DOCKET NO. 26

AN APPLICATION SUBMITTED BY NORTHEAST UTILITIES SERVICE COMPANY, AS AGENT FOR THE CONNECTICUT LIGHT AND POWER COMPANY, FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED WITH RESPECT TO THE RECONSTRUCTION OF AN OVERHEAD 115 kV ELECTRIC TRANSMISSION LINE BETWEEN PLUMTREE SUBSTATION IN BETHEL AND RIDGEFIELD JUNCTION IN REDDING.	:	CONNECTICUT SITING COUNCIL
	:	October 8, 1982

F I N D I N G S

1. The Connecticut Light & Power Company (CL&P), acting by its agent, the Northeast Utilities Service Company (NU), in accordance with the provisions of section 16-501 of the General Statutes of Connecticut, Revision of 1958, revised to 1981, as amended, applied to the Connecticut Siting Council on February 8, 1982, for a certificate of environmental compatibility and public need for the reconstruction of an overhead 115 kV electric transmission line along an existing route from Plumtree Substation in Bethel to Ridgefield Junction in Ridgefield. (Record)
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 the General Statutes.
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 the General Statutes, the

Connecticut Siting Council, after giving due notice thereof, held a public hearing at the J.C. Andrews Municipal Center, 9 Nashville Road, Bethel, Connecticut, on June 14, and 15, 1982. An evening session was held on June 14, 1982. (Record)

6. The parties to the proceeding are the applicant, the 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: the Department of Environmental Protection, the Department of Transportation, and the Department of Economic Development. (Record)

8. On June 9, 1982, members of the Council made a ground inspection of the proposed route. (Record)

9. The applicant proposes to rebuild an existing 115 kV transmission line along the existing 9.3 mile right-of-way between Plumtree Substation in Bethel and Ridgefield Junction in Redding. (Tr. Vol. I, p. 15; NU Exhibit 1, p. 1)

10. On March 11, 1981, the Council ruled that the rebuilding of the subject transmission line may have substantial adverse environmental effect and denied a petition by NU for a declaratory ruling that no certificate of environmental compatibility and public need would be required. (Council Petition No. 65, administratively noticed)

11. The applicant is seeking Council approval for the acquisition of an easement 0.06 mile long. (NU Exhibit 2, Q. 1)

12. The existing line was originally built as a 66 kV line in 1940, then modified and reconductored to 115 kV in 1960, and other changes were made in 1980. (Tr. Vol. I, pp. 16,17)

13. By 1985 the line will be 45 years old, which is beyond the expected life for most wood pole structures. (Tr. Vol. I, p. 17)

14. NU studies show that the subject line will overload under certain system conditions by the summer of 1985. (Tr. Vol. I, pp. 16, 18)

15. Future regional demand in southwestern Connecticut is based on a computer simulation of the system utilizing actual metered substation by substation loads and system characteristics. (NU Exhibit 2, Q. 22; F-82 Tr. pp. 141, 142)

16. NU assumes that the area served in part by this line is a summer peaking area, with a growth rate of 1.8% per year. (Tr. Vol. II, p. 13)

17. The growth rate of the area since 1976 has averaged 5.1 percent per year. (Tr. Vol. II, p. 13)

18. The planned coal conversions would not eliminate the need for the reconstruction of the subject line. (Tr. Vol. I, p. 24)

19. The conversion of United Illuminating's (UI) Bridgeport Harbor No. III to dual fuel capability would result in a loss of short term emergency capabilities, increasing the need for the proposed rebuild of the subject line. (Tr. Vol. I. p. 203)

20. The Norwalk Harbor Generation Unit may go off-line from six to eight weeks for conversion to coal generation, thereby increasing the load on the Redding-Ridgefield line. (Tr. p. 21; NU Exhibit 2, Q-25)

21. If NU's coal conversions do not take place as planned, the need for the proposed reconstruction would be increased. (Tr. Vol. I, p. 24, 200)

