STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

The Connecticut Light and Power Company	**)**	**Docket No. 370**
Application for a Certificate of Environmental	**)**	
Compatibility and Public Need for the Connecticut	**)**	
Portion of the Greater Springfield Reliability Project	**)**	
and for the Manchester to Meekville Junction	**)**	
Circuit Separation Project	**)**	**July 7, 2009**

PREFILED TESTIMONY OF ISO NEW ENGLAND INC.
BY FRANK MEZZANOTTE

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I. Introduction

Q1. Please state your name, position, and business address.

A1. I am Frank Mezzanotte, Manager – Area Transmission Planning at ISO New England Inc. (the "ISO"). My business address is ISO New England Inc., One Sullivan Road, Holyoke, Massachusetts 01040.

Q2. Please state your educational background and work experience.

A2. As outlined in my professional biography attached as ISO Exhibit 1, I have a Masters in Power Engineering & Engineering Management from the George Washington University. I began my career with the Long Island Lighting Company where I worked for nineteen years in various planning and engineering positions. After that, I served as the Manager of System Engineering & Planning at Northern Virginia Electric Cooperative.

I joined Transmission Planning at the ISO as a Lead Engineer in June, 2001, was promoted to Supervisor in 2004, and achieved the title of Manager in

2008. My main responsibility has been to lead, coordinate and review studies in the three southern New England states of Rhode Island, Massachusetts and Connecticut. I have been directly involved in the development of all of the Regional Transmission Expansion Plan and Regional System Plan reports since joining the ISO in 2001.

I am a licensed Professional Engineer in the states of Massachusetts, New York and Virginia.

Q3. Have you previously testified before the Connecticut Siting Council?

A3. I have previously testified in Dockets F-2007 and F-2008 regarding the Siting Council's annual Forecast of Loads and Resources, but not in a transmission siting proceeding. I have previously testified in a transmission siting proceeding in Rhode Island and am testifying there regarding the Rhode Island Reliability Project (Docket SB-2008-02).

II. Summary of Testimony

Q4. What is the purpose of your testimony in this proceeding?

A4. In my testimony, I describe generally the ISO's mission and responsibilities. I also describe the ISO's planning criteria and how they relate to the Federal Energy Regulatory Commission ("FERC"), the North American Electric Reliability Corporation ("NERC") and the Northeast Power Coordinating Council, Inc. ("NPCC") standards and requirements for the Nation's bulk power transmission system. My testimony supports the need for the Greater Springfield Reliability Project ("GSRP") and the Manchester to Meekville Junction Circuit Separation Project ("MPP") (collectively, the "The Connecticut Valley Electric

Transmission Reliability Projects") to address identified reliability concerns in the Greater Springfield and north-central Connecticut areas.

Q5. Please summarize your testimony.

A5. Based on studies to date and applicable regional reliability standards, the ISO is concerned about the reliability of the existing electricity delivery system in the Greater Springfield area and the transfers of power over the 345-kV interstate tie line between Massachusetts and Connecticut. In an effort to evaluate the ability of the transmission system in southern New England to continue to perform reliably, a working group consisting of planners from the ISO, National Grid and Northeast Utilities was formed (the "Working Group"). The Working Group undertook a comprehensive forward-looking transmission planning study, known as the Southern New England Transmission Reliability analysis. This analysis is documented in the Southern New England Transmission Reliability Report, Needs Analysis (the "Needs Analysis") referenced in the Application in this proceeding.[1]

Transmission reliability, which can be described as the ability to supply the area's load under all design contingency events, within all applicable equipment ratings, independent of specific local generation, and while maintaining the needs of the region, is a major concern for the Greater Springfield and north-central Connecticut systems. Critical weaknesses in the north-central Connecticut and Springfield areas are identified in Sections 3.3.1 and 3.3.3 of the Needs Analysis, respectively where there are reliability criteria violations.

[1] *See* Application, Volume V, Exhibit 1 and CEII Appendix.

Without transmission improvements, the system may fail to provide reliable service in these areas.

After establishing the existence, nature and location of the reliability concerns, the Working Group identified a number of possible solutions and tested each to determine its ability to eliminate the criteria violations. As a result, twelve possible transmission solutions were developed. The Working Group detailed this analysis in the New England East-West Options Analysis ("Options Report") referenced in the Application in this proceeding.[2] Northeast Utilities subsequently selected Option A6b based on their preliminary engineering results. However, during their detailed engineering phase, modifications were made to the project, most notably to the 115kV portions, resulting in the solution proposed in this proceeding.

