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 NORWAL 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 July 19, 2004

MEMORANDUM OF EZRA ACADEMY, CONGREGATION B'NAI JACOB, THE JEWISH COMMUNITY CENTER OF GREATER NEW HAVEN, AND THE JEWISH FEDERATION OF GREATER NEW HAVEN ON THE SAFETY BUFFER ZONE REQUIREMENTS OF PUBLIC ACT 04-246

Ezra Academy, Congregation B'nai Jacob, The Jewish Community Center of Greater New Haven and the The Jewish Federation of Greater New Haven ("The Woodbridge Educational Organizations") hereby submit this memorandum in response to the Siting Council's request for comments on the safety buffer zone requirements of Public Act 04-246, An Act Concerning Electric Transmission Line Siting Criteria.

Introduction:

Public Act 04-246, was signed into law on June 3, 2004.[1] The legislation recognizes the Legislature's concerns about health issues arising from exposing children to the Electromagnetic Fields ("EMF") emitted by overhead transmission lines. The new legislation's purpose is to create a presumption in favor of underground transmission lines, and if undergrounding is deemed technically infeasible, then to protect the children of the State of Connecticut from the potential hazards of overhead transmission lines. [2]

To accomplish this goal, the legislation changes Siting Council procedures in many substantive ways, most of which were outlined by the Attorney General in his Motion filed May 19, 2004. The Woodbridge Educational Organizations concur with the Attorney General's overview of the additional requirements mandated by the new law. These changes enable the Siting Council to be fully informed of the effect of proposed overhead transmission lines, regarding EMF, and bestow additional responsibilities on the Siting Council to create a safety buffer zone between overhead transmission lines and *residential areas, private or public schools, licensed child day care facilities, licensed youth camps, and public playgrounds* ("Sensitive Populations") and to monitor EMF and EMF research to ensure that the buffer zone remains safe. The new requirements are designed to provide the public with assurances that the siting of new overhead transmission lines will be safe.

[1] Passed by a nearly unanimous vote of the Connecticut State Legislature, with only five Representatives voting against the bill, House Bill 5418 was signed into law as Public Act 04-246 on June 3, 2004.

[2] As stated in Public Act No. 04-246, Section 7. "[*T]here 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 day care facilities, licensed youth camps or public playgrounds is inconsistent with the purposes of this chapter*."

A. <u>New Procedures and Information Requirements</u>:

Pursuant to Public Act No. 04-246, the Siting Council must now: 1) Require Applicants to file additional maps that identify areas within one mile of the proposed overhead line for the desired route and all alternative routes that contain "*residential areas, private or public schools, licensed child day care facilities, licensed youth camps, and public playgrounds*" Section 1. (a)(1)(C); 2) Require Applicants to file additional information on the impact of any electromagnetic fields for the desired route and alternative routes in accordance with the Council's Best Management Practices *including "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*." Section 3(a)(1)(C) and Section 10.(c); 3) Deny a Certificate to the Applicant unless the Council shall find and determine that the nature of the probable environmental impact, "*including, but not limited to, electromagnetic fields, that whether alone or cumulatively with other effects*" does not conflict with the policies of the state concerning " *the natural environment, ecological balance, public health and safety,,…*" Section 3.(a)(2.); 4) Deny a Certificate to the Applicant unless it shall find and determine that the overhead line is "*contained within an area that provides a buffer zone that protects the public health and safety, as determined by the council*."; Section 3.(a)(4.) ; and 5) The Siting Council "*shall administratively notice completed and ongoing scientific and medical research on electromagnetic fields*." Section 8.(b.)

B. Analysis

1) Creating a Safety Buffer Zone:

The responsibility of creating a buffer zone to safeguard Sensitive Populations was entrusted to the Siting 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; Section 3(a)(4.)

The new mandate for a buffer zone was intended as a mechanism to shelter the public, especially children, from exposure to EMF emitted by transmission lines. EMF as described in testimony is invisible and can easily penetrate physical structures. In our daily atmosphere there is a background level, or ambient level, of EMF.[3] This background level has been measured and the geometric mean is approximately 0.9 milligaus ("mG") for the general population. For children, the geometric mean is lower at approximately 0.6 mG. [4] It is reasonable, appropriate, and the intention of the legislature that buffer zones would bring EMF to background levels, thereby reducing the risk of exposure to the susceptible target population, children;

It was the intention of the legislature that the Siting Council should consult with the Connecticut Department of Public Health in setting standards for buffer zones. Our Department of Public Health has recommended that "*If the power lines are more than 300 feet away, there should be no cause for concern. At this distance EMF levels from the power lines are no*

[3] Background, or ambient level, is herein defined as a greater than 95% probability of achieving 0.6 mG or lower at maximum capacity load levels.
[4] *See*, http:///www.niehs.nih.gov/emfrapid/htm1/WGReport/Chapter2.html

different from typical EMF levels outside or inside the home." (*See*, Fact Sheet: Connecticut Department of Public Health: Electromagnetic Fields (EMF) Health Concerns: January, 2004.) The Department of Public Health's recommendation reveals a methodology, i.e. via distance, to create a safety zone so that citizens are protected. The Department of Public Health's recommendation of 300 feet as a safe buffer from transmissions lines should be used as a baseline for the distance between transmission lines and *residential areas, private or public schools, licensed child day care facilities, licensed youth camps, and public playgrounds* , wherever possible.

