STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

THE CONNECTICUT LIGHT AND POWER COMPANY AND THE UNITED ILLUMINATING COMPANY APPLICATION FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION OF A NEW 345-KV ELECTRIC TRANSMISSION LINE AND ASSOCIATED FACILITES BETWEEN THE SCOVILLE ROCK SWITCHING STATION IN MIDDLETOWN AND THE 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 WALLINFORD, 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 16, 2005

BRIEF OF RICHARD BLUMENTHAL, ATTORNEY GENERAL
FOR THE STATE OF CONNECTICUT

Richard Blumenthal, Attorney General for the State of Connecticut ("Attorney General"), hereby submits this brief in the above-captioned proceeding. For the reasons fully described herein, the Attorney General respectfully urges the Connecticut Siting Council ("Council") to impose specific conditions and modifications if it approves the construction of the electric transmission line proposed in the Application for a Certificate of Environmental Compatibility and Public Need for a 345 kV Electric Transmission Facility and Associated Facilities Between Scovill Rock Switching Station in Middletown and Norwalk Substation in Norwalk filed on October, 9, 2003

("Application") by the Connecticut Light and Power Company and the United Illuminating Company (collectively referred to herein as "Applicants").

I. EXECUTIVE SUMMARY

This office strongly supports improving our state's transmission facilities as quickly as possible. Transmission system upgrades are vitally necessary to deliver reliable power throughout the state and to improve the overall reliability and integrity of the regional electric grid. These upgrades are also necessary to reduce electricity costs and enable economic growth in all areas of Connecticut. But, the Council must take reasonable steps to reduce any immediate damage or lasting detriment.

The 69 mile, 345 kV electric transmission line proposed in this case is a construction project of huge scale and scope -- virtually unprecedented in our state's history -- through one of the most densely populated and highly developed areas of the country. It will permanently and massively alter and scar our landscape, first affecting features of our physical land and natural resources but ultimately impacting our health, environment and quality of life. The proposed project involves building massive transmission towers, construction through local environments and the reconfiguration of many residential communities. It will also increase levels of electric and magnetic fields ("EMFs").

For these reasons, the Attorney General respectfully requests that the Council carefully consider all of the comments and proposals made by the towns and citizens that will be directly affected by this project and only approve the construction of a Middletown to Norwalk electric transmission line if the design of the line provides the most effective environmental and public health safeguards. Additionally, any approval

must completely comply with the legislative mandates regarding undergrounding as much of the line as is technologically feasible and protecting against the harmful effects of EMF.

The electric infrastructure serving parts of our state -- notably Southwestern Connecticut ("SWCT") -- is clearly inadequate to meet the needs of the state and the entire New England region. Upgrades are needed to maintain system reliability in Connecticut as well as in New England. System upgrades will also provide much needed economic relief to all of Connecticut's citizens and businesses by reducing electric costs and enabling economic development. For example, the evidence presented in this case shows that in 2005 electric ratepayers throughout Connecticut will be required to pay $308 million in federally imposed penalties -- penalties that are unfair and ill advised -- related to our electric infrastructure. These charges, however, should be significantly reduced with the completion of much needed transmission upgrades.

Upgrading our electrical system is critical and requires a balanced approach and strategy. Transmission, generation (including distributed generation) and conservation and load management are all important in meeting the state's electric needs. This proposed transmission facility is only one aspect of an overall approach to solving Connecticut's energy needs and should not be imposed on the state, by federal mandate or otherwise, at any undue cost to our environment or the health of our citizens.

The Council should design the proposed transmission line to operate reliably and to include the maximum amount of undergrounding technologically feasible, as is required by Connecticut law. The Council must fully and completely examine all of the evidence relating to undergrounding and affirmatively determine whether additional

miles of undergrounding can be added to the 24 miles of cable proposed by the Applicants. The use of underground 345 kV cable is common in urban settings and can be cost effective.

With respect to health and environmental impact, the Council should recognize that the EMFs associated with transmission lines present a public health concern given their association with an increased risk of childhood leukemia. Any portions of the proposed transmission line that cannot be buried underground must be located in buffer zones that protect public health and safety. Such buffer zones should reduce EMF levels to no more than 3 mG near all schools, day care facilities, youth camps, playgrounds and other locations where children congregate. Elsewhere along the overhead route, EMF levels should be reduced to no more than 3 mG where possible, but absolutely no higher than 6 mG. To accomplish this, the Council should require that the Applicants apply all mitigation measures necessary. Mitigation measures that should be considered include:

-Moving the proposed transmission line within the existing overhead right-of-way to increase the distance between the line and the protected facilities;

-Adjusting the pole structure locations and heights;

-Applying low EMF designs, including optimizing the height and phasing of the electric conductors, including "split-phasing" (if tested and proven effective using reasonable assumptions);

-Placing the existing 115 kV line underground if doing so will reduce EMF's from the remaining 345 kV line; and

-Undergrounding or re-locating the overhead right-of-way to avoid certain sensitive areas, including the Royal Oak neighborhood, the Jewish Community Center in Woodbridge and the Ezra Academy in Woodbridge.

Any Council order should be explicitly contingent on the development and management phase of this proceeding where decisions regarding locally specific concerns

can be examined and resolved. Such issues would include local overhead and underground route configurations and designs, such as pole heights, tower types, tower locations, line configurations as well as cable locations and the impact of construction on traffic and safety in order to allow the affected towns and interested parties the opportunity to participate in such decision-making processes. An assessment of the line's impact along every step of its route is critical to protecting the state's environment and public health.

In addition, the Council should rescind its revised Best Management Practices for EMF that were adopted on December 21, 2004 in light of the inappropriate manner in which they were adopted. The Attorney General respectfully submits that the Council should adopt an open, inclusive and transparent process when drafting revisions to the EMF BMP.

II. INTRODUCTION

In their Application, the Applicants asked that the Council approve their proposal to construct a 69 mile 345 kV electric transmission line from Middletown to Norwalk. The proposed line would, if constructed, represent "Phase II" of a 345 kV loop in SWCT. Phase I of that loop, which runs from Bethel to Norwalk, was approved in Siting Council Docket No. 217. Such a loop would connect SWCT to the New England 345 kV grid and is intended to provide reliability and economic benefits to the entire state and to the New England region.

The Applicants initially proposed that 45 miles of the Phase II transmission line be constructed above-ground. This overhead portion of the line would run through 13 municipalities from the East Devon substation in Milford east to points in Meriden,

Haddam and Middletown.[1] The Applicants further proposed that the segment of the line running from East Devon substation west to Norwalk be placed underground. This 24 mile stretch would pass through six municipalities.[2]

The Applicants initially proposed to use high pressure fluid filled ("HPFF") cable for the 24 mile underground portion of the Phase II line. They further stated in their Application that their proposed configuration "would not require the acquisition of any homes or businesses and would minimize the adverse effects on environmental resources, while conforming to sound engineering practice . . . ." Application, Vol. 1, H-26. The Applicants further testified that they will "be able to operate in a fairly reliable manner." Transcript ("Tr.") April 20, 2005, 22.

The Council and all of the parties and intervenors in this proceeding dedicated a tremendous amount of time and resources to examining the configuration that was proposed in the Application. A significant amount of discovery was conducted, multiple pieces of pre-filed testimony were submitted and experts were engaged to assist in their review of the Application.

During the course of this proceeding, Public Act 04-246, An Act Concerning Electric Transmission Line Siting Criteria ("P.A. 04-246" or "Act") was adopted into law. The Act changed many of the standards that the Council must apply in its consideration of the proposed Phase II line. For example, the Act created a presumption in favor of underground transmission lines and required the establishment of a buffer zone to protect public health and safety around overhead transmission lines.

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[1] These municipalities are Milford, Orange, West Haven, Woodbridge, Bethany, Hamden, Cheshire, Wallingford, Meriden, Middlefield, Durham, Middletown and Haddam.

[2] These municipalities are Milford, Stratford, Bridgeport, Fairfield, Westport and Norwalk.

The legislative provision's effect on this docket was minimal compared with the upheaval caused by the astonishing testimony submitted by ISO New England, Inc. ("ISO-NE" or "ISO") on June 7, 2004. In that testimony, ISO-NE stated that the Applicants' proposed configuration was not adequately reliable and that the ISO could not support it. This revelation effectively started the case over and rendered useless much of the time and energy that was dedicated to the review of the Application until that point.

The ISO's June 2004 testimony led to the creation of the Reliability and Operability Committee ("ROC"), which was made up of the Applicants and ISO-NE and was charged with the task of designing and presenting a configuration that maximizes the amount of underground to the extent technologically feasible and that the Applicants and ISO could support as adequately reliable and operable. The ROC's Report, which included its final proposal, was not filed until the end of December, 2004. The ROC Report proposed the same overhead/underground route as was initially proposed, but did so using a different type of underground technology, cross-linked polyethelene ("XLPE") cable, and applying a number of other infrastructural upgrades.

