STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

RE:	JOINT APPLICATION OF THE CONNECTICUT LIGHT AND POWER COMPANY AND THE UNITED ILLUMINATING COMPANY FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR A 345-KV ELECTRIC TRANSMISSION LINE FACILITY AND ASSOCIATED FACILITIES BETWEEN SCOVILL ROCK SWITCHING STATION IN MIDDLETOWN AND NORWALK SUBSTATION IN NORWALK	:	DOCKET NO. 272
		:	OCTOBER 29, 2004

OFFICE OF CONSUMER COUNSEL'S
FOURTH SET OF INTERROGATORIES

The Office of Consumer Counsel ("OCC") requests that KEMA (the Connecticut Siting Council's expert consultant) respond to the attached interrogatories by **November 12, 2004**. The questions below relate to the Harmonic Impedance Study for Southwest Connecticut Phase II Alternatives, prepared by KEMA, Inc., and dated October 18,2004 (the "KEMA Report").

If there are objections to any questions, or if providing responses to certain questions would be unduly burdensome, please contact the undersigned as soon as possible.

OCC-32 Please refer to the KEMA Report, p. 9, stating that KEMA developed "a new 368-bus model" for its studies. Does KEMA believe that its model is fully equivalent to and consistent with the model used by the Applicant's consultant for its studies reported in this docket? Please explain any answer in specific detail.

OCC-33. Harmonic performance. Refer to the KEMA Report, pp. 29-30.

(a) Did those aspects of the KEMA analysis implicating the Phase One transmission project assume or test any configurations for that project that differ from what actually is planned for its construction? Please explain any answer in specific detail.

(b) How does KEMA rank the relative importance of harmonic, transient, thermal and voltage, stability and short circuit performance when evaluating the reliability of various configurations for the Phase Two transmission project? Please explain any answer in specific detail.

OCC-34. Refer to the KEMA Report, p. 69, Recommendation 3, stating that transient analyses should be performed.

(a) Does KEMA intend to do such transient analyses? If yes, when does KEMA expect the results of such studies to be available? If no, why not, and whom does KEMA propose could or should do such studies?

(b) Does KEMA believe that transient studies are required before a valid answer can be given to the question of how many miles of underground construction for the Phase Two project are compatible with electric system reliability?

OCC-35. Transient performance. Refer to the ROC Group Report, filed in this docket on August 16, 2004, and the studies conducted in connection with that report.

(a) Does KEMA believe that the transient performance of the SW CT electrical system must be acceptable for that system to be considered reliable?

(b) If no, why not? If yes, what does KEMA believe is the minimum acceptable level of transient performance for the SW CT electrical system, and what does KEMA believe is the preferable level of transient performance for the SW CT electrical system? Please explain any answers in specific detail.

OCC-36. Thermal and voltage performance. Refer to the Application, 10/9/03, Vol. 1, p. F-28 and the ROC Group Report, filed in this docket on August 16, 2004, and the studies conducted in connection with that report.

(a) Does KEMA believe that the thermal and voltage performance of the SW CT electrical system must be acceptable for that system to be considered reliable?

(b) If no, why not? If yes, what does KEMA believe is the minimum acceptable level of thermal and voltage performance for the SW CT electrical system, and what does KEMA believe is the preferable level

of thermal and voltage performance for the SW CT electrical system? Please explain any answers in specific detail.

OCC-37. Stability performance. Refer to the ROC Group Report, filed in this docket on August 16, 2004, and the studies conducted in connection with that report.

(a) Does KEMA believe that the stability performance of the SW CT electrical system must be acceptable for that system to be considered reliable?

(b) If no, why not? If yes, what does KEMA believe is the minimum acceptable level of stability performance for the SW CT electrical system, and what does KEMA believe is the preferable level of stability performance for the SW CT electrical system? Please explain any answers in specific detail.

OCC-38. Short circuit performance. Refer to the Application, 10/9/03, Vol. 1, pp. F-29-30 and the ROC Group Report, filed in this docket on August 16, 2004, and the studies conducted in connection with that report.

(a) Does KEMA believe that the short circuit performance of the SW CT electrical system must be acceptable for that system to be considered reliable?

(b) If no, why not? If yes, what does KEMA believe is the minimum acceptable level of short circuit performance for the SW CT electrical system, and what does KEMA believe is the preferable level of short circuit performance for the SW CT electrical system? Please explain any answers in specific detail.

OCC-39. Refer to the Application, 10/9/03, Vol. 1, pp. F-24-31, where the SW CT electrical system is described as inadequate to meet national and regional reliability performance standards.

