STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

NORTHEAST UTILITIES SERVICE COMPANY APPLICATION TO THE CONNECTICUT SITING COUNCIL FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED ("CERTIFICATE") FOR THE CONSTRUCTION OF A NEW 345-KV ELECTRIC TRANSMISSION LINE FACILITY AND ASSOCIATED FACILITIES BETWEEN SCOVILL ROCK SWITCHING STATION IN MIDDLETOWN AND NORWALK SUBSTATION IN NORWALK, INCLUDING THE RECONSTRUCTION OF PORTIONS OF EXISTING 115-KV AND 345-KV ELECTRIC TRANSMISSION LINES, THE CONSTRUCTION OF BESECK SWITCHING STATION IN WALLINGFORD, EAST DEVON SUBSTATION IN MILFORD, AND SINGER SUBSTATION IN BRIDGEPORT, MODIFICATIONS AT SCOVILL ROCK SWITCHING STATION AND NORWALK SUBSTATION, AND THE RECONFIGURATION OF CERTAIN INTERCONNECTIONS

DOCKET NO. 272

DECEMBER 1, 2004

KEMA RESPONSES TO PRE-HEARING QUESTIONS FROM THE TOWN OF WOODBRIDGE

1. With reference to Table 14 on page 59. This table shows that for the additional 10 miles of undergrounding scenario, the resonances with the 3rd C-Type Filter Option fall below 3.0 for the Southington 345kV and the Southington Ring 1 115kv.

   a. Please specify what additional measures could be taken to boost these resonances above 3.0.
   b. Provide copies of any analyses, studies or reports which examined any such additional measures.

   A: Despite the labeling in Table 14, Southington 345 kV and 115 kV substations do not have a resonance peak around the 3rd. The maximum value indicated

around or below the 3rd harmonic is the result of the filtering characteristics of the C-Type filter. These maximum values are also damped to levels that they do not pose problems in terms of overvoltages or resonances. Table 14 will be revised to correctly reflect this fact.

2. With reference to Table 15 on page 61. This table shows that for the additional 20 miles of undergrounding scenario, the resonances with the 3rd C-Type Filter Option fall below 3.0 for the Southington 345kV and the Southington Ring 1 115kv.

   a. Please specify what additional measures could be taken to boost these resonances above 3.0.
   b. Provide copies of any analyses, studies or reports which examined any such additional measures.

A: Despite the labeling in Table 15, Southington 345 kV and 115 kV substations do not have a resonance peak around the 3rd. The maximum value indicated around or below the 3rd harmonic is the result of the filtering characteristics of the C-Type filter. These maximum values are also damped to levels that they do not pose problems in terms of overvoltages or resonances. Table 15 will be revised to correctly reflect this fact.

3. With reference to Table 16 on page 63. This table shows that for the additional 40 miles of undergrounding scenario, the resonance with the 3rd C-Type Filter Option falls below 3.0 for the Southington Ring 1 115kv.

   a. Please specify what additional measures could be taken to boost this resonance above 3.0.
   b. Provide copies of any analyses, studies or reports which examined any such additional measures.

A: Despite the labeling in Table 16, Southington 345 kV and 115 kV substations do not have a resonance peak around the 3rd. The maximum value indicated around or below the 3rd harmonic is the result of the filtering characteristics of the C-Type filter. These maximum values are also damped to levels that they do not pose problems in terms of overvoltages or resonances. Table 16 will be revised to correctly reflect this fact.

4. In a format similar to Tables 14, 15, and 16, please provide the results for the analyses of the scenario which includes an additional 15 miles of undergrounding between Devon and Beseck.

   A: Please see Table TOW-1 (attached).

5. a. Please specify whether Cases II-7, II-8, II-9, and II-10 examined by KEMA all assume that the additional undergrounding would start at either the Devon or the Beseck substations.

A: All of the modeled undergrounding cases are assumed to start at Devon and extend toward Beseck.

b. If the answer to part a. of this question is yes, please specify whether KEMA examined any scenarios in which the additional undergrounding did not start at either the Devon or the Beseck substations.

