingency analysis. Although the addition of C-Type filters improved performance characteristics under normal operating conditions, they degraded system performance under other conditions. TOVs were worse under many contingent conditions with C-Type filters added to the system than without them. (App. Ex. 176, pp. 35-36)

107. TNA results show that many high TOVs can also occur for light load conditions when the C-Type filters associated with capacitor installations would not be in service. (App. Ex. 176, p. 9; 1/11/05 Tr. 93)

108. Enernex reviewed the GE report of Case 5 and Case 5 plus additional lengths of 2 and 5 additional linear miles of underground and concluded that:

- As more cable is added, the first resonant frequency of the system decreases.
- As more cable segments are added with their associated shunt compensating reactors, additional local resonances are created in addition to the main resonance point.

- More complicated dynamic behaviors occur as we add more capacitance.
- At key 345-kV and 115-kV buses throughout Southwest Connecticut, the worst TOVs increase as more cable is added.
- The impact of load, capacitor dispatch, and other topology changes seem to be more pronounced as more cable or capacitance is added (e.g. more variability in results – sometimes large reductions in TOVs, sometimes large increases in TOVs). (App. Ex. 176, pp. 25-26, Sched. C, Sched. D)

109. The potential for TOVs on the electric system that would exceed the withstand capability of system elements limits the use of underground cable. An expanded SWCT system could not be considered reliable if TOVs exceeding the withstand capability of any of its elements were likely to occur under contingency conditions. (App. Ex. 176, pp. 4-5)

110. Sustained and distorted overvoltages, resulting from routine cable and transformer switching, are not acceptable when considering power quality throughout the system. Equipment must be able to withstand TOVs, and circuit breakers must be capable of successfully interrupting under contingencies such as faults and equipment failures. (App. Ex. 25.f, p. 5-1)

111. Each piece of electric transmission and distribution equipment has a capability to withstand a rated range of overvoltages for a short period of time. To determine if the system would or could be made to withstand TOV peaks and durations indicated by the TNA studies, the Applicants determined the withstand capabilities of the equipment that is currently installed in the system and contemplated for the proposed Project. The Applicants then identified the equipment that had insufficient capability to withstand the overvoltage conditions and considered whether that equipment could be replaced with equipment that had a higher withstand capability without causing problems elsewhere on the system. (App. Ex. 176, pp.19-20, Sched. B; 1/11/05 Tr. 139-141)

112. Competing factors in selection of a surge arrestor's voltage rating are: (1) select a voltage rating low enough that the arrestor's voltage protective level coordinates with equipment insulation levels to protect against lightning and switching transients, and (2) select a sufficient voltage rating which can withstand the expected temporary overvoltage levels without damage or failure of the arrestors. (App. Ex. 25.f, p. 5-11)

113. The ROC determined that it could increase the system's withstand capability by upgrading surge arrestors from 209 kV to 235 kV. The present allowable TOV limit of 209 kV arrestors is 1.58 per unit at 6 cycles, and a substantial upgrade to the 235 kV arrestors will increase the allowable TOV limit to 1.8 per unit for 6 cycles. (App. Ex. 176, pp. 21-22, Sched. B, p.1)

114. In considering how the withstand capability of critical system elements could be upgraded to handle these TOVs indicated by the TNAs, the ROC Group was required to exercise engineering judgment, with the assistance of its consultants. No system should be designed with an expectation that it will be operated for an indefinite time at or near

the limit of tolerance of new system equipment, since equipment can degrade over time. Moreover, all of the TNA models incorporated assumptions as to load characteristics that are necessarily based in part on engineering judgment rather than definitive data. Even after rigorous attempts to synchronize the modeling techniques and assumptions using the same model base, there remained some variability among different consultants' results. Finally, system conditions will change, including the possible addition of generators and substation capacitor banks. It is impossible to be sure that the TNA studies and screens have definitively identified the worst TOV cases that the system will be required to withstand. (App. Ex. 176, pp. 20-21)

115. Some margin of safety below the equipment rating is prudent to account for system variability and allow for present-day operations and future evolution of the SWCT system (which are likely to include generation retirements, re-powering or replacement, generator lead connections, capacitor bank installations to maintain local voltages, and 115-kV transmission line upgrades or 115-kV cable installation). (App. Ex. 176, pp. 6, 20-21)