The GSRP consists of the following components: a new 345 kV transmission line along approximately 35 miles of overhead right-of-way, 23 miles in Massachusetts and 12 miles in Connecticut; the construction, reconstruction and upgrade of 115-kV lines along approximately 27 miles of existing and new overhead line ROW in Massachusetts; and related substation improvements in Massachusetts and Connecticut.

In Connecticut, the substation improvements associated with the new 345-kV line consist of installing a 345-kV switchyard and a second 345-kV to 115-kV, 600 Mega Volt Ampere (MVA) autotransformer in the North Bloomfield Substation.

[2] *See* Application, Volume V, Exhibit 2 and CEII Appendix.

The related MMP includes the separation of a 345-kV circuit and a 115-kV circuit between Manchester Substation and Meekville Junction in Manchester Connecticut over a distance of approximately 2.2 miles.

In October, 2008, The Connecticut Light and Power Company ("Northeast Utilities"[3]) filed with the Connecticut Siting Council an application to construct the Connecticut Valley Electric Transmission Reliability Projects. I wish to state the ISO's support for the Projects as being needed to address the reliability concerns identified in the Needs Analysis and to ensure the continuation of reliable electric service to customers in the Greater Springfield and north-central Connecticut areas.

III. The ISO's Mission and Responsibilities

Q6. Why was the ISO established?

A6. The "Independent System Operator" concept was developed by FERC as part of the framework to support competitive electricity markets. In 1996, FERC stated its principles for the ISO operation and governance in FERC Order 888.[4] FERC identified Independent System Operator principles as: providing independent, open and fair access to the region's transmission system; establishing a non-discriminatory governance structure; facilitating market based wholesale electricity rates; and ensuring the efficient management and reliable operation of the regional bulk power system.

[3] Northeast Utilities operates in Connecticut through its subsidiary, The Connecticut Light & Power Company ("CL&P") and in Massachusetts through its subsidiary, Western Massachusetts Electric Company ("WMECO"). My collective reference to "Northeast Utilities" will include each of these subsidiaries as and to the extent context may require.

[4] Promoting Wholesale Competition Through Open Access, Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, Order No. 888, 75 FERC ¶ 31,036 (1996)(establishing principles for ISO's operation and governance).

The ISO was established to be the Independent System Operator of the New England bulk power grid on July 1, 1997,[5] and it assumed certain operating and transmission reservation responsibilities which had previously been carried out by NEPOOL, which transferred staff and assets to the ISO. In May, 1999, the ISO commenced administration of the restructured wholesale electricity marketplace for the region.[6] In June, 2001, FERC conferred authority on the ISO to be responsible for the regional transmission planning process.[7] In March, 2004, FERC granted the ISO status as a Regional Transmission Organization ("RTO"),[8] and the ISO began operation as an RTO in February, 2005.

Q7. *Does the ISO make any profit from its role as the Independent System Operator?*

A7. No. As the Independent System Operator, the ISO complies with FERC Order No. 889.[9] In this regard, the ISO is an independent, private, non-profit, non-stock, company. The ISO therefore has no shareholders, and its Board of Directors and employees are barred from being employed by or owning shares in NEPOOL Market Participants. Its budget is reviewed and approved annually by FERC, and the ISO only recoups its annual expenses. As a result, market activity covers the ISO's expenses in monitoring and administering the system.

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5 New England Power Pool, Order Conditionally Authorizing Establishment of an Independent System Operator and Disposition of Control Over Jurisdictional Facilities, 79 FERC ¶ 61,374 (1997) (authorizing formation of ISO).

6 New England Power Pool, Order Conditionally Accepting New and Revised Market Rules, 87 FERC ¶ 61,045 (1999)(authorizing ISO-NE to administer the restructured wholesale electricity marketplace).

7 ISO New England Inc. & New England Power Pool, Order On Rehearing Requests and Compliance Filings, 95 FERC ¶ 61384 (2001)(authorizing ISO to oversee regional transmission planning).

8 Order Granting RTO Status Subject to Fulfillment of Requirements and Establishing Hearing and Settlement Judge Procedures 106 FERC ¶ 61,280 (2004)(granting ISO-New England RTO status).

9 Open Access Same-Time Information System Conduct, Order No. 889, 75 FERC ¶ 61,078 (1996) (rules establishing and governing Open Access Same-Time Information System).

Q8. What are the ISO's mission and responsibilities?