The Council should not approve the transmission line proposed in the Application as revised by the ROC Report. Rather, modifications and conditions to the Applicants' proposed design are necessary in order to ensure that the approved line complies with the letter and intent of P.A. 04-246 to protect the health and safety of the public and to minimize the environmental and societal impact of the line. Such modifications and conditions include:

-Require the maximum amount of underground 345 kV cable that is technologically feasible;

-For any portions of the 345 kV line that must be overhead, adopt all reasonable measures to protect public health and safety, including:

> -the creation of a buffer zone that limits electric and magnetic fields ("EMFs") to no more than 3 mG near schools, day care facilities, youth camps, playgrounds and other locations where children congregate. Elsewhere along any overhead route, EMF levels must be reduced to no more than 3 mG where possible, but absolutely no higher than 6 mG.
>
> -applying all reasonable mitigation techniques available to reduce EMFs to levels that are considered safe such as adjusting pole placements and pole heights and split-phase line configurations, so long as they are tested and proven effective.
>
> -altering the overhead route to avoid certain, specified sensitive areas where effective buffer zones are not possible.

-Make any approval explicitly contingent on the development and management phase decisions regarding locally specific overhead or underground route configurations designs, such as pole heights, tower types, line configurations and cable locations in order to allow the affected towns and interested parties the opportunity to participate in such decision-making processes.

-Takings should be a last resort. The Phase II line should be configured in a manner that protects public health and safety without having to take individual homes or properties.

III. LEGAL STANDARD

The Council must consider the Application pursuant to the relevant standards and requirements set forth in the Public Utility Environmental Standards Act ("PUESA"), codified at Conn. Gen. Stat. § 16-50g et seq., as amended by P.A. 04-246. For the ease and convenience of the Council, relevant provisions of the PUESA are discussed below and again in the body of this Brief.

Pursuant to Conn. Gen. Stat. § 16-50g, the purpose of the PUESA is to, among other things:

> provide for the balancing of the need for adequate and reliable public utility services at the lowest reasonable cost to consumers with the need to protect the

environment and ecology of the state and to minimize damage to scenic, historic, and recreational values.

The factors that the Council must consider when considering the Applicants' proposal are set forth in Conn. Gen. Stat. § 16-50p. Pursuant to § 16-50p(a)(1), the Council "shall render a decision upon the record either granting or denying the application as filed, or granting it upon such terms, conditions, limitations or modifications of the construction or operation of the facility as the council may deem appropriate." Moreover, § 16-50p(a)(3) requires the Council to "file, with its order, an opinion stating in full its reasons for the decision."

Section 16-50p(a) further sets forth the standards that the Council must apply in the present case. Pursuant to § 16-50p(a)(3):

> The council shall not grant a certificate, either as proposed or as modified by the council, unless it shall find and determine:
> (A) Except as provided in subsection (c) of this section, public need for the facility and the basis of the need;
> (B) The nature of the probable environmental impact of the facility alone and cumulatively with other existing facilities, including a specification of every significant adverse effect, including, but not limited to, electromagnetic fields that, whether alone or cumulatively with other effects, on, and conflict with the policies of the state concerning, the natural environment, ecological balance, public health and safety, scenic, historic and recreational values, forests and parks, air and water purity and fish, aquaculture and wildlife;
> (C) Why the adverse effects or conflicts referred to in subparagraph (B) of this subdivision are not sufficient reason to deny the application;

Moreover, in the case of an electric transmission line, such as the one proposed in this proceeding, the Council must find and determine:

> (i) what part, if any, of the facility shall be located overhead, (ii) that the facility conforms to a long-range plan for expansion of the electric power grid of the electric systems serving the state and interconnected utility systems and will serve the interests of electric system economy and reliability, and (iii) that the overhead portions, if any, of the facility are cost effective and the most appropriate alternative based on a life-cycle cost analysis of the facility and underground alternatives to such facility, are consistent with the purposes of this chapter, with

> such regulations or standards as the council may adopt pursuant to section 16-50t, including, but limited to, the council's best management practices for electric and magnet fields for electric transmission lines and with the Federal Power Commission "Guidelines for the Protection of Natural Historic Scenic and Recreational Values in the Design and Location of Rights-of-Way and Transmission Facilities" or any successor guidelines and any other applicable federal guidelines and are to be contained within an area that provides a buffer zone that protects the public health and safety, as determined by the council. In establishing such buffer zone, the council shall take into consideration, among other things, residential areas, private or public schools, licensed child day care facilities, licensed youth camps or public playgrounds adjacent to the proposed route of the overhead portions and the level of the voltage of the overhead portions and any existing overhead transmission lines on the proposed route. At a minimum, the existing right-of-way shall serve as the buffer zone;

Conn. Gen. Stat. § 16-50p(a)(3)(D).

Also in the case an electric transmission line, the Council must find and determine that "the location of the line will not pose an undue hazard to persons or property along the area traversed by the line." Conn. Gen. Stat. § 16-50p(a)(3)(E). In addition, pursuant to § 16-50p(h), "a public need exists for an energy facility if such facility is necessary for the reliability of the electric power supply of the state."

Further, in the present case:

> there shall be a presumption that a proposal to place the overhead portions, if any, of such facility adjacent to residential areas, private or public schools, licensed child day care facilities, licensed youth camps or public playgrounds is inconsistent with the purposes of this chapter. An applicant may rebut this presumption by demonstrating to the council that it will be technologically infeasible to bury the facility. In determining such infeasibility, the council shall consider the effect of burying the facility on the reliability of the electric transmission system of the state.

Conn. Gen. Stat. §16-50p(i).

P.A. 04-246 also amended the PUESA to require that the Council:

> adopt, and revise as the council deems necessary, standards for best management practices for electric and magnetic fields for electric transmission lines. Such standards shall be based on the latest completed and ongoing scientific and medical research on electromagnetic fields and shall require individual, project-

specific assessments of electromagnetic fields, taking into consideration design techniques including, but not limited to, compact spacing, optimum phasing of conductors, and applicable and appropriate new field management technologies. Such standards shall not be regulations for purposes of chapter 54.

Conn. Gen. Stat. § 16-50t(c).

IV. DISCUSSION

A. BACKGROUND

The Applicants filed their Application to construct a 69 mile 345 kV electric transmission line from Middletown to Norwalk on October 9, 2003. The Applicants initially proposed to use overhead construction for Segments 1 and 2 of the proposed line, a 45 mile stretch from Milford east to Middletown and underground cable construction for Segments 3 and 4, a 24 mile stretch from Milford west to Norwalk. The Applicants proposed to use HPFF cable for the underground segments of the line. The Applicants testified that their initially proposed configuration would operate reliably, even when harmonics were considered. Tr. April 20, 2004, 22, 25. Indeed, at one point very early on in these proceedings, when addressing the possibility of various alternate routes including routes that would contain additional underground cable, the Applicants stated that "it may be technically possible to add in the range of 5 miles of underground cable construction to the Companies' proposed route, provided that the additional length is contiguous to or originating from a substation." Applicants' Ex. 7, Applicants' Supplemental Filing, December 16, 2003, 8. This proposal, however, was only tepidly supported by Applicants' witness in hearings. Tr. April 21, 2004, 137-138.

Two significant events changed the course of this proceeding. First, the passage of P.A. 04-246 altered the legal landscape by amending and adding to the legal requirements that apply to this Application. For example, the Act created a presumption

in favor of undergrounding 345 kV electric transmission lines near certain, specified facilities such as schools, day care centers and camps, and required that overhead transmission lines be contained in a buffer zone that protects public health and safety.

Second, on June 7, 2004, ISO-NE submitted testimony in this case which stated that the Applicants' proposal was not acceptable. Specifically, ISO-NE stated that the Applicants' proposed design and configuration "will not operate reliably" because it "would introduce too much capacitance to a relatively weak system, resulting in low order harmonic resonances." ISO-NE Ex. 8, Supplemental Prefiled Testimony ("PFT") of ISO-NE, June 7, 2004, 6. See also tr. June 15, 2004, 8-20, 23-24, 26. ISO-NE stated that in order to operate reliably, the SWCT system must operate at a resonance level above 3. Connecticut's system today operates with system resonance between 2.9 and 9. Tr. June 15, 2004, 27; App. Ex. 110. But, according to ISO-NE, the addition of the Phase II line as initially designed and proposed by the Applicants would cause the Connecticut system to operate below 3, which it viewed as unacceptable. Tr. June 15, 2004, 45.

ISO-NE's June 2004 testimony significantly delayed these proceedings. It also revealed that the Applicants and ISO-NE had mismanaged certain critical aspects of this proceeding from the beginning, primarily by failing to communicate and adequately study the proposed design. In its initial response to ISO-NE's June 7 testimony, the Applicants agreed with ISO-NE's conclusion that a system should not be designed to operate below the 3rd harmonic. Tr. June 15, 2004, 175. At the same time, however, the evidence clearly indicated that the Applicants' preferred design did not measure up to this standard.