A: No. All of the modeled undergrounding cases studied by KEMA started from Devon.

c. Please provide the analyses and input and output files for any scenarios examined by KEMA in which the additional undergrounding did not start at either the Devon or Beseck substations.

A: All of the modeled undergrounding cases studied by KEMA started from Devon.

d. Please explain how the results presented in Tables 14 and 15 would change, if at all, if KEMA assumed that the additional underground did not begin contiguous to either the Beseck or Devon substations.

A: The results cannot be anticipated, because no such cases were studied. However, KEMA expects that any overhead sections between Devon and the beginning of the cable section would tend to increase the frequency of the first resonance peak and would have some effect on the damping levels.

6. a. Please explain how the results presented in Table 14 would change, if at all, if KEMA assumed that the additional 10 miles of undergrounding examined in Case II-7 were not in a single ten-mile piece but instead were in two five-mile pieces.

A: The results cannot be anticipated because no such case was studied. However, KEMA expects that adding shunt reactive compensation at 5 mile sections would help to maintain better voltage profiles along the cable.

b. Please explain how the results presented in Tables 15 would change, if at all, if KEMA assumed that the additional 20 miles of undergrounding examined in Case II-8 were not in a single 20-mile piece but instead were in two ten-mile pieces.

A: The 20-mile section that KEMA modeled was split into two 10-mile

sections with shunt compensation at each termination.

c. Please explain how the results presented in Tables 14, 15 or 16 would change, if at all, if KEMA assumed that approximately five miles of the additional undergrounding in Cases II-7, II-8, or II-9 were located in the portion of the proposed Phase II project proposed to be sited to the East of the Beseck substation while the remainder of the undergrounding was located between Devon and Beseck.

A: The results cannot be anticipated, because no such case was studied. In general, however, small variations in the amount of undergrounding should produce limited variations in the results.

d. Please explain how the results of the Case-10 analyses would change, if at all, if KEMA assumed that approximately five miles of the additional undergrounding in Cases II-7, II-8, or II-9 were located in the portion of the Phase II project proposed to be sited to the East of the Beseck substation while the remaining 10 miles of the undergrounding was located between Devon and Beseck.

A: The results cannot be anticipated, because no such case was studied. In general, however, small variations in the amount of undergrounding should produce limited variations in the results.

Submitted by:

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Table TOW-1: First Resonances for Additional 15 Miles of Undergrounding				
Additional 15 Miles of Undergrounding 70% Load, Minimum Dispatch (Case II-10)				
Substation & Bus Voltage		No Mitigation, All Caps ON	STATCOMs, Remaining Caps ON	3rd C-Type Filters, Remaining Caps ON
Norwalk 345 kV	1st Resonance	2.7	N/A	3.3
	Impedance Ω	72	N/A	159
Norwalk 115 kV	1st Resonance	2.4	N/A	3.2
	Impedance Ω	6	N/A	7
Plumtree 345 kV	1st Resonance	2.5	N/A	3.3
	Impedance Ω	61	N/A	110
Plumtree 115 kV	1st Resonance	2.5	N/A	3.2
	Impedance Ω	10	N/A	13
Southington 345 kV	1st Resonance	2.5	N/A	See note
	Impedance Ω	32	N/A	See note
Southington 115 kV	1st Resonance	2.4	N/A	See note
	Impedance Ω	6	N/A	See note
Singer 345 kV	1st Resonance	2.6	N/A	3.3
	Impedance Ω	76	N/A	170
Devon 345 kV	1st Resonance	2.6	N/A	3.3
	Impedance Ω	75	N/A	170
Beseck 345 kV	1st Resonance	2.4	N/A	3.6
	Impedance Ω	33	N/A	40

Note: Southington 345 kV and 115 kV substations have maximum impedance values below the 3rd harmonic. From the detailed plotted results, it is clear that these are not resonance peaks, as such. These maximum values, indicated around or below the 3rd harmonic, are the result of the system characteristics and the filtering properties of the C-Type filter. These maximum values are also damped to levels that they do not pose any problems in terms of overvoltages or resonances. Therefore, the results from these substations are excluded from the conclusions.