DOCKET NO. 25

AN APPLICATION SUBMITTED BY NORTHEAST UTILITIES SERVICE COMPANY, AS AGENT FOR THE CONNECTICUT LIGHT AND POWER COMPANY AND THE HARTFORD ELECTRIC LIGHT COMPANY FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED WITH RESPECT TO THE CONSTRUCTION OF AN OVERHEAD 345 kV ELECTRIC TRANSMISSION LINE BETWEEN THE MILLSTONE POINT GENERATING STATION IN WATERFORD, AND THE MANCHESTER SUBSTATION IN MANCHESTER.	:	CONNECTICUT SITING COUNCIL June 4, 1982

F I N D I N G S

1. The Hartford Electric Light Company (HELCO) and Connecticut Light & Power Company (CL&P), acting by its agent, the Northeast Utilities Service Company, in accordance with the provisions of section 16-501 of the General Statutes of Connecticut, Revision of 1958, revised to 1977, as amended applied to the Connecticut Siting Council on September 1, 1981, for a certificate of environmental compatibility and public need for the construction of an overhead 345 kV electric transmission line along an existing route from Millstone Point Generating Station in Waterford to Manchester Substation in Manchester via Hunts Brook Junction in Montville and Village Hill Road Junction in Lebanon.
2. The fee prescribed in section 16-50v-1(b) of the Regulations of Connecticut State Agencies accompanied the application.

3. The application was accompanied by proof of service as required by section 16-501(b) of said General Statutes of the State of Connecticut.
4. Affidavits of newspaper notice as required by Statute and section 16-501-1 of the Regulations of Connecticut State Agencies were also filed with the application. (Record)
5. Pursuant to section 16-50m of said General Statutes of the State of Connecticut, the Connecticut Siting Council, after giving due notice thereof, held a public hearing at the Manchester Town Hall, 41 Center Street, Manchester, Connecticut, on January 11, 1982. An evening session was held on January 11, 1982. (Record)
6. The parties to the proceeding are the applicant, the Hartford Electric Light Company, Connecticut Light & Power Company, and those persons and organizations whose names are listed in the Decision and Order which accompanies these findings. (Record)
7. The following state agencies filed written comments with the Council pursuant to section 16-50j(f) of the General Statutes of the State of Connecticut: Department of Environmental Protection, the Department of Transportation, and Department of Economic Development. (Record)
8. On January 7, 1982 members of the Council made a ground inspection of the proposed route. (Record)
9. The Applicant proposes to build one 345 kV line from Millstone Point in Waterford to Manchester Substation in

Manchester along an existing right-of-way. The bundled 1272 kcmil conductors and the ground wires will be suspended from new wood pole H-frame structures, except for a total of 5.9 miles where they will be suspended in a vacant position on existing and new double circuit steel structures. (Application p. 14, Tr. p. 21,22)

10. The proposed line includes 4.1 miles in Waterford and 1.8 miles in Manchester where the new circuits will be placed in vacant positions on existing double-circuit structures. These sections will require two new towers in Manchester and new single-circuit steel poles at the angles in Waterford. (Application, Summary, p. 22, Tr. p. 23)

11. The proposed line via Hunts Brook Junction in Montville and Village Hill Road Junction in Lebanon is approximately 47 miles long and passes through the towns of Waterford, Montville, Bozrah, Franklin, Lebanon, Columbia, Andover, Hebron, Glastonbury, and Manchester. (Application, Summary and Location Map)

12. The proposed line includes 41.1 miles of new single-circuit wood H-frame structures which will be parallel and similar to the existing structures. (Application, Summary, p. 22)

13. In the 36.2 miles from Hunts Brook Junction to Manchester Junction, the new structures are proposed to be added just west or south of, and parallel to, the existing structures. In the 4.9 miles from I-95 to Hunts Brook Junction, the new structures will be added among and parallel to three

existing rows of such structures. (Application, Summary, p. 22)

14. The proposed line will be located almost entirely within existing rights-of-way. Additional acquisition is required along a 0.8 mile stretch of right-of-way in Bozrah. (Application pp. 27-28; Tr. p. 22)