ISO stated that it was aware of Applicants' proposal before it was filed in October of 2003. Tr. June 17, 2004, 38. ISO-NE also claimed that it studied the Applicants' proposal when it first learned of it, presumably in the summer or early fall of 2003. Tr. June 17, 2004, 42. Clearly, ISO-NE was aware of the harmonics issue by the fall of 2003. Id. Apparently, however, ISO-NE kept any concerns it had about the Applicants' design and the resulting resonance and harmonics levels to itself, because the Applicants testified that they did not become aware of ISO's concerns until June 7, 2004, some eight months after the Application was filed and after the Council and parties to this case expended tremendous effort, time and resources studying the Application. Tr. June 15, 2004, 175-176. Indeed, ISO-NE did not even advise the Applicants that they were doing their own study of the Application until that study was filed with the Council. Tr. June 17, 2004, 47.

ISO-NE suggested that it raised its concerns with the Applicants' proposed design in the March 2004 hearings. This claim, however, is not accurate. On March 23, 2004, the Council's staff asked ISO-NE directly "[d]o you have any concerns" regarding the proposed underground segments and regarding the "reliability of operation of the system?" Tr. March 23, 2004, 147. ISO-NE's response was only that:

> I think we have some concerns. We've been airing those concerns during the design process. And the designers have been trying to mitigate those concerns, but it is going to be a very complicated project. And we – overall, we still have some concerns about it because there's a lot of overhead/underground and overhead/underground and it's getting very long, and there's going to be a lot of issues trying to manage the voltage with the line charging from the cables, and its technically going to be very complex.

Tr. March 23, 2004, 147. These statements, while somewhat cautionary, are a far cry from advising the Council and parties that the Applicants' proposal is absolutely

unacceptable and that they must go back to the drawing board. Moreover, even if the ISO had notified the Council and Applicants that the proposed Phase II design was not adequately reliable in March of 2004, that would have been many months too late.

In addition to a clear lack of communication, ISO-NE's June 7, 2004 testimony revealed that neither the Applicants nor the ISO adequately studied the proposed project design until these proceedings were well underway. The fact that critical studies were not performed until the ROC process, almost a year after the Application was filed, proved to be a major failure. The Applicants conducted the so-called "Phase II Study" of the proposed design, which included 24 miles of HPFF cable, in November of 2003. Tr. January 13, 2005, 165-167. This study showed that harmonics were a problem but were manageable. The next time that harmonics were carefully studied in this case was after the formation of the ROC, in the summer-fall of 2004. Tr. January 13, 2005, 168. It appears that the Applicants put off doing critical studies of their proposed route to do other work instead. Tr. June 15, 2004, 100-101.

According to ISO-NE, detailed harmonics and resonance studies are not typically done until later in the design and approval process. Tr. January 11, 2005, 41-42. The SWCT system, however, is not typical. Throughout the Phase I and Phase II proceedings, ISO-NE and the Applicants have stressed that the SWCT electric system is extremely weak and vulnerable. Clearly, there should have been more study much earlier in the process.

The collective mismanagement of this case by the Applicants and ISO-NE led to the formation of the ROC in June of 2004. The ROC was made up of the Applicants, ISO-NE and their experts and was charged with the task of proposing a Phase II design

and configuration that maximizes underground cable and that is sufficiently reliable and operable such that both the Applicants and ISO-NE would support it. This process, though entirely necessary and appropriate under the circumstances, caused roughly six months of delay in this case.

On December 20, 2004, after months of study and review, the ROC submitted its Report to the Council. App. Ex. 176. The ROC identified three solutions it would support as adequately reliable. The ROC's preferred route included 24 miles of underground cable between East Devon and Norwalk as well as a number of mitigation measures, such as upgrades to certain substation equipment. The ROC also proposed two alternate routes, one containing thirteen miles of underground cable and the other containing four miles of underground cable. The underground cable that ROC proposed to use was XLPE, rather than the HPFF that the Applicants had initially proposed, because XLPE would mitigate the capacitance on the line. Tr. January 11, 2005, 31-32. ISO-NE and the Applicants made very clear that the 24 miles of underground cable in their preferred route was the most that they could or would support as being adequately reliable. Tr. January 13, 2005, 33-34. In fact, ISO-NE testified that it would not allow a line that included more than 24 miles of underground cable to be connected to the New England grid. Tr. January 11, 2005, 43-44; January 13, 2005, 61.

KEMA, the expert hired by the Council to advise it on the issue of maximizing the use of underground cable in this proceeding, initially disagreed with ROC's conclusion. KEMA first stated that the studies included in the ROC Report did not support the ROC's conclusion that ten to twenty additional miles of underground cable were not feasible. Council Ex. 24, KEMA Whitepaper, January 19, 2005; Tr. February

17, 2005, 13-14. After further study and after the February 14, 2005 technical session in this case, however, KEMA came to agree with the conclusions stated in the ROC Report that additional undergrounding beyond 24 miles was not feasible or advisable. Tr. February 17, 2005, 14; Council Ex. 25, KEMA Engineering Summary. While KEMA had indicated in its white paper, Council Ex. 24, that C-Type Filters could be used to mitigate the temporary over-voltages ("TOVs") that were limiting the reliable use of underground cable in Phase II, KEMA later stated that there was not enough of a track record for use of C-Type Filters for this purpose. KEMA further stated that given the size and scope of this project, and given the number of TOV's, it would not be appropriate to use C-Type filters in this application for that purpose. Tr. February 17, 2005, 16-18, 22-24, 45-52.

B. NEED

Pursuant to Conn. Gen. Stat. § 16-50p(a)(3), the Council shall not grant a certificate unless it finds and determines a "public need for the facility and the basis of the need." The Attorney General has consistently recognized and acknowledged the need to improve the electric system in SWCT.

1. Upgrades To The SWCT Electric System Necessary

The electrical system that now serves SWCT fails to meet basic planning criteria, tr. January 11, 2005, 23, and is in need of immediate improvement. Tr. June 17, 2004, 55. Connecticut must upgrade the transmission infrastructure in SWCT in order to have a reliable system, not only in SWCT but throughout the state and the entire New England region. Tr. March 23, 2004, 33, 35-36. This is especially the case since demand for electricity in the State continues to grow. Tr. January 11, 2005, 23.

Moreover, upgrading the SWCT transmission system would benefit our state's economy and all of its electric customers because it would significantly reduce onerous, unfair and ill-advised federally mandated charges. Tr. April 20, 2004, 43-44. In 2005, Connecticut ratepayers will be forced to pay roughly $308 million in penalties that are related to our electric infrastructure. Tr. January 11, 2005, 24-26. These charges include congestion charges, payments for reliability must-run contracts, the emergency "gap" RFP, and may in the future include locational installed capacity charges. ISO-NE Ex. 13. According to ISO-NE, the completion of a 345 kV loop should "significantly" reduce these charges to all Connecticut consumers. Tr. February 17, 2005, 82.

It is important to stress, however, that addressing our state's electrical needs require a balanced approach. While this case centers on a transmission upgrade, the Council and the state must pursue a balanced approach to upgrading our electrical system. Transmission, generation (including distributed generation) and conservation and load management should all play important roles in meeting the state's electric needs. In other words, while transmission upgrades are an important piece in the puzzle, they should not be relied upon as the only solution. Indeed, the state should not rely upon any single solution, but should rather employ a reasonable mix of a number of available and cost-effective resources. Alternative means of addressing our energy needs are especially critical during the planning and construction of a Phase II project. See, tr. March 23, 2004, 34.

2. The Proposed Phase II Line Must Operate Reliably

A major change in the design of the proposed Phase II line that occurred during this case was the change in cable technology, from HPFF cable to XLPE. The Council

should carefully scrutinize 345 kV XLPE cable and satisfy itself of its reliability, as the Applicants' position regarding this cable technology evolved over the course of this proceeding. Prior to the formation of the ROC, the evidence presented by the Applicants in this case and in Docket 217 (regarding the Phase I line) indicated that XLPE cable was considered reliable only in short lengths. Tr. April 20, 2004, 251-252; June 1, 2004, 199. Since the formation of the ROC and the subsequent proposal to employ 24 miles of XLPE cable for the Phase II project, however, the Applicants have testified that based on newly gathered information they are now comfortable proposing the use of XLPE cable for this distance. See App. Ex. 113. While the XLPE technology has not changed, there is now more of a track record to evaluate, and according to the Applicants this technology is adequately reliable. Tr. January 19, 2005, 133.

ISO-NE also supported the use of 24 miles of XLPE cable for the proposed Phase II project. Tr. January 13, 2005, 61-62. ISO conducted its own study of 345 kV XLPE technology and determined that the technology had improved and is becoming the technology of choice in the industry. Tr. February 17, 2005, 82-83. ISO-NE further stated that the two circuit design for the underground segments of the line offer redundancies that further bolster its confidence in the XLPE technology. Id. The Council should further recognize that the record in this case indicates other advantages of 345 kV XLPE cable, including reduced maintenance costs, lower line losses, higher ratings and more vendors, not to mention the fact that it does not require the use of fluid insulation. Tr. June 15, 2004, 142.

C. The Council Must Require Maximum Undergrounding of the Proposed Transmission Line

By law, the Council must require that as much of the proposed Phase II transmission line be buried underground as is technologically feasible. Pursuant to Conn. Gen. Stat. § 16-50p(i):

> there shall be a presumption that a proposal to place the overhead portions, if any, of such facility adjacent to residential areas, private or public schools, licensed child day care facilities, licensed youth camps or public playgrounds is inconsistent with the purposes of this chapter. An applicant may rebut this presumption by demonstrating to the council that it will be technologically infeasible to bury the facility. In determining such infeasibility, the council shall consider the effect of burying the facility on the reliability of the electric transmission system of the state.