116. To provide a margin of safety to address sensitivities associated with additional substation capacitor banks, additional generation, and loads, the ROC assessed the components of the required system variability margin using the sum of squares method as follows:

Factor	**Margin**	**Margin Squared**
Load levels and damping characteristics	0.2	0.04
Generation dispatch	0.1	0.01
Capacitor dispatch, and LV capacitors	0.1	0.01
	Sum of Squares:	0.06
	Total Margin: (square root of sum of the squares)	**0.25**

(App. Ex. 176, p.21)

117. KEMA agreed that the .25 variability margin of safety determined by the ROC is appropriate. (CSC Ex. 24, p. 2; 2/17/05 Tr. 59-60)

118. TOV limits were reduced by the variability safety margin of .25. For example, reducing the TOV limit of 1.8 per unit at 6 cycles by the safety margin results in a

margin-adjusted TOV limit of 1.55 per unit. The margin-adjusted TOV limit is 1.60 per unit at 2 cycles. The ROC then evaluated the TNA results according to these criteria using load assumptions of 40%, 50% and 70% of peak load levels. Limited testing was also done at a 30% load level. Cases with substantial numbers of TOVs above or within the variability margin of safety were deemed unacceptable. (App. Ex. 176, pp. 22-23; CSC Ex. 24, p. 2)

119. The results of further testing conducted after the KEMA white paper by ROC and its consultants indicated, with respect to 2 cycle TOVs, that there were 134 TOVs in the safety margin for case 5, but none which exceeded upgraded equipment ratings. For Case 5 plus 5 more miles of underground between East Devon and Beseck, there were 195 TOVs in the safety margin and 15 TOVs exceeding equipment ratings. For Case 5 plus 10 more underground miles, there were 251 TOVs in the safety margin and 54 TOVs exceeding equipment ratings. For Case 5 plus 20 more underground miles, there were 289 TOVs in the safety margin and 23 TOVs exceeding equipment ratings. (App. Ex. 199; 2/17/05 Tr. 112-115)

120. When a lightning arrestor exceeds its equipment ratings, it can fail catastrophically, causing a violent explosion and fire that has the potential to damage transformers, cause line failure and harm personnel. (3/23/04 Tr. 174-175; 1/11/05 Tr. 140-142)

121. The TNA results and the volatility of the system transient response and load composition variations, as well as various possible generator, capacitor, and reactor dispatches, demonstrate that the maximum length of underground cable that is technologically feasible for the Project is the 24 linear miles (48 circuit miles) of underground XLPE cable in Case 5, provided that the following system improvements are made:

- XLPE cable is used rather than HPFF cable as had originally been proposed;
- replacement of approximately 1,200 surge arrestors and upgrades of other equipment are completed at about half of CL&P's transmission substations and all of the UI transmission substations to improve the capability of such equipment to withstand TOVs; and
- more extensive changes are made to remedy local area problems (Rocky River Substation). (App. Ex. 176, pp. 4-5, 24-25; 1/13/05 Tr. 44, 82, 204-205)

122. The addition of more underground cable (capacitance) on the system will yield higher TOVs. (App. Ex. 176, p. 27; 1/13/05 Tr. 85; 2/17/05 Tr. 60, 97)

123. Further underground cable would pose unacceptable risks and would be neither operable nor reliable. (App. Ex. 176, pp. 4-5, 24-25; 1/13/05 Tr. 84-85; 2/17/05 Tr. 99-100)

124. Due to the unpredictable nature of system transient response if more underground cable were to be added between Beseck and East Devon, further increments of 345-kV underground cable, beyond the 24 linear miles from East Devon to Norwalk, cannot be supported as technologically feasible. (App. Ex. 176, pp. 2-3)

125. Further studies conducted by the ROC following KEMA's white paper attempted to optimize the location and design of C-type Filters, as had been recommended by KEMA. (CSC Ex. 25, p. 2)

126. After review of the TOVs shown by the ROC consultants' TNAs, KEMA agrees with the Applicants that the introduction of C-type Filters should be done on a conservative, step-wise basis, starting with a smaller project. The scale of the Project is too large for introducing the application of C-type Filters for TOV mitigation, especially given the potential consequences of failure of the system in SWCT. (CSC Ex. 25, p. 2; 2/17/05 Tr. 23)