(a) Does KEMA agree with this assessment of the present SW CT electrical system?

(b) How is such electrical system weakness measured and evaluated? How should it be measured and evaluated? Please explain any answer in specific detail.

(c) Would construction of the transmission system configuration that KEMA recommends for further study (i.e., 10-20 miles of additional undergrounding) strengthen the SW CT electrical system?

(d) Would the construction of such a project (i.e., with 34-44 miles of undergrounding) fully resolve the present electrical system weaknesses found in SW CT?

(e) If this transmission project were built with 34-44 miles of undergrounding, as KEMA has stated may be possible, would the SW CT electrical system still be relatively weak? Would it be measurably strengthened? Would it be decisively strengthened?

OCC-40. Refer to the ROC Group Report filed in this docket on October 8, 2004, and specifically its analysis of "Case 7." Does KEMA agree with the ROC Group conclusion concerning STATCOM units, namely that no further consideration should be given to utilization of multiple STATCOM units as a mitigation measure? Please explain any answer in specific detail.

OCC-41. Refer to the KEMA Report, p. 60, Key Conclusions 4 and 7, for the 10 Mile Underground Results.
(a) On what basis were Southington and Southington Ring 1 excluded from these conclusions?
(b) Would these key conclusions be the same if Southington and Southington Ring 1 had been included here?

OCC-42. Refer to the KEMA Report, p. 62, Key Conclusions 4 and 7, for the 20 Mile Underground Results.
(a) On what basis were Southington and Southington Ring 1 excluded from these conclusions?
(b) Would these key conclusions be the same if Southington and Southington Ring 1 had been included here?

OCC-43. Refer to the KEMA Report, p. 64, reporting the results of KEMA's analysis of underground construction for all of Segments 1 and 2 of the proposed project. Has KEMA concluded that it is definitely not possible to construct all 69 miles of this proposed project underground, based on system reliability considerations? Please explain any answer in specific detail.

OCC-44. Refer to the KEMA Report, p. 69, Conclusion 5, mentioning the difficulty of system operations when certain equipment is installed.
(a) Does KEMA believe that the difficulty of system operations is a factor that should be taken into account when evaluating whether an electrical system is reliable? Please explain any answer in specific detail.

(b) Does KEMA believe that the SW CT electrical system will be more difficult to operate if the proposed project is constructed with 34-44 miles of undergrounding, with the additional filtering recommended, and with further mitigation measures included as appropriate?

OCC-45. Refer to the KEMA Report, p. 9, stating that SW CT has inadequate local generation, and to the Application, 10/9/03, Vol. 1, p. F-30, referring to existing restrictions on the operation of generation resources in SW CT.

(a) Please state whether KEMA believes that it is possible to make the most efficient use of generation resources within SW CT, under each of three different system configurations, namely, (i) the existing transmission system in this area, (ii) the facility that the Applicants have applied to build [i.e., with 45 miles overhead and 24 miles underground], and (c) the Applicants' proposal as modified through the addition of 10-20 miles of underground construction that KEMA states may be possible.

(b) Does KEMA believe that the possibility for such efficient use of generation resources is a standard that should be addressed when determining the reliability of a transmission system?

(c) Did KEMA use the possibility for such efficient use of generation resources as a standard to evaluate the various transmission line configurations considered in the KEMA Report?

OCC-46. Refer to the KEMA Report, p. 9, stating that SW CT has inadequate local generation.

(a) Please state whether KEMA believes that it is possible to take any existing generation units within SW CT off-line for re-powering, under each of three different system configurations, namely, (i) the existing transmission system in this area, (ii) the facility that the Applicants have applied to build [i.e., with 45 miles overhead and 24 miles underground], and (c) the Applicants' proposal as modified through the addition of 10-20 miles of underground construction that KEMA states may be possible.

(b) Does KEMA believe that the possibility for such re-powering is a standard that should be addressed when determining the reliability of a transmission system?

(c) Did KEMA use the possibility for such re-powering as a standard to evaluate the various transmission line configurations considered in the KEMA Report?

OCC-47. Refer to the KEMA Report, p. 9, stating that SW CT has inadequate local generation, and to the Application, 10/9/03, Vol. 1, p. F-31, referring to allowance for the addition of new generation resources in SW CT.

(a) Please state whether KEMA believes that it is possible to add new generation resources within SW CT, under each of three different system configurations, namely, (i) the existing transmission system in this area, (ii) the facility that the Applicants have applied to build [i.e., with 45 miles overhead and 24 miles underground], and (c) the Applicants' proposal as modified through the addition of 10-20 miles of underground construction as KEMA states may be possible.