In the present case, the Applicants and ISO-NE testified that the 24 miles of undergrounding proposed in the ROC Report, from East Devon substation in Milford west to Norwalk Substation in Norwalk, was the maximum amount of undergrounding that they would support. Ex. 176, ROC Report, 3; tr. January 13, 2005, 33-34. In fact, ISO-NE testified that it would not allow a Phase II line that included additional underground cable to be connected to the New England 345 kV grid. Tr. January 11, 2005, 43-44; January 13, 2005, 61.

KEMA, the Council's expert, initially performed a harmonics resonance model of the 24 mile underground route and found that based on harmonic impedence calculations alone, more than 24 miles underground cable was possible and would meet the 3rd harmonic standard. Tr. December 14, 2004, 21-23; Council Ex. 24, KEMA Whitepaper. While KEMA's analysis may have solved the harmonics issue initially identified by ISO-NE, it did not address, much less study, transients and TOVs, which were a major focus of the ROC inquiry. Tr. December 14, 2004, 23. When transients and TOVs were fully

studied, and the results of those studies were analyzed by KEMA, KEMA ultimately concluded that under the circumstances, 24 miles of XLPE cable was the maximum amount of undergrounding that was feasible and advisable for the Phase II line. Tr. February 17, 2005, 13-18.

In response to Council Briefing Questions 2 and 3, [3] the Council must satisfy itself that the 24 miles of underground cable proposed to be used by the Applicants in the Phase II line is the maximum amount that is technologically feasible. A critical part of this inquiry must be a careful examination of KEMA's change in position and a determination of what additional studies are appropriate.

If the Council is convinced that additional undergrounding of the line is technologically feasible and will not harm the reliable operation of Connecticut's electric transmission system, then pursuant to Conn. Gen. Stat. § 16-50p(i) it must approve a configuration that includes such additional underground cable. In meeting this clear obligation, the Council must consider all of the facts and evidence before it. The Council should not, however, cede its regulatory authority to ISO-NE and to its demands and thinly veiled threats.

Placing the proposed Phase II, 345 kV electric transmission line underground would minimize the invasiveness of this facility. Burying the cable under streets and roadways would avoid any environmental impact because those areas have already been disturbed. Undergrounding these lines would also eliminate many of the issues that must be confronted when siting the lines overhead, such as placing high and unsightly towers

[3] On February 17, 2005, the Council issued a list of questions that parties to this case should address their briefs, referred to herein as "Council's Briefing Questions." The Attorney General's responses to these questions are identified as they are included in the context of his brief.

in a right-of-way that now passes through or near a number of sensitive areas such as neighborhoods, a community center/day care facility and a school.[4]

Placing 345 kV transmission lines underground is not unusual. Such power lines have been buried and worked reliably in a number of cities in the United States for many years. For example, in Boston, NSTAR has constructed and operated 18 miles of underground 345 kV cable since the 1980's, using HPFF technology, and the Applicants were not aware of any failures on that system. Tr. April 20, 2004, 26. In fact, there are 36 miles of underground 345 kV cable in the city of Boston. Tr. April 20, 2004, 95. In addition, Chicago has six miles of underground, HPFF 345 kV cable and New York City has considerable lengths of 345 kV HPFF cable which have worked reliably. Tr. April 21, 2004, 108.

In certain urban and urbanized settings including much of SWCT, the use of underground 345 kV cable can be cost-effective. In the present case, the underground cable that was initially proposed by the Applicants for segments 3 and 4 (East Devon Substation in Milford west to Norwalk Substation in Norwalk), which was HPFF, was actually cost-effective compared to overhead cable in those areas. That is because the overhead right-of-way in that area is narrow and must be widened to accommodate an overhead 345 kV line. Tr. April 20, 2004, 20, 32-33. Given the density of development and the extremely high real estate costs in that part of the state, placing these lines overhead would require significant costs. In fact, the evidence presented by the Applicants regarding the cost of the various configurations that would be supported by the ROC demonstrates that because of the high cost of overhead construction in SWCT, there is relatively little distinction between the cost of a 24 mile underground route and a

[4] See discussion of buffer zones in Section IV.D.2, infra.

13 or 4 mile underground route. [5] See Ex. 172, Applicants' Pre-Filed Testimony Concerning Project Costs, December 28, 2004, 3-4, App. A.

A good example of the fiscal and societal cost of overhead construction in SWCT was provided by the City of Bridgeport. Bridgeport has dedicated significant resources to redevelop many areas in the vicinity of what could be overhead lines if Phase II went overhead in that city. Specifically:

> -Bridgeport has spent about $20 million clearing properties and relocating residents from 1998 to 2002 in the Steel Point area;
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> -about $23 million in local, state and federal funds have been dedicated to complete an intermodal transit center;
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> -roughly $12.5 million in federal funds were spent between 1999 and 2002 to refurbish the City's port authority;
>
> -$9 million was spent in 2002-2003 to move a juvenile court facility to a downtown area adjacent to CL&P's right-of-way; and
>
> -An additional $45 million has been budgeted to replace a courthouse in the area.

Tr. June 3, 2004, 109-110.

In light of the foregoing discussion, in response to the Council's Briefing Question 1(a), it is quite clear that the language of P.A. 04-246, now codified in Conn. Gen. Stat. § 16-50p(a)(3)(D), does not contemplate cost or the costs associated with placing such transmission lines underground to comply with this presumption. It is also clear that another section of the PUESA, Conn. Gen. Stat. § 16-50g, states that the purpose of the PUESA is to, among other things, balance the need for "adequate and reliable public utility services at the lowest reasonable cost to consumers with the need to protect the environment . . . ."

The Council must seek to interpret these sections consistently. See Hall v. Burlington Coat Factory, 263 Conn. 279, 280-281 (Conn. 2003). The legislature intended to create a presumption in favor of burying as much of a 345 kV electric transmission lines underground as is technologically feasible. Had the legislature intended that the Council consider the issue of cost in connection with the presumption against overhead lines near certain identified facilities, it would have said so explicitly. Id. As a result, the Council should seek to arrive at a configuration for a 345 kV line that maximizes the use of underground cable to the greatest extent technologically feasible. Only after such a configuration has been designed should the Council apply Conn. Gen. Stat. § 16-50g and balance the need for that facility with the need to protect environmental and other values.

Council Briefing Question 1(b) asks how the term "adjacent" in Conn. Gen. Stat. § 16-50p(h) should be interpreted. Again, § 16-50p(h) creates the presumption that placing 345 kV lines overhead "adjacent to" certain facilities, such as residential areas and day cares, is inconsistent with the purpose of this chapter. The Council asks whether adjacent means within a certain distance of a facility or border the property of such a facility. The Council should interpret this term to further the clear intent of the Act, which is to protect public health and safety, and particularly the health and safety of children, from the health effects of EMF. The protection of public health and safety must take precedence over specific issues relating to the location of certain property lines and ownership rights.

Council Question 1(c) relates to the term "technologically feasible" in Conn. Gen. Stat. § 16-50p(h) and essentially asks how the Council should consider possible but

unproven technology. The Council must apply its expertise, experience and judgment when evaluating technological feasibility. Any electric transmission line that may be approved in this proceeding must be one that can be constructed and operate reliably. The legislature has left it to the Council to determine what design, technology and configuration best balances the need for the proposed line with the environmental impact. In so doing, the Council should consider the track record of the technology being used or considered, along with many other factors.

D. Environmental Considerations

Conn. Gen. Stat. § 16-50p(a)(3) essentially requires that the Council not grant a certificate unless it finds and determines that there is a need for the facility and that the need for that facility outweighs the adverse environmental impacts of that facility. This section defines environmental impacts as:

> [t]he nature of the probable environmental impact of the facility alone and cumulatively with other existing facilities, including a specification of every significant adverse effect, including, but not limited to, electromagnetic fields that, whether alone or cumulatively with other effects, on, and conflict with the policies of the state concerning, the natural environment, ecological balance, public health and safety, scenic, historic and recreational values, forests and parks, air and water purity and fish, aquaculture and wildlife;

Conn. Gen. Stat. § 16-50p(a)(3)(B).