127. KEMA acknowledges that the feasibility of mitigating TOVs with passive C-type Filters has not been established in actual industry practice. KEMA therefore agrees with the ROC and its consultants that neither the technical nor operational feasibility of underground cable beyond 24 miles can be confirmed. (CSC Ex. 25, p. 3; 2/17/05 Tr. 108)

128. The ROC and its consultants have performed extensive studies and TNA analysis, KEMA believes that adequate studies have been performed to support the conclusions that the technical and operational feasibility of more than 24 miles of underground cannot be confirmed, and KEMA does not recommend that C-type Filters be used in the Project to extend the underground cable beyond the 24 miles proposed in Case 5. (1/13/05 Tr. 92-93; 2/17/05 Tr. 21, 46)

Underground Cable Technologies

129. The Applicants conducted comprehensive evaluations of underground cable technologies, examining the status of both HPFF and XLPE high voltage underground electric transmission line technology, taking into consideration factors such as reliability, fault rates and extent of successful cable operations elsewhere in the world. (CSC Admin Notice 15, FF 124; App. Ex. 179).

130. Underground transmission lines can be reliable with proper selection of the specific technology, proper construction methods and attention to necessary operation and maintenance procedures. Underground transmission line lengths of less than 5 to 10 miles are most common in worldwide applications. Longer lengths are unusual and often present system and reliability concerns. For some commercially available underground

cable technologies, there is very little worldwide operating experience at 345-kV and higher transmission voltages. (CSC Admin Notice 15, FF 125)

131. The principal underground cable technologies evaluated for the project included high-pressure fluid filled (HPFF) and cross-link polyethylene (XLPE). Either is acceptable, but XLPE must be used in connection with Case 5 because it has lower capacitance than HPFF (CSC Admin Notice 15, FF 126; App. Ex. 179; 1/13/05 Tr. 77-78, 85)

132. While overhead lines are susceptible to interruptions from external forces, the problems are easier to find and repair (on the order of hours) versus underground lines that are less susceptible to external forces but problems take longer to find, and repair (on order of weeks). The shorter time to return an overhead transmission line to service lowers the risk of a multiple contingency outage events. (CSC Admin Notice 15, FF 133)

133. When evaluating how an EHV cable system would be designed and operated within a transmission system grid, it is necessary to consider the following issues: transient system overvoltage following switching under conditions during which the transmission line is being energized or de-energized; steady-state system overvoltages after contingencies like the loss of local generation, another transmission line or the line itself; switching transients that occur less than a second after energization of the line; and harmonic distortion within a line that affects power quality. (CSC Admin Notice 15, FF 142)

Underground/Overhead Configurations

134. Transmission facilities can be constructed with both overhead and underground segments. (CSC Admin Notice 15, FF 146)

135. Factors to be considered in evaluating a mixed underground and overhead cable transmission line include:

- A transition (termination) station would be required at each end of each underground section. This station would include a dead-end structure, pothead stands, potheads and surge arrestors, and possibly other components.
- For XLPE cable, the reliability problems that have occurred in existing lines have been predominantly, but not exclusively, in termination stations and splices.
- The number of underground sections in a line must be limited because of technical issues. A line should not be designed to "porpoise" frequently from overhead to underground and back because such a design exposes the line to a high risk of damage due to overvoltages caused by "reflections," as transient surge voltages travel back and forth between the different systems, with different impedance characteristics, at the speed of light in the event of a lightning strikes and switching events on the network.

- Cable systems that typically use a cross-bonded sheath, like XLPE, are vulnerable to damage from unwanted fault currents flowing on the cable sheath, unless they can be terminated at one end to a strong ground grid, such as is found at a substation.
- Two different underground technologies may not be used in sequence, spliced together. However, two such different technologies may be used in different segments of a line. (CSC Admin Notice 15, FF 147).

136. A configuration involving less underground cable in segments 3 and 4 than is proposed in Case 5 in order to install a portion of underground cable between East Devon and Beseck would not be as reliable as Case 5 because it involves porpoising and additional substation construction. (2/17/05 Tr. 101-102)

Respectfully submitted,

ISO NEW ENGLAND INC.