(b) Does KEMA believe that the possibility for such addition of new generation resources is a standard that should addressed when determining the reliability of a transmission system?

(c) Did KEMA use the possibility for such addition of new generation resources as a standard to evaluate the various transmission line configurations considered in the KEMA Report?

OCC-48. Refer to the ROC Group Report filed in this docket on August 16, 2004, and the statement (p. 4) that it was a significant challenge to "track new risks to system operability and reliability that are introduced when seeking to develop an atypical transmission design."

(a) Does KEMA believe that adding more undergrounding to the proposed project (beyond the 24 miles the Applicants have proposed) would represent an atypical transmission design for the specific area where the line is to be sited?

(b) Does KEMA agree that such tracking of new risks is a significant challenge?

(c) Do the system configurations that KEMA studied introduce new risks to system operability and reliability? If no, why not? If yes, please describe those new risks in specific detail.

(d) Does the KEMA Report track new risks to system operability and reliability that the system configurations it studied may introduce? Does the KEMA Report specifically address those risks, through analysis of mitigation measures or otherwise? Please explain any answers in specific detail.

OCC-49. Refer to the ROC Group Report filed in this docket on October 8, 2004, and its statement (on p. 9-13 and otherwise) of 13 system criteria that the proposed facility must meet.

(a) Does KEMA agree that any facility approved by the Siting Council must meet each of these 13 system criteria? Please explain any answer in specific detail.

(b) Please provide a summary chart stating whether, for each of the 11 key study cases that KEMA analyzed, the case meets each of the 13 system criteria specified in the ROC Group Report. Please provide additional explanatory details as appropriate.

OCC-50. Refer to the Supplemental Pre-Filed Testimony of ISO New England, Inc., (Stephen G. Whitley), filed in this docket on June 7, 2004, and its discussion (at pp. 2-4, etc.) of Good Utility Practice.

(a) Does KEMA agree that any facility approved by the Siting Council must meet the Good Utility Practice standard?

(b) Would construction of the transmission system configuration that KEMA recommends for further study (i.e., 10-20 miles of additional undergrounding) meet the Good Utility Practice standard? Please explain any answer in specific detail.

OCC-51. Refer to the KEMA Report, p. 9, stating that SW CT has inadequate local generation.

(a) Please provide a comparison of the transmission import capability into SW CT and the Norwalk-Stamford area under each of the three different system configurations, namely, (i) the existing transmission system in this area, (ii) the facility that the Applicants have applied to build [i.e., with 45 miles overhead and 24 miles underground], and (iii) the Applicants' proposal as modified through the addition of 10-20 miles of underground construction as KEMA states may be possible.

(b) Does KEMA consider the transmission import capability into SW CT and the Norwalk-Stamford area as a standard that should addressed when determining the reliability of a transmission system?

(c) Did KEMA use the transmission import capability into SW CT and the Norwalk-Stamford area as a standard to evaluate the various transmission line configurations considered in the KEMA Report?

OCC-52. Please provide estimates of the costs (unit costs and overall costs) of using C-type filters to mitigate harmonic problems, as recommended in the KEMA Report.

OCC-53. Refer to the KEMA Report, p. 6. Please provide a copy of any qualifications that KEMA submitted to the Siting Council describing KEMA's expertise in harmonic impedance studies. If none was submitted, please provide KEMA's qualifications and experience in harmonic studies.

OCC-54. Please provide a detailed list of all other Harmonic Impedance studies or similar analyses performed by KEMA. Include the name of the client, the date completed, a description of the system being analyzed, the type of transmission alternatives being studied, the analytical tools or software used, a summary of the results, and any recommendations. If possible, provide copies of those reports.

OCC-55. Please describe the history and experience with passive C-type filters. How many of these devices are in service in the US? Where are they located and what are their specifications? What has been their performance track record to date? Please provide all reports that describe actual C-type filter performance.

OCC-56. Refer to the KEMA Report, p. 9. Where are the 368 busses located? Are all in SW CT, within the NU transmission system, or do they extend to all of the ISO-NE control area? How are ties to other areas modeled?

OCC-57. Other than the Phase I assets, how many miles of underground transmission lines are included in the 368-bus model? What type of cable is each of these, how long is each line, how are they modeled, and where are they located?

OCC-58. Refer to the KEMA Report, p. 10. Please describe the PowerFactory computer program, its inputs and outputs, and how it functions.