1. EMF

EMFs are an environmental impact that Council must consider when evaluating the environmental impact of the proposed Phase II line. See Conn. Gen. Stat. § 16-50p(a)(3)(B). Specifically, the Council must find and determine that any overhead portions of the proposed transmission line are consistent with the purposes of the PUESA

as amended by the Act and with the Council's best management practices for EMFs.[6] In addition, any overhead portions of the proposed line:

> are to be contained within an area that provides a buffer zone that protects the public health and safety, as determined by the council. In establishing such buffer zone, the council shall take into consideration, among other things, residential areas, private or public schools, licensed child day care facilities, licensed youth camps or public playgrounds adjacent to the proposed route of the overhead portions and the level of the voltage of the overhead portions and any existing overhead transmission lines on the proposed route. At a minimum, the existing right-of-way shall serve as the buffer zone;

Conn. Gen. Stat. § 16-50p(a)(3)(D). Furthermore, pursuant to Connecticut law the Council must find that "the location of the line will not pose an undue hazard to persons or property along the area traversed by the line." Conn. Gen. Stat. § 16-50p(a)(3)(E). In light of these provisions of the Act, it is entirely fair to conclude that the entire purpose of P.A. 04-246 was to protect the public from the health impacts of EMFs.

a. EMFs Associated with the Proposed 345 kV Line Present a Public Health Risk

The evidence presented in this proceeding demonstrates that EMFs associated with the proposed Phase II, 345 kV electric transmission line present a public health risk to the children of our State. Prominent scientific studies in the field show a small but significant link between EMFs and childhood leukemia. Although this association is not fully understood, it cannot be dismissed as coincidence or due to chance. Tr. March 25, 2004, 168; June 16, 2004, 146.

One of the primary studies in this area is the NIEHS[7] Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields, NIH Publication No. 99-4493, dated May 4, 1999 ("NIEHS Study"). In this study, the NIEHS concluded

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[6] The Council's Best Management Practices for EMFs are addressed in Section IV.E, infra.

[7] NIEHS stands for the National Institute of Environmental Health Sciences.

that "[w]hile support from individual studies is weak, the epidemiological studies demonstrate, for some methods of measuring exposure, a fairly consistent pattern of a small, increased risk with increasing exposure that is somewhat weaker for chronic lymphocytic leukemia than for childhood leukemia." The NIEHS went on to conclude "that ELF-EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard." NIEHS Study, ii-iii.

In addition, each of the three prominent meta-analyses in the field, Wartenburg,[8] Greenland[9] and Ahlbom,[10] have identified a statistically significant increase in childhood leukemia in children that are exposed to 2 mG, 3 mG and 4 mG respectively. Woodbridge Educational Institutions Ex. 11, Pre-filed Testimony of Dr. Bell, Dr. Rabinowitz and Dr. Gerber, 1. Moreover, EMF has been classified as a class 2B carcinogen, or a possible human carcinogen, by the International Agency for Research on Cancer ("IARC"), the cancer research arm of the World Health Organization. Tr. March 25, 2004, 148, 167. Substances such as dioxin have moved from class 2B to class 1, which are known human carcinogens. Tr. March 25, 2004, 167.

Perhaps the most important and persuasive evidence presented concerning the public health risks associated with the EMFs from 345 kV electric transmission lines came from the Connecticut Department of Public Health ("DPH"). Of all of the experts that testified in this proceeding, the DPH is the most impartial, disinterested and unbiased. As a result, its testimony should be granted significant weight. According to the DPH, there is a definite association between EMF and childhood leukemia. Tr. October 14, 2004, 96. This association, while weak, is not random and presents a definite

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[8] Wartenberg D. et al., Bioelectromagnetics. 2001, Supplement 5:S86-S01.
[9] Greenland S. et al., Epidemiology. 2000, 11: 624-634.
[10] Ahlbom A. et al., British Journal of Cancer. 2000, 83:692-698.

risk factor. Tr. October 14, 2004, 123-124. Though the question is difficult to study, according to DPH there is a statistical association above 4 mG, and at 5.8 mG the evidence supports a doubling of the risk of childhood leukemia. Tr. October 14, 2004, 125-126.

The negative impact of EMFs associated with 345 kV electric transmission lines on the functioning of implantable defibrillators, known as ICD's, was unrefuted in this case. Woodbridge Educational Institution Ex. 2, Pre-Filed Testimony of Dr. Grubman, 1-3.

The Council heard a vast amount of conflicting testimony on the question of whether, and to what extent, EMF's impact public health from the scientific panel that testified for the Applicants and from the scientific panel that testified for the Woodbridge Jewish Organizations. Upon careful scrutiny and consideration, however, it is clear that the Council should reject the testimony submitted by the Applicants regarding the health impacts of EMF for three reasons.

First, the portions of the Application that addressed EMFs was misleading and unfairly minimized the health impacts of EMFs associated with 345 kV lines. A prime example is Applicants' description of the NIEHS Report which deleted important language. On page 95 of Volume 6 of its Application, the Applicants included the following quotation from the conclusion of the NIEHS Report:

> The scientific evidence suggesting that ELF-EMF exposures pose any health risk is weak. The strongest evidence for health effects comes from associations observed in human populations with two forms of cancer: childhood leukemia and chronic lymphocytic leukemia in occupationally exposed adults . . . In contrast, the mechanistic studies and animal toxicology literature fail to demonstrate any consistent pattern . . . No indication of increased leukemias in experimental animals has been observed . . . The lack of consistent, positive findings in animal or mechanistic studies weakens the belief that this association

> is actually due to ELF-EMF, but it cannot completely discount the epidemiological findings . . . The NIEHS does not believe that other cancers or other non-cancer health outcomes provide sufficient evidence of a risk to warrant concern.

The portions of the NIEHS's Report that the Applicants deleted from this quotation, however, are essential to understanding the NIEHS' position regarding the health effects of EMF. Following is the NIEHS's complete conclusion. The highlighted portions indicate the language of the conclusion that Applicants did not include in their description of it:

> The scientific evidence suggesting that ELF-EMF exposures pose any health risk is weak. The strongest evidence for health effects comes from associations observed in human populations with two forms of cancer: childhood leukemia and chronic lymphocytic leukemia in occupationally exposed adults. **While the support from individual studies is weak, the epidemiological studies demonstrate, for some methods of measuring exposure, a fairly consistent pattern of a small, increased risk with increasing exposure that is somewhat weaker for chronic lymphocytic leukemia than for childhood leukemia.** In contrast, the mechanistic studies and animal toxicology literature fail to demonstrate any consistent pattern **across studies although sporadic findings of biological effects (including increased cancers in animals) have been reported.** No indication of increased leukemias in experimental animals has been observed.
>
> **The lack of connection between the human data and the experimental data (animal and mechanistic) severely complicates the interpretation of these results. The human data are in the "right" species, are tied to "real-life" exposures and show some consistency that is difficult to ignore. This assessment is tempered by the observation that given the weak magnitude of these increased risks, some other factor or common source of error could explain these findings. However, no consistent explanation other than the exposure to ELF-EMF has been identified.**
>
> **Epidemiological studies have serious limitations in their ability to demonstrate a cause and effect relationship whereas laboratory studies, by design, can clearly show that cause and effect are possible. Virtually all of the laboratory evidence in animals and humans and most of the mechanistic work done in cells fail to support a causal relationship between exposure to ELF-EMF at environmental levels and changes in biological function or disease status.** The lack of consistent, positive findings in animal or mechanistic

studies weakens the belief that this association is actually due to ELF-EMF, but it cannot completely discount the epidemiological findings.

> **The NIEHS concludes that ELF-EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may cause a leukemia hazard. In our opinion, this finding is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the United States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures.** The NIEHS does not believe that other cancers or other non-cancer health outcomes provide sufficient evidence of a risk to warrant concern.

(Emphasis added).

The Applicants' misrepresentation of the conclusions of this major study should give the Council great pause. It certainly does little to inspire public trust in the Applicants' arguments concerning the health impacts of EMF. The Council should bear this incomplete representation in mind when it considers the evidence presented by the Applicants on this topic.

Second, the Council should reject the Applicants' expert testimony regarding the health effects of EMF because it was largely irrelevant to this proceeding. The essence of the Applicants' expert testimony regarding EMF was that there is no scientific proof that EMFs cause malignancies in humans. Tr. March 25, 2004, 24, 147. The Siting Council is not, however, charged with resolving the question of whether a cause-and-effect relationship between EMFs and cancers in humans can be scientifically proven. Rather, the issue presented before the Council in this case is to what extent do EMFs associated with 345 kV lines present a public health risk and what steps should be taken to protect the public from that risk. The Connecticut DPH has found a definite association between EMF and childhood leukemia that is not random. Because the DPH has found such an

association, the Council need not address the issue raised by Applicants' experts of whether scientists can prove why and how this association can exists.

Third, the Council should reject the Applicants' expert testimony regarding EMF because their experts have taken a number of unreasonably extreme positions in the past. For example, a member of the Applicants' panel has denied that other substances are carcinogens despite being considered carcinogens by IARC, including MSA and dioxin. Tr. March 25, 2004, 224-229. Indeed, this member even went so far as to recommend smokeless tobacco for individuals addicted to nicotine, even though smokeless is a clear cancer causer. Tr. March 25, 2004, 230-231; May 13, 2004, 165-166. In fact, the Applicants' panel did not even believe that more study on this topic is required, tr. March 25, 2004, 38-40, despite the clear testimony of the Connecticut DPH in this case.