15. Along the entire 47 miles of the proposed line no permanent buildings will have to be removed, and no existing open space uses in the right-of-way will be significantly disturbed. (Application p. 28)

16. Little of the area of the proposed line is developed on an urban scale, and only limited portions of it are designated as having urban development potential by the State Plan of Conservation and Development. (Application p. 18)

17. In the more populated sections of the proposed route little additional clearing and construction are required. (Application, Summary)

18. The rocky soils of the area of the proposed line tend to discourage both agriculture and intensive development, and they also limit the productivity of the area's central hardwood forest. (Application p. 18)

19. The Atomic Energy Commission Final Environmental Statement (February 1974) recommended that the proposed route be pursued. (Application pp. 44, 47)

20. The proposed line will require the existing clearing to be widened by 80 feet along 36.2 miles of the route between Manchester Junction and Hunts Brook Junction. The 80 feet

of additional clearing represents an area of about 350 acres, of which about 270 acres will have to be cleared of taller woods and vegetation; the remaining 80 acres consist of agricultural and other open lands. (Application pp. 29, 31)

21. A 1975 forest product survey estimated that about 50 acres of the proposed right-of-way widening could contain significant amounts of saw timber and that the remainder was suitable primarily for cordwood. (Application p. 31)

22. Potential to recover marketable timber from the area to be cleared for the proposed line is now believed to be low. (Response to Council question No. 4)

23. The proposed line will have some visual effects where nearby agriculture does not permit screening. (Application, Summary)

24. Some vegetation may be cleared near houses on Shallowbrook Lane in Manchester. (Tr. p. 44, Docket No. 12 Northeast Utilities Exhibit No. 6)

25. Clearing for the proposed line would remove some of the tall woody vegetation presently screening the right-of-way from some houses on Leitao Drive in Bozrah. (N.U. Late File Exhibit No. 17, Tr. p. 91)

26. Clearing for the proposed line would remove all the tall vegetation presently screening the right-of-way from lot No. 11 on Winthrop Road in Manchester and some of the vegetation presently screening the right-of-way from other

houses on Winthrop Road. (N.U. Late File Exhibit No. 18, Tr. p. 91)

27. Widening and clearing for the proposed line will eliminate or reduce forest buffers adjacent to roads, homes, and water bodies at the following locations: (a) south of Waterman Road, Lebanon; (b) Old Route 2, Bozrah; (c) north of Route 66, Columbia; (d) Hennequin Road Town Recreation Area in Columbia; (e) West Street, Columbia; (f) Clubhouse Pond next to East Street in Hebron; (g) Tallwood Country Club west of Route 85 in Hebron; (h) Buckingham Reservoir in Glastonbury; (i) Shallowbrook Lane at the Glastonbury-Manchester town line; (j) Keeney Street, Manchester; and (k) Glendale Street, Manchester. (Response to Council question No. 14)

28. Access roads already exist for the proposed line, so there will be only limited need for new access roads or improvement of existing ones. (Application p. 22, Tr. p. 22)

29. In the absence of suitable alternate access routes, the Ten Mile River may have to be forded. This would require placing approximately 18 inches of rip rap in the stream bed 12 inches below water level for the width of the river. (Response to Council question No. 6; Application, p. 32)

30. Roughly 20% of the proposed route passes over areas designated for wetland regulation. It is estimated that about 40 wood H-frame structures may be located in these designated wetland areas. (Application p. 32)

31. Two fish and game clubs use portions of the existing right-of-way for recreational purposes. (Application p. 32)

32. A small portion of the right-of-way is part of the Pease Brook State Wildlife Management Area; another portion adjoins the Bishop Swamp Wildlife reservation. (Application p. 32)

33. Cross Bog, a Natural Area of importance for its flora, fauna, or geology, is crossed by the proposed route. (Application p. 33)

34. The Department of Environmental Protection considers the Pease Brook flood control project to be a desirable project but, because of local opposition, no progress toward construction has occurred. (DEP comments, 11/18/81)