By ________________________

Anthony M. Macleod
John T. Shaban
Whitman Breed Abbott & Morgan LLC
100 Field Point Road
Greenwich, Connecticut 06830
Telephone: 203-869-3800
Its Attorneys

CERTIFICATION

I hereby certify that a copy of the foregoing was hand delivered or sent via email or first class mail postage prepaid, on March 11, 2005, to all parties and intervenors of record as shown on the attached service list.

____

John T. Shaban
Commissioner of the Superior Court

LIST OF PARTIES AND INTERVENORS
SERVICE LIST

Status Granted	Status Holder (name, address & phone number)	Representative (name, address & phone number)
Applicant	Northeast Utilities Service Company	Anthony M. Fitzgerald, Esq. Brian T. Henebry, Esq. Carmody & Torrance LLP 50 Leavenworth St., P.O. Box 1110 Waterbury, CT 06721-1110 (203) 573-1200 (203) 575-2600 - fax afitzgerald@carmodylaw.com bhenebry@carmodylaw.com tranmn345docket272@nu.com
Applicant	The United Illuminating Company	Linda L. Randell, Esq. Bruce L. McDermott, Esq. Wiggin & Dana LLP One Century Tower New Haven, CT 06508-1832 (203) 498-4322 (203) 782-2889 - fax lrandell@wiggin.com bmcdermott@wiggin.com
Intervenor (granted 11/20/03)	Norwalk Association of Silvermine Homeowners **~STATUS WITHDRAWN 03/26/04~**	Norwalk Association of Silvermine Homeowners c/o Leigh Grant 99 Comstock Hill Road Norwalk, CT 06850 (203) 846-4577 (203) 846-4577 - fax cartellino@aol.com
Party (granted 11/20/03)	Honorable Robert W. Megna State Representative - 97th District 40 Foxon Hill Road, #54 New Haven, CT 06513 (860) 240-8585 1-800-842-8267 Robert.Megna@po.state.ct.us	

LIST OF PARTIES AND INTERVENORS
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Status Granted	Status Holder (name, address & phone number)	Representative (name, address & phone number)
Intervenor (granted 11/20/03)	Honorable Al Adinolfi State Representative 103rd District 235 Sorghum Mill Drive Cheshire, Connecticut 06410 (203) 272-9701 - Home 1-800-842-1423 – Capitol (860) 240-0207 - fax Alfred.adinolfi@housegop.state.ct.us	
Party (granted 11/20/03)	Town of Middlefield	Eric Knapp, Esq. Branse & Willis, LLC 41-C New LondonTurnpike Glen Lochen East Glastonbury, CT 06033-2038 (860) 659-3735 (860) 659-9368 – fax eknapp@bransewillis.com
Party (granted 11/20/03)	Town of Milford	Julie Donaldson Kohler, Esq. Hurwitz & Sagarin, LLC 147 North Broad St. Milford, CT 06460 (203) 877-8000 (203) 878-9800 - fax jdk@hurwitz-sagarin.com
Party (granted 11/20/03)	Town of Wallingford	Peter G. Boucher, Esq. Halloran & Sage, LLP 225 Asylum Street Hartford, CT 06103 (860) 297-4650 (860) 548-0006 fax boucher@halloran-sage.com

LIST OF PARTIES AND INTERVENORS
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Status Granted	Status Holder (name, address & phone number)	Representative (name, address & phone number)
Party (granted 11/20/03)	Town of Wallingford continued…	Janis M. Small, Esq. Town Attorney Wallingford Town Hall 45 South Main St. Wallingford, CT 06492 (203) 294-2140 (203) 294-2112 – fax wlfdlaw@sbcglobal.net
Party (granted 11/20/03)	Town of Durham	Peter G. Boucher, Esq. Halloran & Sage, LLP 225 Asylum Street Hartford, CT 06103 (860) 297-4650 (860) 548-0006 fax boucher@halloran-sage.com Maryann Boord First Selectwoman Durham Town Hall 30 Townhouse Rd. Durham, CT 06422 (860) 349-3625 (860) 349- 8391 – fax mboord@townofdurhamct.org
Party (granted 11/20/03)	City of Norwalk	Louis S. Ciccarello Corporation Counsel P.O. Box 798 Norwalk, CT 06856-0798 (203) 854-7750 (203) 854-7901 fax lciccarello@norwalkct.org
Party (granted 11/20/03)	Town of Westport	Town of Westport c/o Ira W. Bloom, Esq. 27 Imperial Avenue Westport, CT 06880 (203) 227-9545 (203) 227-2443 - fax ibloom@wsdb.com ecederbaum@wsdb.com