The Council should also reject the notion that it should not take steps to protect against the health effects associated with EMFs because other states may not do so. See, e.g., the recent decision by the Vermont Public Service Board in Docket No. 6860, in which that body approved the siting of a 35.5 mile 345 kV electric transmission line and considered the issue of EMFs. Other states do not have to comply with the requirements of the PUESA, as amended by P.A. 04-246, which binds the Council. Moreover, the transmission line sited in Vermont in Docket No. 6860 had a 250 foot right-of-way, which made it much easier for that regulatory body to avoid having to take aggressive measures to mitigate EMFs.

b. Council Should Adopt a Reasonable Public Health Policy Approach Toward EMF Issue in This Case

As noted supra, the Act requires the Council to site any overhead portions of the proposed transmission line in a buffer zone that protects the public health and safety.

Conn. Gen. Stat. § 16-50p(a)(3)(D). In order to most effectively carry out this charge, the Council should adopt a public health approach to the EMF issue in this case. This means that the Council should require reasonable steps to guard against our best understanding of the public health risk presented by EMFs emanating from the proposed 345 kV line.

By adopting a public health policy approach, the Council need not seek to resolve certain of the significant scientific questions that were debated in this case, such as whether there is proof that EMF causes childhood leukemia or why the association between EMF's and childhood leukemia exists. Rather, Council need only recognize, as our state's DPH has done, that an association between EMFs and childhood leukemia exists and that EMFs therefore present a public health risk. Thus, the Council should take reasonable steps to protect the public from that risk, as it is required to do by the Act.

c. The Council Should Adopt Prudent Measures to Eliminate or Mitigate Risk

A responsible public health approach to addressing the EMF issues in this case is entirely consistent with the Act and calls for the Council to require that the Applicants take reasonable steps to mitigate the impact that EMFs associated with the proposed line will have on children in Connecticut. In this case, the Connecticut DPH recognized and endorsed the use of a "prudent avoidance" approach toward EMF mitigation. Tr. May 12, 2004, 163-164. According to DPH, EMF presents a public health risk because of its association with childhood leukemia, and therefore the Council should take prudent measures to eliminate or mitigate that risk. Tr. October 14, 2004, 90-92. Prudent avoidance, as proposed by DPH, means focusing upon the effectiveness of the various actions taken relative to the risks presented. Tr. October 14, 2004, 91-92. The goal of these prudent measures should be to reduce the EMFs associated with the proposed Phase

II line to levels that do not present a public health risk. DPH specifically rejected the narrow definition of prudent avoidance advanced by the Applicants that measures should only be adopted if their cost of implementation is minimal. Tr. October 14, 2004, 91-92. The Council should note that the DPH did not take its decision to recommend of prudent avoidance lightly. Tr. May 12, 2004, 98, 163-164.

In common household examples, such as appliances that emit EMFs when in use, prudent avoidance for EMF has meant taking basic actions to reduce EMF exposures, such as increasing one's distance from the source or turning off the appliance when children are present. A 345 kV electric transmission line, however, is an entirely different source of EMF and thus requires different steps to achieve prudent avoidance. People who are near the lines cannot simply move their homes, schools or community centers further away from the lines. Similarly, people cannot turn the lines off when their children are nearby. See, tr. June 16, 2004, 177-179. Accordingly, the most reasonable approach in the present case is to design and configure the proposed lines in a manner that reasonably minimizes EMF exposures, particularly in areas where children may be exposed. The Phase II line does not yet exist, so now is the best opportunity to take reasonable steps to reduce its EMFs. Tr. June 16, 2004, 179.

The Council should not be distracted by a number of "red herring" issues that were raised during this proceeding. First, the issue presented in this case is not how the health risks presented by EMF compare to other health risks that children in Connecticut may or may not face. See, tr. May 12, 2004, 184. P.A. 04-246 requires the Council to protect against the risk of EMFs. Moreover, the public health issues presented by EMFs are very different than other public health risks that face children and thus must be treated

differently. Unlike many other health risks facing children, parents and caretakers have no control over the location and manner of operation of 345 kV lines. Unlike appliances in the home, they cannot be turned off or moved as desired. Tr. May 13, 2004, 221. The health impacts of EMFs from transmission lines, therefore, cannot reasonably be compared with such issues as microwave ovens, sunburn, seatbelts and the like. Tr. May 13, 2004,183-184.

Second, the Council should not adopt or become side-tracked by the idea that that EMF's should only be maintained at their current levels, which became known in this proceeding as the "no net increase" standard. See tr. February 1, 2005, 83. The Council may not, consistent with the Act, approve a Phase II line in a manner that leaves EMFs along that route at levels that threaten public health and safety simply because such levels existed before the proposed 345 kV line was constructed. Rather, 04-246 requires that the Council site any overhead portions of the proposed line in a buffer zone that protects public health and safety. Moreover, the evidence presented in this case makes clear that there is no reliable way for the Council to even know what "present" EMF levels are even if it were inclined to apply such an inappropriate standard. That is because the "existing" EMF levels presented by the Applicants are based on too many debatable assumptions. See, tr. February 17, 2005, 247-248.

Third, the Council should not seek to resolve in this proceeding what can or should be done about EMFs that are associated with other electric transmission and distribution lines throughout the state that are not related to the present Application. See, tr. October 14, 2004, 141. The focus of this proceeding is the Application to construct the Phase II electric transmission line from Middletown to Norwalk only. The Act

requires that the Council create a buffer zone around any overhead portions of this proposed facility, and the Council cannot and should not address EMFs associated with other lines around the state in this docket.

2. Overhead Route Buffer Zone

a. Buffer Zone Defined

In light of the scientific uncertainty and the serious health risks to children associated with EMF, the Connecticut DPH recommended in this case that the Council should seek to avoid this risk when possible. Tr. October 14, 2004, 149. Avoiding this risk means reducing EMFs to levels that are not associated with increased risk of childhood leukemia. The DPH testified in this case that prudent avoidance measures should begin at 3 mG. DPH further testified that between 3 and 6 mG is a "grey area" that is slightly above background levels which is not ideal but is not an identifiable health risk. Above 6 mG, however, there is a larger public health risk that should be protected against. Tr. October 14, 2004, 139.

In Council Question 5, the Council asked the definition of "residential area" as it is used in the buffer zone language of Conn. Gen. Stat. § 16-50p(a)(3)(D). When creating a buffer zone, the Council should define a residential area as existing residences (houses, apartments, etc.) in areas that are zoned residential. The Council should reject the Applicants' proposed definition that required a certain number of homes be located within a certain proximity to each other. Children deserve the same level of protection regardless of whether their homes happen to be closely surrounded by other homes.

b. Buffer Zone Applied

The Act left the specific design of the buffer zone to the Council, indicating that one size does not fit all. The Council should thus design a buffer zone that is tailored to the specific needs of the overhead route in Phase II. The Council should begin with the goal of designing a buffer zone that extends 300 feet from each side of the 345 kV transmission line. A 300 foot buffer zone would reduce EMFs to less than 2 mG, or levels for which there is no proof of an increased risk of childhood leukemia. Tr. January 20, 2005, 170. According to DPH, at 300 feet, EMFs from even a strong source would be reduced to background levels. Tr. May 12, 2004, 173; May 13, 2004, 71-72. Such a standard would eliminate any guess work regarding EMF measurements and the effectiveness of various mitigation measures.

A 300 foot buffer zone, however, may not be practical in this case because it is generally wider than the existing overhead right-of-way. As a result, its application could adversely impact a tremendous number of homes and other structures.

Thus, in the event that underground cable is not technologically feasible and a 300 foot buffer zone is not reasonably practical, in order to protect public health and safety the Council must design a buffer zone that reduces EMF levels to no more than 3 mG near all schools, day care facilities, youth camps, playgrounds and other locations where children congregate in order to protect Connecticut's children from an increased risk of childhood leukemia. Elsewhere along the overhead route, EMF levels should be reduced to no more than 3 mG where possible, but absolutely no higher than 6 mG.

The Council has at its disposal a number of tools that it may apply to mitigate EMF levels at specific points along the overhead route to meet this standard. The

Council should consider and apply any or all of these tools as necessary and appropriate. They include:

> -Moving the proposed transmission line within the existing overhead right-of-way to increase the distance between the line and the protected facilities;
>
> -Adjusting the pole structure locations and heights, Applicants Ex. 166; Tr. July 27, 2004, 175; September 28, 2004, 142, 221-222;
>
> -Applying low EMF designs, as listed in Applicant Ex. 96. These include optimizing the height and phasing of the electric conductors, including "split-phasing;"
>
> -Placing the existing 115 kV line underground if doing so will reduce EMF's from the remaining 345 kV line; and
>
> -Re-locating the overhead right-of-way to avoid certain sensitive areas.

Before the Council requires the application of a split-phasing technique, however, it should recognize that it has little track record as an EMF mitigation technique for 345 kV lines. The only known experience with this approach, aside from a parking lot demonstration by the Applicants, is a 115 kV line in New York State. Tr. July 27, 2004, 114, 125. Accordingly, the Council must first satisfy itself of its effectiveness. The Council should also require testing of the measure and allow for some recourse or further mitigation if the measure proves to be ineffective.

Moreover, when applying and evaluating any of these mitigation measures, the Council should err on the side of caution. This means applying reasonable line loading assumptions when measuring and calculating EMFs because higher line loadings produce higher EMF levels. The proposed Phase II lines, if approved, may be constructed and in service by 2008 and are expected to have a 40 year useful life. Tr. September 29, 2004, 168. The average load that will occur at the time that the Phase II line is in use will likely be 16 to 18 gigawatts ("GW").