A8. The ISO manages the New England region's bulk electric power system, operates the wholesale electricity market, administers the region's Transmission, Markets and Services Tariff (the "Tariff"),[10] and conducts regional transmission planning. More specifically, the ISO's responsibilities include independently operating and maintaining a highly reliable bulk transmission system, promoting efficient wholesale electricity markets, and working collaboratively and proactively with state and federal regulators, NEPOOL Participants, and other stakeholders in pursuit of these goals.

Because FERC has conferred upon the ISO responsibility for conducting long-term system planning for New England,[11] the ISO must maintain a level of system reliability that meets criteria established by NERC, NPCC, and the ISO's own planning standards. Applicable reliability standards are discussed more fully below.

It is appropriate to add that the massive outage that struck the North American electric power system on August 14, 2003, causing the loss of approximately 2,500 megawatts ("MW") of load in New England, has underscored the significance of the ISO's mission and responsibilities. The event demonstrated the need for appropriate reliability standards, effective monitoring of compliance, and, most importantly, a reliable bulk power transmission system.

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[10] *See* http://www.iso-ne.com/regulatory/tariff/index.html. The ISO's Open Access Transmission Tariff ("OATT") comprises Section II of the Tariff.

[11] ISO New England Inc. and New England Power Pool,Order on Reh'g, 95 FERC ¶ 61,384 (2001) (authorizing ISO to oversee regional transmission planning); ISO New England Inc and New England Power Pool, 103 FERC ¶ 61,304 (2003) (finding that "[w]e are persuaded by ISO-NE's arguments it is the appropriate authority to approve planning for transmission upgrades…"); Order Accepting Compliance Filing, As Modified, 123 FERC ¶ 61,113 (2008) (accepting ISO Tariff provisions regarding transmission planning).

A well coordinated regional system plan and additional power system infrastructure are more essential than ever to ensure reliability of service to load, because without a well-planned system, there may not be operating options available to maintain reliable service.

Q9. What is the ISO's role in conducting regional transmission planning?

A9. The ISO is responsible for conducting long-term regional transmission planning for the New England region. Attachment K to the ISO's Tariff sets forth the ISO's responsibility for regional transmission planning in New England. Specifically, Attachment K requires the ISO to undertake an assessment of the needs of the bulk power system. The ISO annually prepares a comprehensive Regional System Plan ("RSP") for the six New England states that includes forecasts of future load and how the electrical transmission system as planned can meet the growing demand by adding generating resources, energy efficiency or other demand-side resources, and transmission. Transmission upgrades are planned and required throughout New England to maintain system reliability, improve the efficiency of system operations, increase system transfer capability, serve major load pockets, and reduce locational dependence on generating units. The RSP identifies additional work required to fully develop a highly coordinated regional plan to meet the reliability requirements of New England. The regional transmission plan is developed through an open process and through participation of, and review by, interested parties, including state regulators and NEPOOL market participants. To ensure that the ISO receives the full benefit of input from all interested stakeholders, the ISO convenes multiple planning meetings over the

course of the year with the Planning Advisory Committee ("PAC") – a stakeholder group that is open to any interested entity, including, but not limited to, Transmission Customers, Market Participants, and various officials of the New England states. The ISO also coordinates the regional system planning process with the Participating Transmission Owners and other asset owners in New England.

IV. Reliability Standards

Q10. What criteria does the ISO use in determining whether electricity service in New England, including the Greater Springfield and north-central Connecticut areas, is reliable?

A10. As explained below, there are numerous criteria employed in planning a reliable transmission system. Overall, these criteria all seek to satisfy one overarching objective: to ensure an electric system that can reliably deliver electric energy to the distribution systems served by the Participating Transmission Owners. If this objective were not met, the consequence would be significantly increased probability of widespread electric outages to many customers. Put plainly, the reliability objectives seek to keep the lights on in the region, generally, and in specific areas of transmission need, particularly.

The ISO plans the New England regional transmission system to comply with the reliability and criteria standards established by NERC, NPCC and the ISO. The ISO's implementation and compliance with NERC/NPCC Reliability Rules are codified in its Operations, Planning, and Administrative manuals and other written procedures. NERC oversees a number of regional councils, one of

which is the NPCC. The NPCC covers New York, New England, and parts of Canada. Under this framework, NERC has established a general set of mandatory rules and criteria applicable to all geographic areas. The NPCC has established a set of rules and criteria particular to the Northeast, although they also encompass the more general NERC standards. In turn, the ISO has developed standards and criteria specific to New England that coordinate with the NPCC rules. Similar standards exist throughout the nation and other portions of North America.