LIST OF PARTIES AND INTERVENORS
SERVICE LIST

Status Granted	Status Holder (name, address & phone number)	Representative (name, address & phone number)
Intervenor (granted 11/20/03)	Honorable Mary G. Fritz State Representative - 90th District 43 Grove Street Yalesville, CT 06492 (203) 289-1169 1-800-842-1902 (860) 240-0206 - fax mary.fritz@po.state.ct.us	
Party (granted 11/20/03)	Town of Woodbridge	David A. Ball, Esq. Cohen and Wolf, P.C. 1115 Broad Street Bridgeport, CT 06604 (203) 337-4134 (203) 576-8504 fax dball@cohenandwolf.com
Party (granted 11/20/03)	City of Meriden	Deborah L. Moore, Esq. Legal Department City Hall 142 East Main Street Meriden, CT 06450 (203) 630-4045 (203) 630-7907 - fax dmoore@ci.meriden.ct.us
Party (granted 11/20/03)	Attorney General Richard Blumenthal	Michael C. Wertheimer Assistant Attorney General Office of the Attorney General 10 Franklin Square New Britain, CT 06051 (860) 827-2603 (860) 827-2893 michael.wertheimer@po.state.ct.us

LIST OF PARTIES AND INTERVENORS
SERVICE LIST

Status Granted	Status Holder (name, address & phone number)	Representative (name, address & phone number)
Intervenor (granted 11/20/03)	Honorable Raymond Kalinowski State Representative – 100th District P.O. Box 391 Durham, CT 06422 1(800)842-1423 860) 240-0207 - fax repkalinowski@aol.com	
Party (granted 11/20/03)	City of Bridgeport	Melanie J. Howlett Associate City Attorney Office of the City Attorney 999 Broad Street Bridgeport, CT 06604-4328 (203) 576-7647 (203) 576-8252 – fax Howlem0@ci.bridgeport.ct.us
Party (granted 11/20/03)	Communities for Responsible Energy	Trish Bradley, President Ed Schwartz, Treasurer Comunities for Responsible Energy, Phase II 45 Ironwood Lane Durham, CT 06422 (860) 349-9137 thebradco7@aol.com
Party (granted 11/20/03)	Office of Consumer Counsel	Bruce C. Johnson Litigation Attorney Office of Consumer Counsel Ten Franklin Square New Britain, CT 06051 (860) 827-2900 (860) 827-2929 – fax bruce.johnson@po.state.ct.us

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Status Granted	Status Holder (name, address & phone number)	Representative (name, address & phone number)
Intervenor (granted 11/20/03	Honorable Themis Klarides State Representative – 114th District 23 East Court Derby, CT 06418 (203) 735-5911 1-800-842-1423 (860) 240-0207 - fax Themis.klarides@housegop.state.ct.us	
Party (granted 11/20/03)	The Woodlands Coalition for Responsible Energy, Inc.	Lawrence J. Golden, Esq. Pullman & Comley, LLC 90 State House Square Hartford, CT 06103-3702 (860) 424-4346 (860) 424-4370 lgolden@pullcom.com Ruthann@woodlandscoalition.com
Intervenor (granted 12/9/03)	ISO New England Inc.	Anthony M. Macleod, Esq. Whitman Breed Abbott & Morgan LLC 100 Field Point Road Greenwich, CT 06830 (203) 869-3800 (203) 869-1951 – fax amacleod@wbamct.com
Party (granted 12/9/03)	Department of Transportation	Charles H. Walsh Assistant Attorney General Juris. No. 402623 55 Elm St., P.O. Box 120 Hartford, CT 06141-0120 (860) 808-5090 (860) 808-5384 fax charles.walsh@po.state.ct.us Arthur.gruhn@po.state.ct.us