35. The State Wildlife Management area in Lebanon and the area near Blackledge River adjacent to Gay City State Park are two areas which might be suitable for snag management, the retention of standing tree snags, to improve wildlife habitat and evaluate such management for the control of woodpecker damage to utility poles. Appropriate management techniques could be addressed in a Development and "anagement Plan. (Tr. p. 138)

36. Erosion along the right-of-way is a problem in the area of the Manchester Reservoir. This has resulted in silt deposits in the northern end of Buckingham Reservoir. (Tr. p. 52)

37. Methods to control erosion and prevent unauthorized use of the right-of-way will be used in cooperation with the

Manchester Water Company at Buckingham Reservoir. (Response to Council question No. 7)

38. The erosion problem in the right-of-way near Buckingham Reservoir is related to unauthorized vehicular traffic along the access roads. (Tr. p. 53)

39. A problem with unauthorized vehicular use of the right-of-way exists in the Shallow Brook Lane area of Manchester. (Tr. p. 167)

40. In Lebanon the proposed line passes within a mile of the historic district and national landmarks at the center of town. (Application p. 29)

41. The proposed line will be approximately one mile from the historic Lebanon Green area. The H-frame structures are below the horizon and viewed from the side against a wooded background. (Response to Council question No. 2, 12/30/81)

42. The line as proposed includes a diagonal at the southwest corner of Village Hill Junction designed by Northeast Utilities in response to the discussion of Segment 11 and suggested alternative alignment presented by Cahn Engineers, Inc., for the 1977 application (Docket No. 12). (Tr. p. 81; NU Exhibit No. 8)

43. The State Historic Preservation Officer indicated that the route for the proposed transmission line appears appropriate in light of cultural resources and environmental data. (State Historic Preservation Officer letter to NU 1/19/82)

44. The State Historic Preservation Officer has identified

areas with potential architectural significance in segments 1, 8, 15, and 18, an early 19th century architectural structure listed on the State Register of Historic Places in Segment 19, and environmental characteristics which suggest a potential for the existence of prehistoric archaeological resources in Segments 1, 2, 6, 7, and 12. (State Historic Preservation Officer's letter to NU 1/19/82, p. 2)

45. The State Historic Preservation Officer has requested the opportunity to review and comment on specific plans prior to field construction or any site specific activity. (State Historic Preservation Officer's letter to NU 1/19/82, p. 2)

46. Mr. Williams, a farmer in Lebanon through whose property the proposed line runs, objected to having additional structures placed in his fields and stated a preference for single poles instead of H-frames. (Tr. pp.46-49)

47. Use of single pole structures on Mr. Williams property in Lebanon would result in taller poles which may be more visible from historic areas around the Lebanon green. (Tr. p. 23)

48. The proposed line passes through the middle of Mr. William's farm where the best crop land is located. Addition of H-frame structures would make it more difficult to cultivate the fields. Single pole structures would minimize this impact. (Tr. pp. 107-112)

49. Replacing the wood pole H-frames on the Williams farm with double circuit steel towers would add approximately $732,^00 to the cost of the project. (Tr. p. 75; NU Exhibit 15, NU 16)

50. The applicant has agreed to work with Mr. Williams prior to submitting a D^M Plan with the Council to mitigate the impacts of placing structures on his property. (Tr. pp. 77-79)

51. The proposal for the new 0.8 miles of right-of-way required in Bozrah (Sullivan property) is to acquire 240 feet of additional right-of-way width (approximately 25 acres). (NU Exhibit 6, Tr. p. 98)

52. An easterly alternative for the Sullivan property proposes 125 feet of additional right-of-way width (about 13 acres including approximately 2 acres for updating the clearances of the existing line) or 48% less than the proposal. (NU Exhibit 14, 21; Tr. p. 98)

53. Two 345 kV circuits of parallel wood H-frame structures require a minimum right-of-way width of 250 feet. (Application p. 20)

54. The additional 115 feet of right-of-way width in the proposal over the easterly alternative is not needed for the proposed line nor is it needed in any short or long range supply plans the company has to date. (Application p. 20; Tr. pp. 83-84)