The Applicants recommend that the Council apply a 15 GW case that it created for use in this proceeding when evaluating the effectiveness of mitigation measures. The Applicants asserted that the GW case reflects normal, or average, line loading conditions. The Council should reject the 15 GW case because at best it reflects the normal line loading conditions for years gone by and will be far obsolete by the time the Phase II line is put into service. In 2002, approximately 48% of the hours of the year were above the 15 GW case and about 52% of the hours were below it. Tr. September 29, 2004, 149-150. Moreover, load in the region rises by about 1% a year. Tr. May 13, 2004, 7-8.

The Applicants provided EMF data at load levels of 15 GW and 27.7 GW. The 27.7GW case was created by the Southwest Connecticut Working Group for system planning purposes. Tr. September 29, 2004, 152. It was designed to stress and test the electric system rather than to predict electric usage of the line at that load level. Tr. September 29, 2004, 153-154. New England load is expected to hit 27.7 GW level in 2010 under average use conditions, and 2005 in the extreme weather case. Tr. September 29, 2004, 160-161. At those peak levels, however, the average load would be roughly 16.8 GW. Tr. September 29, 2004, 161. Similarly, New England load is expected to hit the 30 GW level in 2013 under extreme weather conditions, and at those peak levels the average load would be about 18 GW. Tr. September 29, 2004, 162. Moreover, in 2002, 69% of the hours of the year were below a 16 GW load level. Tr. September 29, 2004, 149.

While a 16 to 18 GW case likely reflects average load levels for the period the line will be in use, if the Council must choose between the 15 GW case and the 27.7 GW

case, it should go with the 27.7 GW case. Of the two, the 27.7 GW case better reflects load levels that will be reached in the future.

c. Specific Trouble Spots Along the Overhead Right-of-Way

As noted above, one mitigation technique available to the Council is to move the overhead right-of-way to avoid certain sensitive areas. Three such areas rightly received significant attention in this proceeding, and the Council should act to protect these areas by altering the overhead right-of-way.

i. Royal Oak Bypass

The first is the Royal Oak neighborhood along the Durham and Middletown line. At present, the existing 115 kV lines pass directly through this neighborhood. There is no overhead right of way along this portion of the route, only an easement for the utility poles. Placing the proposed 345 kV transmission lines overhead along this easement would bring these lines directly through this residential area that deserves protection pursuant to P.A. 04-246.

Many alternatives were mentioned during hearings in the event that undergrounding the lines is not technologically feasible, including: moving the new 345 kV to a bypass through adjoining undeveloped Wilson property and leaving the existing 115 kV lines where they are; moving 345 and existing 115 lines to that bypass; and placing the existing 115 kV lines underground and moving the proposed 345 kV lines to the bypass. Tr. February 1, 2005, 149-151.

The Applicants testified that they would build the lines in a "Royal Oaks" bypass if ordered to do so. Tr. January 19, 2005, 74. The transmission lines should be placed underground in the Royal Oak neighborhood. If they cannot be placed underground, the

Council should defer to the towns' preferences and utilize a bypass to protect this neighborhood.

The owners of the property on which the bypass would travel, the Wilsons, oppose such a bypass and claim that they had made plans to develop this property in November of 2004. Tr. January 19, 2005, 61-62. This bypass, however, has been considered in this docket since at least the spring or summer of 2004. Moreover, the Council must balance the interests of existing homeowners against the interests of potential future owners of homes in a neighborhood that has yet to be developed.

ii. The Jewish Community Center

The existing 115 kV transmission lines now bisect the property of the Jewish Community Center in Woodbridge ("JCC"), going between the main building and the JCC's camp facilities. The JCC's camp represents a vital part of that organization's operations and revenues. The JCC has asked that the Phase II lines be placed underground if possible. Woodbridge Educational Institutions Ex. 13, Pre-filed testimony of Deborah Witkin, January 13, 2005. If underground lines are not possible, the JCC has suggested that it may be possible to require that the Applicants move their camp to a parcel of CL&P (or Northeast Utilities) owned land that is adjacent to the JCC and then place the transmission lines over the property where the camp is now located, presuming that property is suitable. Id.; tr. February 17, 2005, 166.

The Council should note that for the last ten years there have been negotiations between CL&P and the Jewish Federation regarding the acquisition of this property by the Jewish Federation. According to the Applicants, the last discussion on this topic ended with the Jewish Federation indicating that it wished to purchase the land, and

CL&P has yet to respond to this request. Tr. January 20, 2005, 203. The Council should also note that since the municipal consultation phase of this proceeding, the Applicants have been well aware that EMFs from the proposed line at the JCC were a major issue of concern. Tr., January 20, 2005, 221-223. Under these circumstances, the Applicants' lack of progress on this issue is disappointing, to say the least.

The proposed transmission lines should be buried in Woodbridge, especially near the JCC. If underground construction is not possible by the JCC, the Council should respect the wishes of the JCC and move the transmission lines as far from the JCC's vital facilities as possible while not destroying either the use of the main building or the camp. This may be possible by moving the camp and placing the transmission lines over the property where the camp now sits. Since this transmission line will be constructed by CL&P to further its business needs, it would only be fair for CL&P to make its land available to the JCC.

iii. Ezra Academy

The proposed transmission lines also travel very close to Congregation B'nai Jacob in Woodbridge, which is the home of the Ezra Academy ("Ezra"), a kindergarten through eighth grade school, and a religious school. Woodbridge Educational Institutions Ex. 12, Pre-filed testimony of Melanie Waynik, Jeanetter Kuvin Oran, Jay Brotman and Susan Birke Fiedler, January 13, 2005. The existing 115 kV lines now travel along a CL&P right-of-way and are extremely close to the Ezra classrooms and practically over the Ezra playground. Id.

Ezra has testified that their strong preference is to place the 115 kV and 345 kV transmission lines underground to protect the B'nai Jacop/Ezra campus. Id. If

undergrounding is not possible, Ezra has clearly stated that the lines should be placed as far away from this campus as possible, preferably by moving CL&P's right-of-way onto undeveloped property to the north of the campus. Id. This undeveloped property became known in this case as the Reis property. Tr. February 17, 2005, 168-170.

The Council should require the undergrounding of the proposed transmission lines in Woodbridge, especially near Ezra. If underground lines are not technologically feasible, the Council should defer to Ezra's preference and utilize a bypass. If a bypass on Reis property is not possible, then the Council should require the Applicants to move the transmission right-of-way and the transmission lines as far from the building as possible on Ezra's property. Tr. February 17, 2005, 208.

d. Specific Buffer Zone Issues

In Council Question 4, the Council asked a number of questions regarding the effect of establishing a buffer zone, such as whether the establishment of a buffer zone requires the taking of homes or other facilities or requires that warnings be posted, and whether the size of the buffer zone should vary depending on whether the facility is used primarily by children or adults. The Council should bear in mind that the design of a buffer zone is a fact-specific exercise. Therefore, its design of a buffer zone should be tailored to meet the specific needs at each point along any overhead route.

The establishment of a buffer zone in this Phase II proceeding absolutely should not require the taking of any homes or other statutorily protected facilities. The evidence plainly demonstrates that no takings are necessary because the Council can design a buffer zone that protects public health and safety using the mitigation methods and techniques described herein. In general, the Council should consider the taking of

property as an absolute last resort. P.A. 04-246 was designed to protect public health and safety and should not be used as a tool to destroy homes or other facilities.

With respect to the question of whether the design of a buffer zone requires signage or possibly restricted use of that property, again the inquiry must be fact specific based on the proximity of the transmission lines, the EMF levels at the facility, the use of the facility and the preferences of the owners and users of that facility. When engaging in this inquiry, the Council should bear in mind that the evidence regarding the health effects of EMF relates only to childhood leukemia, and thus the focus should be on protecting children. Further, the Council should strenuously seek to avoid imposing restrictions on the use of property.

In light of the foregoing, it is clear that the design of a buffer zone is not only very fact specific, but requires the input and feedback from the individual facility owners and users along any overhead route as well as other interested parties. Thus, the Council should make its decision contingent upon the development and management phase of this proceeding where locally specific overhead and underground route configurations and designs, such as pole heights, tower types, line configurations as well as cable locations and the impact of construction on traffic and safety, can be examined and resolved. This approach will allow the affected towns and interested parties the opportunity to participate in such decision-making processes. Such give-and-take is critical to the fair and appropriate design of a buffer zone that protects public health and safety without unnecessarily impacting or destroying the usefulness of the facilities themselves.

3. Underground Route

While the specific language of Conn. Gen. Stat. § 16-50p(a)(3)(D) does not require the creation of a buffer zone around the underground segments of the Phase II line, the Council nonetheless has a duty to protect the public health and safety. See, e.g. Conn. Gen. Stat. § 16-50p(a)(3)(B). Since the legislature has identified EMF as a threat to public health and safety in P.A. 04-246, the Council should take reasonable steps to protect the public from the health effects from EMFs along the underground route.