OCC-59. Refer to the KEMA Report, p. 13. Please identify all known power converters within the 368-bus model, provide their location, and describe how they were modeled.

OCC-60. Refer to the KEMA Report, pp. 23-24.
(a) How were the light and minimum generator dispatch conditions contained in Table 2 determined?
(b) Were any other dispatch scenarios considered or utilized? How sensitive are the results to changes in this dispatch?
(c) Would placing generation at Norwalk in-service affect the results?

OCC-61. Refer to the KEMA Report, p. 24. Would capacitors to perform voltage support be required more during heavy load periods or during light / medium periods?

OCC-62. Refer to the KEMA Report, p. 25.
(a) Please describe the physical and electrical characteristics of XLPE and HPFF cables, as modeled in Powerfactory.
(b) Explain why charging capacitance for XPLE is 60% of HPFF.
(c) Explain how any differences in the physical and electrical characteristics (e.g., charging capacitance) of XLPE and HPFF cables affects the harmonic performance of the KEMA undergrounding proposal.
(d) How did KEMA treat such differences in its study?

OCC-63. How did any differences in physical and electrical characteristics of XLPE and HPFF cables affect KEMA's recommendations addressing each of three configurations, namely, (i) the existing transmission system in this area, (ii) the facility that the Applicants have applied to build [i.e., with 45 miles overhead and 24 miles underground], and (iii) the Applicants' proposal as modified through the addition of 10-20 miles of underground construction as KEMA states may be possible?

OCC-64. Refer to the KEMA Report, p. 27.
(a) Please explain why "a load in the range of 70-100% of full load with all capacitors in service is expected to be a worst case."
(b) If a 100% full load scenario was studied, what generator dispatch was assumed?

OCC-65. Refer to the KEMA Report. p. 27. Do any of the capacitors listed in Table 3 have the ability to operate at levels between "all on" and "all off"? Are any of these dispatchable remotely, manually operated, or are they fixed?

OCC-66. Refer to the KEMA Report, p. 28, section 3.6.7. Please explain why the Glenbrook STATCOM was not included in the model. How are these devices normally modeled in PowerFactory?

OCC-67. Refer to the KEMA Report, p. 30. Why does KEMA recommend that a detailed background harmonic voltage measurement program be undertaken? Would the results of this program be necessary to support the results of the KEMA study? Have any such voltage measurements been taken? If so, please provide.

OCC-68. Refer to the KEMA Report, p. 32. Please describe the operational issues with operating numerous STATCOMs.

OCC-69. Refer to the KEMA Report, p. 37, paragraph 6.1.1, which states that the load was changed between full and half load with all capacitor banks in service and light generator dispatch, because the minimum dispatch scenario would not solve or converge.

(a) Did the full load, light generation dispatch scenario converge? If so, what was the total load and total generation in SW CT, and how much was imported from the rest of New England?
(b) Would the modeled transmission system be able to successfully deliver this imported power in this scenario?

OCC-70. Refer to the KEMA Report, pp. 37-38, paragraph 6.2.1, which states that the loads on all of the underlying substations are changed between full-load and half –load conditions with all capacitor banks in service and minimum generator dispatch.

(a) Did the full load, minimum generation dispatch scenario converge? If so, what was the total load and total generation in SW CT, and how much was imported from the rest of New England?
(b) Would the modeled transmission system be able to successfully deliver this imported power in this scenario?

OCC-71. Refer to the KEMA Report, p. 69, Conclusion 6. Is it KEMA's conclusion that a Phase II 20-mile underground extension with C-filters and / or STATCOM mitigation schemes represents a reliable system? Please explain.

OCC-72. Refer to the KEMA Report, p. 69, Conclusions 6 and 7. Please explain the difference between "a workable solution from a system resonance point of view" and "a risky choice from a reliability perspective"?

OCC-73. Refer to the KEMA Report, pp. 25-26, referencing HPFF and XLPE cable.

(a) Please provide a summary of the performance history of the various types of cable being considered. How long have these been used in the industry? How many miles of such cable are in the ground? What is the overall operational/maintenance record for such cable?

(b) Has this performance history demonstrated any notable impacts on system reliability, positive or negative? Please describe.

Respectfully submitted,

MARY J. HEALEY
CONSUMER COUNSEL

By:_____
Bruce C. Johnson
Litigation Attorney

CERTIFICATION

I hereby certify that a copy of the foregoing has been mailed and/or hand-delivered to all parties and intervenors of record this 29th day of October 2004.

Bruce C. Johnson
Commissioner of the Superior Court