55. If at some future time a need should develop for a third 345 kV circuit along this right-of-way, the easterly alter-

native would allow additional clearances to the south and west in this 0.8 mile section consistent with the existing 18 miles of 365 foot wide right-of-way from Hunts Brook Junction to Village Hill Junction. (Application p. 24)

56. The east side alternative would have the advantage of retaining the 300 foot separation of the Sullivan farmhouse and the nearest transmission line. (Response to Council question No. 5; NU Exhibit No. 14)

57. The east side alternative would have the advantage of retaining all the trees that now exist between the (Sullivan) farmhouse and the nearest transmission line. (NU Exhibit 14; Response to Council question No. 5, 12/30/81)

58. The real estate price for easement acquisition for a 365 foot right-of-way in the area of the Sullivan farm is estimated at $95,000. The estimated price of a 250 foot acquisition would be $65,000. (Tr. p. 97-98)

59. The incremental cost of the Sullivan farm east side alternative, in 1983-84 dollars, is calculated to be $100,000. This figure does not include the estimated $30,000 savings (1981 dollars) attributable to smaller land acquisition requirements. (Tr. pp. 31, 97, 99; NU Exhibits 6, 14, 19, 20)

60. On the triangle of land between New Route 2 and Bashon Hill

Road, the proposed configuration would result in six poles (2 three pole angle structures) at that location, while the easterly alternative for the Sullivan property would result in four poles (2 two-pole H-frame). (Tr. p. 104; NU Exhibits No. 6, 14)

61. Herbicides, such as Garlon 4 and Krenite, would be used to control vegetation along the route. The initial application might require approximately 1000 lbs. of triclopyr and 400 lbs. of fosamine, the active ingredients in Garlon 4 and krenite, respectively. Additional treatments would be scheduled every 5 to 8 years, and dosage rates would progressively decrease as tall woody vegetation were replaced by shrubs, grasses, and herbaceous plants. (Response to Council question No. 8)

62. The proposed line conforms to 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." (Application p. 17; Tr. p. 21, 34)

63. The proposed line would conform to the National Electric Safety Code and the regulations concerning method and manner of construction of the Connecticut Department of Public Utility Control. (Tr. p. 35)

64. The location and construction of the proposed line would not pose an undue hazard to persons or property. (Tr. p. 35, 65, 66)

65. The estimated cost of the Millstone - Card Substation - Manchester line is estimated at $20.8 million (1981

dollars) if 1272 kcmil conductors were used. (NU application p. 4; Tr. pp. 22-27; NU Exhibit 25)

66. The cost of the project at termination, in 1984 dollars, is calculated to be $26,130,^00, an escalation of 27.7%. (NU Exhibit 29; Tr. p. 96)

67. The 1977 proposal cost estimate of $16,800,000 is expressed in 1981 dollars. The estimated 1981 cost of $20,800,^00 is in 1983/1984 dollars. (Tr. pp. 150, 153)

68. The annual level premium rate for estimating project carrying charges in the 1977 proposal is 16.' percent. The annual level premium rate of the current proposal is 18.99 percent. (Tr. pp. 128, 129)

69. The proposed line would provide monetary savings through the elimination of certain transmission line losses and the displacement of uneconomic generation, presently estimated at $3.0 million. (Tr. p. 27; Application p. 4; NU Exhibit 11; Response to Council questions, table of revised figures)

70. The savings attributable to the project would exceed the carrying charges associated with the construction of the project. NU estimates annual savings to be $8.3 million which exceeds the annual carrying charges of $3,950,000 by $4,350,000. (Tr. p. 27; Application p. 4; Revised figure)

71. The accounting book life of the proposed transmission facility is twenty to thirty years. Steel pole accounting book life is 45 years. Present value of savings is estimated at a rate of 15% applied to annual savings. (Tr. pp. 156, 157)

72. The 1977 proposed annual carrying charge of $2,760,000 is expressed in 1982 dollars. Annual carrying charge of the 1981 proposal is $3,950,000 in 1986 dollars. (Tr. p. 151, Response to Council question 21)