Whether developed by NERC, NPCC or the ISO, the standards and criteria applicable to the New England transmission system are applied in a deterministic fashion (*i.e.*, for specific disturbances or "contingencies") in order to assess the ability for the system to perform under a series of defined contingency situations. Specifically, these standards and criteria dictate a set of operating circumstances or contingencies under which the New England transmission system must perform without experiencing overloads, instability, or voltage violations. For NPCC, these performance measurements are set forth in NPCC Document A-2, "Basic Criteria for the Design and Operation of Interconnected Power Systems" (revised May 2004) attached hereto as ISO Exhibit 2. The ISO planning procedures are designed to meet the reliability standards that are specifically defined in Planning Procedure No. 3, "Reliability Standards for the New England Bulk Power Supply System" ("PP3"), attached hereto as ISO Exhibit 3. PP3 provides the published standard that provides consistent system planning criteria throughout New England. Analyses of these contingencies also

include assessment of the potential for widespread cascading outages due to overloads, instability or voltage collapse.

V. The Reliability of the Transmission System in Greater Springfield and North-Central Connecticut

Q11. Does the ISO have concerns regarding the ability of the transmission system in the Greater Springfield and north-central Connecticut areas to provide continued reliable electric service?

A11. Yes. The Needs Analysis identifies and details reliability concerns with the Greater Springfield and north-central Connecticut areas electric system. The ISO presented these deficiencies at PAC meetings on five different occasions: May 4, 2005; March 15, 2006; December 15, 2006; December 3, 2007; and May 19, 2008.

Q12. What are the ISO's concerns regarding the ability of this transmission system to provide continued reliability of electricity service in the Greater Springfield and north-central Connecticut areas?

A12. From a reliability perspective, the ISO is concerned that the existing system in Greater Springfield and north-central Connecticut faces a combination of limited transmission capacity, limited generation that is effectively integrated to serve the load, and limited transfer capability into and through the area. As the Needs Analysis shows, there is an increasingly high risk that the system will be unable to withstand single and multiple element contingencies following the single loss or outage of certain critical facilities in these areas as the system approaches or exceeds forecasted peak load levels. Single element contingencies refer to the

loss of an individual transmission line, transformer, or generator due to any event such as a lightning strike. Multiple element contingencies refer to a single event which removes multiple pieces of generating or transmission equipment from service such as may occur following the failure of a circuit breaker or the simultaneous loss of multiple transmission circuits which are on the same tower. These contingencies can result in thermal and voltage violations of the reliability and security standards established by NERC, the NPCC and the ISO.

Q13. What specifically are the ISO's reliability concerns in the Greater Springfield and north-central Connecticut areas?

A13. The ISO shares Northeast Utilities' concerns with thermal overloading of transmission lines and poor voltage performance under numerous contingencies. The severity of these problems increases as the system attempts to move power into Connecticut from the rest of New England. As stated in the Needs Analysis, in the Greater Springfield area, local double-circuit tower outages, stuck-breaker outages, and single-element outages can cause severe thermal overloads and low-voltage conditions. The flow of power through the Springfield 115 kV system into Connecticut increases and thus exacerbates these problems when the major 345 kV tie line between western Massachusetts and north-central Connecticut is not functioning as a result of either an unplanned or planned event. A number of steady-state thermal and voltage violations were observed on the transmission facilities while analyzing the conditions for the 2009 system. The specific overload and voltage violation conditions are summarized in tables 3-6 and 3-7

(page 15) for north-central Connecticut and 3-10 through 3-12 (pages 26-28) of the Needs Analysis.

Q14. How do thermal overloads occur?

A14. Thermal overloads occur when transmission lines, often as a result of a contingency event elsewhere in the system, carry current in excess of their design capacity. Overloaded lines build up heat beyond their temperature limits and may sag in an unsafe manner or fail, redirecting power to other lines, which in turn may become overloaded; a pattern that may result in a sustained loss of load, equipment damage and cascading outages that could affect areas well outside the Greater Springfield /North-Central Connecticut area.

Exceeding the ratings of transmission lines can result in line mechanical failure or sagging into public areas, such as highways; thereby compromising public safety and causing uncontrolled outages. Lines that sagged into trees in Ohio contributed to the Northeast Blackout of August 2003.

Q15. Why is low voltage a concern?

A15. Low voltage at the consumer level is a concern because it can damage equipment and interfere with the proper operation of appliances and machinery. At the transmission level, insufficient voltage can also cause unanticipated and undesirable protective equipment operation, voltage collapse and loss of load.