LIST OF PARTIES AND INTERVENORS
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Status Granted	Status Holder (name, address & phone number)	Representative (name, address & phone number)
Intervenor (granted 12/9/03)	Honorable John E. Stripp State Representative – 135th District 4 Scatacook Trail Weston, CT 06883 1(800)842-1423 (860)240-0207 – fax john.stripp@housegop.state.ct.us **~STATUS WITHDRAWN 01/04~**	
Party (granted 12/9/03)	Town of Fairfield	Honorable Kenneth A. Flatto First Selectman Independence Hall 725 Old Post Road Fairfield, CT 06824 (203) 256-3030 (203) 256-3008 – fax firstselectmanffld@town.fairfield.ct.us ekennelly@town.fairfield.ct.us
Party (granted 12/9/03)	PSEG Power Connecticut LLC	David A. Reif Jane K. Warren Joel B. Casey McCarter & English, LLP CityPlace I Hartford, CT 06103 (860) 275-6700 (860) 724-3397 – fax dreif@mccarter.com jwarren@mccarter.com jcasey@mccarter.com h.borden@pseg.com
Party (granted 12/22/03)	Town of Wilton	Monte E. Frank, Esq. Cohen and Wolf, P.C. 158 Deer Hill Avenue Danbury, CT 06810 (203) 368-0211 (203) 576-8504 fax mfrank@cohenandwolf.com

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Status Granted	Status Holder (name, address & phone number)	Representative (name, address & phone number)
Party (granted 12/22/03)	Town of Weston	David A. Ball, Esq. Cohen and Wolf, P.C. 1115 Broad Street Bridgeport, CT 06604 (203) 337-4134 (203) 576-8504 fax dball@cohenandwolf.com
Party (granted 12/22/03)	South Central Connecticut Water Authority	Andrew W. Lord, Esq. Murtha Cullina LLP CityPlace I, 29th Floor 185 Asylum Street Hartford, CT 06103-3469 (860) 240-6180 (860) 240-6150 alord@murthalaw.com
Party (granted 12/22/03)	Town of Orange	Brian M. Stone,Esq. Sousa, Stone & D'Agosto, LLC 375 Bridgeport Avenue Shelton, CT 06484 (203) 929-8283 (203) 548-0006 brianstone@snet.net Mitchgoldblatt@aol.com
Intervenor (granted 01/12/04)	Connecticut Business & Industry Association (CBIA)	Robert E. Earley Connecticut Business & Industry Assoc. 350 Church Street Hartford, CT 06103-1106 (860) 244-1900 (860) 278-8562 fax earleyr@cbia.com

LIST OF PARTIES AND INTERVENORS
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Status Granted	Status Holder (name, address & phone number)	Representative (name, address & phone number)
Party (granted 01/12/04)	Town of Cheshire	Richard J. Buturla, Esq. Town Attorney Berchem, Moses & Devlin, PC 75 Broad Street Milford, CT 06460 (203) 783-1200 (203) 878-4912 fax rbuturla@bmdlaw.com mmilone@cheshirect.org
Party (granted 1/12/04)	Town of Hamden	Joaquina Borges King Assistant Town Attorney Hamden Government Center 2750 Dixwell Avenue Hamden, CT 06518 (203) 287-7050 (-7053) (203) 287-7051 fax jborgesking@hamden.com jgruen@hamden.com
Party (approved 2/3/04)	City of Middletown	Timothy P. Lynch Deputy City Attorney City Attorney's Office 245 deKoven Drive, P.O. Box 1300 Middletown, CT 06457-1300 (860) 344-3422 (860) 344-3521 timothy.lynch@cityofmiddletown.com
Party (approved 2/3/04)	Town of Bethany	Honorable Derrylyn Gorski First Selectman Bethany Town Hall 40 Peck Road Bethany, CT 06524-3378 (203) 393-2100 ext. 100 DGorski@Bethany-CT.com Kevin195774@yahoo.com