73. The 1977 proposal estimated savings of $3 million per year, expressed in 1982 dollars. The 1981 estimated gross savings of $8,300,000 per year is expressed in 1986 dollars. (Tr. p. 151, Response to Councilquestion 21)

74. The annual net savings per year from the 1977 proposal would have been $240,000, expressed in 1982 dollars. The annual net savings from the 1981 proposal of $4,350,000 is expressed in 1986 dollars. (Tr. p. 151-152)

75. The difference in yearly savings from $240,000 in 1977 to $4,350,000 in 1982 is mostly attributable to the increase in oil costs. (Tr. p. 154)

76. The delay in construction of the 1977 proposal inflated the cost from $16,800,000 (1981 dollars) to $20,800,000 (1984 dollars) at an average annual inflation rate of about 9 percent. (Tr. p. 153)

77. NU estimates increased generation (primarily from fossil fuel facilities) needed to replace power lost while the Millstone plants are off line would cost more than $4.8 million yearly if the new line were not constructed. (Application pp. 4,10, Revised figure)

78. The three Millstone units are designed to run at full rated capacity at all times except during periods of shut down for maintenance, repair, and refueling. For each hour that

combined output is reduced by 1,000 Mw, approximately 1,900 barrels of oil are used to provide replacement fossil fueled generation and a cost of $1,400,000 per 10 hour period (1986 estimated oil prices) is incurred. (Application p. 16)

79. No savings from the proposed line can be realized until Millstone III goes into service. (Tr. p. 154)

80. The total energy cost from Millstone III is expected to be less expensive to customers than the fuel cost of replacement energy alone. (NU Late File No. 24, p. 9)

81. The total cost per kilowatt hour to customers for power generated by Millstone III, levelized over the first 10 years of operation, is projected to be 11.5¢ per Kwh. This compares to a 10 year levelized fossil fuel replacement energy cost of 16.8¢ per Kwh. (NU Late File No. 24, p. 10)

82. NU estimates the savings of nuclear generation over fossil fuel generation to be $2 billion between 1986 and 1993 (1986 estimated oil price per barrel). This anticipated savings was derived from a composite value of coal and oil costs that Millstone III would be expected to replace, based on Data Resources Inc. projections. The oil savings would amount to 50 million barrels of oil from 1986-1993. (NU Late file No. 24, pp. 9-11)

83. The completion of Millstone Unit III and retention of substantial ownership is considered a part of the NU supply side oil reduction program. (Tr. p. 159)

84. The funding granted by the DPUC hearing decisions of

December 2, 1981, was believed by the DPUC to be sufficient to enable NU to meet the 1986 projected completion date for Millstone III and the Department reaffirmed its support for the project. (Tr. p. 158; NU Late File No. 23, pg. 28)

85. The three Millstone units will serve as base load generators. With the three transmission lines now in service, power flow on all three circuits would be heavy under normal conditions regardless of systems load levels. Since transmission line power losses of electric energy are proportionate to the square of the current flow, such losses would be higher than would be the case with the proposed fourth circuit in operation. These power losses would be equivalent to additional load on the system and would be supplied by increasing the output of other system generators by an equal amount. (Tr. p. 10)

86. The need for an additional 345 kV line has increased since the submission of the original proposal in 1977. (Application p. 4; Tr. p. 24)

87. The construction of this line ensures that Millstone Point generation can operate at full capacity after the completion of Unit III. Presently, three 345 kV circuits emanate from Millstone Point. (Application summary sheet)

88. Millstone III completion is expected sometime in 1986 at which time NU plans to begin operations. (Application p. 2; Tr. p. 24-26; NU Late file 23)

89. The Millstone-Manchester line has to be certified and constructed before Millstone III can begin operations in 1986. (Tr. p. 24-26; Application p. 8)