Q16. How many violations of the ISO Reliability Standards may occur before a system is considered to be out of compliance?

A16. None. A system that has only one violation of the criteria outlined in the ISO Reliability Standards is not in compliance.

Q17. What consequences can an uncontrolled blackout have?

A17. There are two consequences of an uncontrolled blackout. First, it is often difficult to accurately predict how large an area will be affected by a blackout, and as a result, it could encompass the entire northeastern United States, as happened in 1965 and again on August 14, 2003, when parts of the Midwest and Canada were also affected along with the Northeast. Second, it may result in equipment damage that will hamper restoration of service, thus prolonging outages, and make efforts to remedy the system more expensive.

VI. Benefits of the Connecticut Valley Electric Transmission Reliability Projects

Q18. What reliability benefits will the Connecticut Valley Electric Transmission Reliability Projects provide to the transmission system?

A18. The installation of the Connecticut Valley Electric Transmission Reliability Projects will address the reliability issues described above by eliminating the thermal and voltage criteria violations and improving transfer capabilities. Moreover, the transmission upgrades will serve to ensure that the transmission system remains in compliance with NERC, the NPCC, and the ISO reliability standards.

Q19. Did the ISO consider market responses in evaluating the need for these upgrades?

A19. Yes. The Tariff requires that the ISO "reflect proposed market responses in the regional system planning process."[12] Market responses include, but are not limited to, demand-side projects, generation, distributed generation and Merchant Transmission Facilities. The ISO evaluates the need for Regulated Transmission Upgrades based on viable market responses that have been proposed and (i) have

[12] Section 4.2(a) of Attachment K to the Tariff.

cleared in a Forward Capacity Auction ("FCA"), (ii) are contractually bound by a state-sponsored Request for Proposals ("RFP"), or (iii) have a financially binding obligation pursuant to a contract.[13]

The first FCA was held in February 2008 and the second FCA was held in December 2008. As required by the Tariff, the ISO has considered the impact on the need for the GSRP based on the cleared resources resulting from these FCAs. The ISO has also considered the timing of need for the project based on recent load forecasts.

As detailed in the ISO's supplemental data response to OCC-16, the ISO has concluded that neither the FCA resources nor the revised load forecast would affect the timing of the need for the project. In the CELT 2009 forecast for the summer of 2014 (the first summer that the GSRP is scheduled to be in service) the western Massachusetts load is forecast to be 2,390 MW. The FCAs resulted in approximately 95 MW of available New Demand Resources in western Massachusetts, the majority of which (86 MW), cleared in the first auction. With respect to New Generating Capacity Resources, one New Generating Capacity Resource cleared in western Massachusetts with a Capacity Supply Obligation of 2.5 MW. The CELT 2009 forecast for summer 2014 of 2,390 MW minus the new 97.5 MW of available new resources still exceeds the 2,245 MW load level that resulted in the 2009 criteria violations detailed in the Needs Analysis.

Q20. Were these findings presented to the PAC?

A.20. Yes. The findings and analysis supporting the determination that neither the FCA resources nor the revised load forecast affect the timing of the need for the

[13] *Id.*

Connecticut Valley Electric Transmission Projects were presented to the PAC on June 17, 2009.

Q21. Does the ISO support the proposed Connecticut Valley Electric Transmission Projects?

A21. Yes. As described above and in the Needs Analysis, the ISO is concerned about the ability of the existing transmission system to maintain reliable electric service in the Greater Springfield and north-central Connecticut areas. The GSRP proposes a second 345 kV transmission circuit between Ludlow Substation and North Bloomfield Substation, which is needed to unload the 115-kV transmission system and increase power transfer capabilities between Massachusetts and Connecticut. The Project will provide an alternative 345-kV source to the North Bloomfield Substation and establishes a new 345/115-kV hub west of the Connecticut River and north of the North Bloomfield Substation at the existing Agawam Substation.

The MMP improves the reliability of the GSRP by eliminating a critical double circuit contingency that creates overloads on a number of 115kV underground cables in downtown Hartford.

Q22. Does this conclude your testimony?

A22. Yes, thank you.

1

ISO EXHIBIT LIST

Frank Mezzanotte

ISO Exhibit 1	Professional Biography of Frank W. Mezzanotte, P.E.
ISO Exhibit 2	NPCC Document A-2 “Basic Criteria for the Design and Operation of the Interconnected Power Systems.”
ISO Exhibit 3	ISO Planning Procedure No. 3, “Reliability Standards for the New England Bulk Power Supply System.”