In instances where a 300 foot buffer zone can not be created between the transmission lines and *residential areas, private or public schools, licensed child day care facilities, licensed youth camps, and public playgrounds*, then the overarching goal must be that the edge of the buffer zone brings EMF down to background level of no greater than 0.6 mG when measured at maximum capacity load. If there is enough undeveloped land between the proposed transmission line and *residential areas, private or public schools, licensed child day care facilities, licensed youth camps, and public playgrounds*, to bring the EMF levels to this safe background level, then such land may be an appropriate buffer. Indeed, if a right of way is of an adequate size so that at the edge of the right of way the EMF levels are no greater than 0.6 mG at maximum capacity load, then such right of way may be an appropriate buffer. However, if the size of the right of way or contiguous undeveloped land does not bring EMF levels to 0.6 mG or below at maximum capacity load, then there is not a sufficient buffer zone. The legislation, under these circumstances, would warrant the Siting Council to deny the application for an overhead transmission line.

2) **Provide full disclosure of EMF levels at average load, peak and maximum load**.

As the intent of the law is to provide safety to Sensitive Populations, the Applicant must assess EMF impact for scenarios that include average load (currently defined by the Applicants as 15GW for Southwest Connecticut), peak load (currently defined by the Applicants as 27GW for Southwest Connecticut) and the maximum capacity load on the line. According to the testimony in this docket, peak load could be reached as soon as 2007, the year this line is proposed to be operational. The Applicants have testified that high voltage lines are necessary to accommodate transmitting electricity for long distances with higher efficiency. However, as the load transmitted increases so does the electromagnetic field. As there has been testimony that the capacity of the proposed line will enable future demands for energy to be met, and the proposed lines are expected to be in service for over fifty years and are being constructed at significant expense, the impact of EMF when the system is at maximum capacity is critical to an overall evaluation of the safety and health implications of the proposal. (See, Public Act No. 04-246, Section 3.(a)(3)(B)). Indeed, Dr. Peter Rabinowitz testified about the importance of transient peaks of EMF as well as time weighted averages when assessing the relationship of EMF to childhood leukemia. Therefore, the peak and maximum capacity load EMF calculations are highly relevant, particularly when assessing the efficacy of mitigation measures and the buffer zones that must be established for any overhead portions of the line. Under all circumstances, therefore, the buffer zone must be determined by evaluating EMF under the **maximum capacity** load potentially transmitted over the line. Any other format would be shortsighted and contrary to the goals of the new law.

3) Calculating EMF.

It is logical that in order to properly assess the impact of EMF, and afford all parties an opportunity to fully evaluate the proposal, the record must be better developed regarding calculations of EMF. The Applicants have the resources and the technology to provide detailed empirical information on the calculation of EMF. It is the Applicants who will determine the flow of power. As there is a direct correlation between the level of EMF and the level of power at the source, i.e. the overhead transmission line, it is imperative that the Applicants provide all data and the methods used to calculate EMF. The Applicants should provide detailed empirical information documenting the exact assumptions made in the estimation of EMF levels at each of the cited "cuts." Based upon determining the probability functions associated with each of the parameters used to estimate 60Hz EMF, the Applicants must quantify and report the EMF levels that would be expected to be exceeded with a probability of 5%, 50%, and 95% at average, peak and maximum capacity load conditions. The Applicants should also provide empirical information documenting the impact on estimated 60Hz EMF of a 10%, 50%, 100% and 200% increase, and a 10% and 50% decrease, in each of the variables used to project EMF for each of the proposed configurations. The Applicants should provide quantitative estimates of EMF at the major harmonics at average, peak and maximum capacity load levels.

4) Electric Field Mitigation Measures.

Additionally, the Applicant has not addressed the severely elevated audible noise levels which may be associated with the enhanced corona effect of split-phasing. Intrusive audible noise levels in excess of 50-60 dB may be expected with split-phasing. The Applicants must quantify and report the audible noise levels that would be expected to be exceeded with a probability of 5%, 50% and 95% at average, peak and maximum capacity load conditions. Such

additional reports should include quantitative projections of reliability, and effect of wind, rain and other climate changes. Such additional reports should further include estimates of the audible noise level under average, peak and maximum conditions and under the least optimal operating and climate conditions which would be expected to most substantially increase the audible noise levels. Should such audible noise levels exceed 30dB under any condition, Applicants should also provide an impact analysis of such audible noise levels on learning outcomes and educational activities and health of different age groups of the Sensitive Populations. Such levels would be expected to exceed New Classroom Acoustics Standard –ANSI S12.60-2002, and thus be harmful to children in a learning environment.