90. NU anticipates that generation from Millstone Station will result in economic and oil conservation benefits with minimal environmental impacts if Millstone's output reliability is assured by expanding the transmission system beyond the present three 345 kV circuits. Without the proposed fourth circuit, serious system instability could result after Millstone III comes on line in 1986. (NU Exhibit 10, Report No. 1, pp. 7-14; Tr. p. 24; Application p. 8)

91. Without the fourth line, power must be backed down when any of the other lines are taken out of service. (Application p. 4-8)

92. NU testified that four circuits will be adequate to transmit the capacity out of Millstone in the foreseeable future. (Tr. p. 184)

93. The system must be able to function under simultaneous double circuit outages. Without the additional fourth circuit, the system could be thrown into instability by the resultant overload. (Application p. 10)

94. The construction of an additional 345 kV circuit to a major load center could assure adequacy of the system in the event of forced outages, by transferring the station's output to the main power grid of the state without overloading the facilities. (Application p. 10)

95. The added fourth 345 kV circuit would prevent the loss of capacity at Millstone Station and would provide a system consistent with the stability requirements of the Northeast

Power Coordinating Council (NPCC) and the New England Power Pool ("EPOOL). (Application p. 10, Tr. p. 24)

96. System stability problems deal with transient stability associated with fault type operations when transmission lines are switched out of service. (Tr. p. 146-147; NU 10, Report No. 1)

97. The applicant considered several alternatives to the proposal:

(a) Using double circuit steel pole structures in the 36.2 miles between Hunts Brook Junction and Manchester Junction. The steel poles would be approximately 130 feet high. This alternative would cost approximately $29,850,000 more than the proposed line.

(b) A direct line route from Waterford to Manchester. This alternative would require the acquisition of over thirty miles of new rights-of-way.

(c) Constructing the proposed circuit underground at a cost of $127,120,000 or $106,320,000 more than the proposed construction.

(d) Constructing a 345 kV line from Millstone Point along the proposed route only to Card Street Substation in Lebanon at a cost of $12.9 million. This alternative would not prevent instability of the Millstone generators and would not eliminate several overload conditions.

(e) The Chesterfield Junction Bypass, possibly a route running from the proposed route near I-95 in Waterford northwesterly to a point called Chesterfield Junction, at the border of East Lyme and Montville, on the existing right-of-way from Hunts Brook Junction to Haddam Neck. This alternate would require the acquisition of six miles of new right-of-way 300 feet wide. Several public agencies objected to this route when it was originally discussed at proceedings before the Atomic Energy Commission, and additional development in this area create more land use conflicts.

(f) A 345 kV circuit from Millstone Point to Manchester via Hunts Brook Junction, Haddam Neck, and Scovill Rock. This alternative would be approximately 53 miles long, six miles longer than the proposed route, would require two crossings of the Connecticut River,

115 acres of right-of-way acquisition, 225 acres of clearing, and the acquisition of one and possibly two houses; it would cost $6,350,000 more than the proposed route. Also, the Midstate Regional Planning Agency Executive Committee opposes any system alternative which affects existing land use in the Midstate Region. (Transcript pp. 27-29, Response to Council question No. 3; Midstate Regional Planning Agency letter, 1/21/82; Application pp. 14-18, 20, 21, 26)

98. Cahn Engineers reported that none of the alternatives offer significant system, construction, or environmental advantages over the route as proposed by the applicant. (Application p. 21)

99. A double circuit steel pole angle structure costs $112,000. A single circuit three pole wood angle structure costs $16,000 (1981 dollars). (Tr. p. 125)

100. The cost of replacing a wood pole due to damage is between 3 and 4 thousand dollars each. (Tr. p. 142)

101. Replacing the existing wooden poles with double circuit steel poles would require taking the 47 miles of line out of service while reconstruction was taking place. (Tr. p. 143-144)

102. Manchester is the optimal 115 KV hub from which to redistribute the power from the proposed circuit to the system network. Other population centers at Haddam, Scovill Rock, and Southington are not practical or readily accessible for an additional circuit connection. (Tr. p. 147, 148)

103. The circuit would be placed in operation approximately 40 months after approval of a development and management plan. (Application p. 6)