As noted above, the Council should defer to the development and management phase specific, detailed design issues regarding the underground segments of the proposed transmission line. Moreover, during the development and management phase the Council should seek and allow the input of those locally affected by the construction and operation of the cable, including the municipalities, nearby facility owners and users as well as the Connecticut Department of Transportation.

E. The Council Should Rescind Its Revised EMF Best Management Practices

On December 21, 2004, the Council adopted EMF Best Management Practices for the Construction of Electric Transmission Lines in Connecticut ("Revised EMF BMP"). The Council took administrative notice of its Revised EMF BMP in this proceeding on January 5, 2005. In certain respects, the substance of these Revised EMF BMP represent a significant departure from the Council's prior version of the Best Management Practices dated February 11, 1993 ("Prior BMP") in that the Revised version has watered down some of the protections and standards that previously applied. The manner in which the Council adopted the Revised EMF BMP, however, was questionable and

potentially illegal. As a result of this process, the Council should rescind the Revised EMF BMP and apply the prior version in this proceeding.

The Council's Best Management Practices for EMF are relevant to this proceeding. Pursuant to Conn. Gen. Stat. § 16-50p(a)(3)(D), the Council must determine that the overhead portions of the proposed transmission line, among other things:

> are consistent with the purposes of this chapter, with such regulations or standards as the council may adopt pursuant to section 16-50t, including, but limited to, the council's best management practices for electric and magnet fields for electric transmission lines . . . .
>
> In addition, pursuant to the Act the Council must:
>
> adopt, and revise as the council deems necessary, standards for best management practices for electric and magnetic fields for electric transmission lines. Such standards shall be based on the latest completed and ongoing scientific and medical research on electromagnetic fields and shall require individual, project-specific assessments of electromagnetic fields, taking into consideration design techniques including, but not limited to, compact spacing, optimum phasing of conductors, and applicable and appropriate new field management technologies. Such standards shall not be regulations for purposes of chapter 54.

Conn. Gen. Stat. § 16-50t(c).

The Revised EMF BMP include a number of fundamental departures from the prior version that they replaced. For example, the Prior BMP required both pre-construction and post-construction measurements of EMF levels. The Revised BMP states, however, that pre-construction measurements "can be obtained using mathematical modeling." Revised EMF BMP, 3. Because modeling requires the application of a number of assumptions, the Revised EMF BMP offer far less certainty as to the impact that a transmission line will have on EMF levels in the vicinity. Moreover, while the Revised EMF BMP call for pre-construction calculations, they also require post-construction measurements. Revised EMF BMP, 4. It makes no sense to apply one

method of determining pre-construction levels and another method to determine post-construction levels.

The Revised EMF BMP also seem to adopt for the first time a "no net increase" standard for EMF levels. Specifically, the Revised version states that "[t]he intent of presenting various design options is to achieve conditions resulting in a no net increase in existing MF levels where possible." Revised EMF BMP, 3. As is discussed supra, a "no net increase" standard is flatly inconsistent with the letter and intent of P.A. 04-246 and should not be adopted or applied by the Council in this or any other proceeding involving the siting of an electric transmission line. The Act requires that the Council create a buffer zone that protects the public health and safety, and this simply is not possible applying a no net increase standard if EMF levels on the existing transmission lines that are being upgraded or replaced are already at levels that are unsafe.

Most troubling, however, is the manner in which the Council adopted its Revised EMF BMP. According to a letter dated January 10, 2005:[11]

> [t]he Council conducted a publicly held meeting to discuss the revisions to this report on December 21, 2004. The Council received verbal remarks from the energy industry and their requests have been included. After discussion, the Council acted to adopt this updated version.

This language could be construed as an admission by the Council that it received "ex parte" communications which are prohibited by law. Pursuant to Conn. Gen. Stat. § 4-181(a):

> Unless required for the disposition of ex parte matters authorized by law, no hearing officer or member of an agency who, in a contested case, is to render a final decision or to make a proposed final decision shall communicate, directly or indirectly, in connection with any issue of fact, with any person or party, or, in connection with any issue of law, with any party or the party's representative, without notice and opportunity for all parties to participate.

[11] This letter is improperly dated January 10, 2004.

In addition, pursuant to § 4-181(c):

> Unless required for the disposition of ex parte matters authorized by law, no party or intervenor in a contested case, no other agency, and no person who has a direct or indirect interest in the outcome of the case, shall communicate, directly or indirectly, in connection with any issue in that case, with a hearing officer or any member of the agency, or with any employee or agent of the agency assigned to assist the hearing officer or members of the agency in such case, without notice and opportunity for all parties to participate in the communication.

The receipt of "verbal remarks from the energy industry" regarding the EMF issue during this case may contravene § 4-181(a), which prohibits the Council from having direct or indirect communications in connection with any issue of fact with any person or party without notice and opportunity for all parties to participate. Clearly, EMFs are an issue of fact in Docket 272. The Council's January 10 letter also raises the question of whether there were violations of § 4-181(c), which prohibits the Council from having direct or indirect communications with any party or intervenor in the case without notice and opportunity for all parties to participate.

On March 8, 2005, the Attorney General asked that the Council:

> immediately and publicly disclose the specific nature of the communications that are referred to in the Council's January 10 letter concerning the Revised Electric and Magnetic Field Best Management Practices dated December 21, 2004 ("Revised EMF BMP"). Please identify who supplied those communications, when and where they were given and received, and by whom they were received. Please also discuss whether the Council gave any notice and opportunity for all parties to this case to participate in those communications.

In its response to this inquiry, on March 14, 2005 the Council asserted that the adoption of the Revised BMP is separate from the present contested proceeding and did not constitute a contested case. As a result, the Council concluded that the requirements of Conn. Gen. Stat. § 4-181 do not apply. The Council further disclosed the nature of the

communications and concluded that they were not substantive and did not prejudice any party or intervenor in the present proceeding.

While the Attorney General appreciates the Council's prompt response, the Council's response raises several questions and concerns. The Council's Best Management Practices are intended to represent the latest scientific and medical research on electric and magnetic fields. Conn. Gen. Stat. § 16-50t(c). The Best Management Practices are to require individual, project-specific assessments of EMFs and will have a direct bearing on all projects that generate EMFs.

Although the Council may not consider the EMF BMP regulations under Connecticut law, id., they nonetheless are legally significant and have a direct impact on this present contested proceeding. Pursuant to Conn. Gen. Stat. § 16-50p(a)(3), the Council must determine the probable environmental impact of the proposed facility, including EMFs. Moreover, pursuant to Conn. Gen. Stat. § 16-50p(a)(3)(D)(iii), any transmission facility that is approved must be consistent with the purposes of the PUESA, as amended by the Act, as well as such regulations and standards that the Council may adopt, including its EMF BMP.

Since the passage of the P. A. 04-246, the Council's EMF BMP have assumed a new and additional importance and relevance to the present case. Pursuant to the Act, the EMF BMP is critical to the review of the proposed 345 KV line because the Council's decision must be consistent with the standards set forth in the BMP. Thus, the development of the Revised EMF BMP during this ongoing contested proceeding, in which EMF is a central issue in dispute, has a direct impact on this contested proceeding,

determining the siting of the transmission line and health and environment of the citizens and communities along the proposed route.

Conversations with only one party to this contested case about a central issue in this case at minimum presents the appearance of impropriety. This fact is especially true here, where the communications that occurred were between Council staff working on the Phase II case and a CL&P employee who appeared as a witness for the Applicants in this proceeding presenting testimony concerning the Applicants' position on EMFs. See, e.g. tr., February 17, 2005, 239-240.

The Attorney General understands that all agency business cannot cease because of the pendency of an contested case. However, the Council's BMP has a direct and critical impact on an ongoing contested case critically important to the State of Connecticut and its citizens. Procedures and safeguards should have been in place to avoid any communications between the Council and parties to the present contested case regarding as highly a disputed issue as EMFs unless all parties were informed of such communications and had an opportunity to comment and participate.

The Council revised its EMF BMP's without notice to, or input from, the public and non-applicant parties and intervenors in this case. Only one party to this case -- the Applicant -- knew that the BMP were being revised and only one party had an opportunity to comment on those revisions, however extensive or significant those comments were. Astonishingly, even some Council members apparently may have been unaware of these communications. See, tr. January 5, 2005, 146.

Under the circumstances, the Council must immediately rescind its Revised EMF BMP. The Council should adopt an open, inclusive and transparent process, allowing

comment and the opportunity for discussion by all parties to the present proceeding when drafting any revisions to the EMF BMP.

V. CONCLUSION

For the foregoing reasons, the Attorney General respectfully requests that the Council only approve a Phase II electric transmission line that meets the requirements of Connecticut law and which protects the environment and the communities and citizens living along its path.

Respectfully Submitted,

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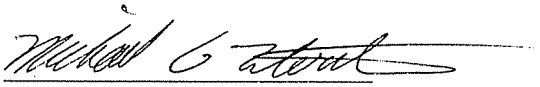
Service is hereby
certified to all parties
and intervenors designated
on this Agency's service
list in this proceeding.



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