5) <u>EMF mitigation measures.</u>

The Applicants must also provide more information on the effect of the various mitigation measures that it has raised, before the Council should rely on these measures as a solution to the EMF problem. For example, the Applicants have proposed reconfiguring the overhead power lines to cancel out EMF, through a technique called "split phasing". Unfortunately, Applicants have provided testimony that such split-phasing to their knowledge, has not been accomplished in the United States; this testimony suggests that such a method is not a proven and accepted mechanism for reducing EMF. Of great concern is that the Applicants' EMF calculations assuming a split phase design are unreliable. The design configuration requires an exacting path for electricity. As noted by the Applicants in their testimony, electricity does not always follow the shortest distance, but travels on the path of least resistance. If a plant is down, or there is another problem along the path, then the electricity may not follow the path designed to cancel out the EMF. Moreover, the Applicants have conceded that their EMF calculations make many assumptions about load flow and transient and harmonic currents. In

actual practice, as described by the Applicants in their testimony, there will be variations in load flow and currents on a day to day basis, which could result in differing levels of EMF. Therefore, the assumptions and the EMF calculations upon which they are based, call into question the extent to which the Council can rely on split phase design as a solution for mitigating EMF. Indeed, in his testimony submitted on June 17, 2004, Dr. Ginsberg highlighted the fact that "[d]uring the course of these hearings, there has been a lack of actual measurement data documenting the effectiveness of split phasing in lowering EMF." The evidence in this proceeding is not adequate to indicate using split- phasing as a reliable mechanism for calculating the depth of a buffer zone. The Applicants should provide additional quantitative projections of reliability, effect of wind, rain, sleet, snow and other climate changes on 60 Hz and harmonic EMF levels associated with the split phase design. Based upon determining the probability functions associated with each of these parameters used to estimate 60Hz EMF, the Applicants must quantify and report the EMF levels that would be expected to be exceeded with a probability of 5%, 50%, and 95% at average, peak and maximum capacity load conditions.

There are a number of other measures that have been discussed including height of the poles, DC technologies, and using the canceling effect of existing transmission lines to mitigate EMF. The record needs be developed on these issues. It is our understanding that testimony relating to these issues will be presented at the end of this month. Importantly, the record needs to specifically be developed considering the reliability of additional technologies and the impact of failure of any such additional technologies on expected 60 Hz and harmonic EMF levels. We reserve our right after that record has been developed to comment on those technologies and the degree to which they meet the requirements and the goals of Public Act 04-246.

6) EMF monitoring

The Council must create a safety buffer zone that protects the public health and safety. This protection is not limited to the initial proposal but must be designed to be effective as long as the overhead transmission line is in place. Accordingly, steps must be taken to assure that EMF levels are monitored to ensure that the actual levels of EMF emitted from the transmission lines do not exceed the projections submitted to the Siting Council with the Application. Monitoring of EMF levels must be assigned to a disinterested third party or independent government entity on an intermittent basis at least twice a year. If the actual EMF levels exceed the projected EMF calculations, then the transmission line must be closed down until such time that EMF can be mitigated to a level that is in compliance with projections and deemed safe.

C. Conclusion:

The testimony in this docket and Public Act 04-246 compel the following conclusions as to the appropriate method for establishing buffer zones: 1) In accordance with the Department of Public Health's recommendation, a Three Hundred (300) foot buffer zone should be established wherever possible. Such buffer zone should provide 60Hz EMF levels at its boundaries of less than or equal to 0.6 mG at maximum capacity load. 2) If a 300 foot buffer zone is not possible, then a safety buffer zone must be established that is wide enough to reduce EMF to a background, or ambient, level that will not exceed 0.6 mG when the system is at its maximum capacity load. 3) If a sufficient buffer zone can not be created, i.e. the Applicant can not bring EMF levels to background at the edge of the buffer zone, then the Council must deny the siting of the overhead 345-kV transmission line. In those instances where a sufficient safety buffer zone cannot be provided, the Council must either order that the line be buried or find an

alternative overhead route, provided in both such options exposure to Sensitive Populations must be maintained at 0.6 mG or less at maximum capacity load.

In summary, the Woodbridge Educational Organizations respectfully request that the Siting Council implement the standards and procedures described herein to ensure adequate safety buffer zones in compliance with Public Act 04-246.

Respectfully submitted,

EZRA ACADEMY, CONGREGATION B'NAI JACOB, THE JEWISH COMMUNITY CENTER OF GREATER NEW HAVEN and THE JEWISH FEDERATION OF GREATER NEW HAVEN

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