LIST OF PARTIES AND INTERVENORS
SERVICE LIST

Status Granted	Status Holder (name, address & phone number)	Representative (name, address & phone number)
Party (approved 2/3/04)	Town of Easton	William J. Kupinse, Jr. First Selectman Easton Town Hall 225 Center Road, P.O. Box 61 Easton, CT 06612 (203) 268-6291 (203) 268-4928 fax w_kupinse@eastonct.org
Intervenor **(approved 2/18/04**	Honorable William A. Aniskovich State Senate – 12th District 15 Grove Avenue Branford, CT 06405 (860) 240-0596 William.A.Aniskovich@po.state.ct.us	
Party (approved 2/18/04)	Town of North Haven	David J. Monz Updike, Kelly & Spellacy, P.C. One Century Tower 265 Church Street New Haven, CT 06510 (203) 786-8303 (203) 772-2037 fax dmonz@uks.com
Party (approved 3/17/04)	Woodbridge Jewish Organizations *(Ezra Academy, B'Nai Jacob, the Jewish Community Center of Greater New Haven, the Jewish Federation of Greater New Haven, and the Department of Jewish Education).*	David R. Schaefer, Esq. Brenner Saltzman & Wallman, LLP 271 Whitney Avenue New Haven, CT 06511 (203) 772-2600 (203) 562-2098 fax dschaefer@bswlaw.com

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Status Granted	Status Holder (name, address & phone number)	Representative (name, address & phone number)
Intervenor (approved 3/17/04)	Senator Joseph J. Crisco, Jr. 17th District State Capitol Hartford, CT 06106-1591 (860) 240-0189 (860) 240-0027 – fax Crisco@senatedems.state.ct.us	
Intervenor (approved 3/23/04)	First District Water Department	Franco Chieffalo General Supervisor First District Water Department P.O. Box 27 Norwalk, CT 06852 (203) 847-7387 (203) 846-3482 fax fchieffalo@norwalkfdwd.org
Intervenor (approved 4/15/04)	Honorable Leonard A. Fasano State Senator – 34th District 7 Sycamore Lane North Haven, CT 06473 Len.Fasano@po.state.ct.us	
Party (approved on 7/13/04)	City of New Haven	Elizabeth Gilson, Esq. 383 Orange Street New Haven, CT 06511 (203) 777-4050 (203) 787-3259 – fax egilson@snet.net

LIST OF PARTIES AND INTERVENORS
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Status Granted	Status Holder (name, address & phone number)	Representative (name, address & phone number)
Intervenor (approved 7/13/04)	Branford Conservation and Environment Commission	Karyl Lee Hall, Esq. Co-Chairman Branford Conservation & Environment Comission c/o Box 3072 Branford, CT 06405 860-262-5044 Karylleehall1@aol.com
Party (approved 07/13/04)	Town of Branford	Honorable John E. Opie, First Selectman Branford Town Hall P.O. Box 150, Town Hall Branford, CT 06405 (203) 488-8394 jopie@branford-ct.gov
Intervenor (approved on 08/26/04)	Linda Wilson	Sebastian N. Giuliano, Esq. Giuliano, Rafala & Scalora P.O. Box 820 Middletown, CT 06457-0820 (860) 344-9045 (860) 344-8397 fax sscalora@aol.com Robert Hoff, Esq. Reid and Riege, P.C. One Financial Plaza Hartford, CT 06103 (860) 278-1150 (860) 240-1002 RHoff@ReidandRiege.com TArmstrong@ReidandRiege.com

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Status Granted	Status Holder (name, address & phone number)	Representative (name, address & phone number)
Intervenor (approved on 8/26/04)	The Honorable Kevin M. DelGobbo, Ranking Member Energy and Technology Committee Legislative Office Building, Room 3904 Hartford, CT 06106-1591 (860) 240-8700 (860) 240-0207 fax Kevin.delgobbo@housegop.state.ct.us	
Intervenor (approved 12/21/04)	Ralph E. Wilson, Allison Wilson, and the South Main Street Irrevocable Trust	Sebastian N. Giuliano, Esq. Giuliano, Rafala & Scalora P.O. Box 820 Middletown, CT 06457-0820 (860) 344-9045 (860) 344-8397 fax sscalora@aol.com Robert Hoff, Esq. Reid and Riege, P.C. One Financial Plaza Hartford, CT 06103 (860) 278-1150 (860) 240-1002 RHoff@ReidandRiege.com TArmstrong@ReidandRiege.com