22. Uprating of the subject line is needed whether oil or coal is burned at Norwalk Harbor. (Tr. Vol. I, p. 20)

23. Even with the Norwalk units converted to coal, generation imports to southwestern Connecticut would continue, although at a decreased rate. (Tr. Vol. I, p. 24)

24. If all planned coal conversions by NU and UI are accomplished, the reduction in capacity in southwest Connecticut would be 11%. (Tr. Vol. II, p. 5; NU Exhibit 1, Figure 5)

25. In the area bounded by Ridgefield Junction, Weston, Old Town, and Ash Creek, the available generation is about one half of the area peak load resulting in the import of power from the 345 kV system during most hours of the year. (Tr. Vol. I, p. 23)

26. The subject line is one of four 115 kV lines supplying the Norwalk-Stamford area but the only line from the north importing more distant generation through the 345 kV grid. (Tr. Vol. I, p. 17)

27. Recent decreases in load growth projects will result in considerable delay in the requirement for a 345 kV loop into the southwestern area, and no timetable has been established by NU for its completion. (NU Exhibit 2, Q. 15b; F-82 NU Forecast Chapter III; Tr. Vol. I, p. 192)

28. Preliminary results from a combined UI and NU study concerning planning for 345 kV supply into southwest Connecticut indicate

that there would not be a need for 345 kV until the turn of the century. (Tr. Vol. 1, p. 199)

29. The proposed rebuild could not be energized at 345 kV. (Tr. Vol. I, p. 135)

30. A 345 kV rebuild of the subject line would reduce line losses expected on the reconstructed 115 kV circuit by one half. (NU Exhibit 2, Q. 17)

31. The 345 kV transmission system does not extend into the southwest region; therefore, to bring in the subject line at 345 kV would require the establishment of a 345 kV to 115 kV auto transformer substation. (F-82 NU Forecast Map 1; NU Exhibit 2, Q. 17)

32. Rebuilding the subject line at 345 kV capacity and operating it at 115 kV would not improve reliability over the proposal. (NU Exhibit 2, Q. 18)

33. If 345 kV were to be required along the subject right-of-way, there would be a need to retain the subject 115 kV circuit in addition to the 345 kV in order to supply the existing substations. (Tr. Vol. I, pp. 135, 190)

34. The 115 kV supply system is sufficient to serve the needs of the southwest region for at least the twenty-year time frame of the 1982 forecast. (Tr. Vol. I, p. 197; NU Exhibit 2, Q. 15)

35. The subject line has a load carrying capacity which is inferior to that of the generally newer lines in the rest of NU's 115 kV system. (Tr. Vol. I, p. 16)

36. The reliability standards of Northeast Utilities, the New England Power Pool, and the Northeast Power Coordinating

Council specify that line loading must not exceed the emergency rating for certain overlapping outages, including outages of a line and a generator. (Tr. Vol. I, p. 18)

37. The short term emergency rating indicates the maximum limit at which a line can be energized and operated safely for up to fifteen minutes. (Tr. Vol. I, p. 18)

38. Records from 1976 to the present show six unscheduled, overlapping outage events involving a Norwalk Harbor Unit and one of the three critical 115 kV circuits supplying the southwest region. (NU Exhibit 2, Q. 25; Tr. Vol. I, p. 22)

39. Overlapping outages can occur when a line and a generator are out during a time of peaking demand rated at 90% of peak load level. (Tr. Vol. I, p. 70; NU Exhibit 2, Q. 25)

40. The mathematical probability of this type of outage cannot be explicitly determined even though there have been six such occurrences since 1976. (Tr. p. 69-72; NU Exhibit 2, Q. 25)

41. There are no probability thresholds for simultaneous occurrence outages at which corrective action is taken. (NU Exhibit 2, Q. 26)

42. The principal need for the subject line reconstructionis to increase the emergency rating for purposes of reliability. (Tr. Vol. I, p. 18)

43. If the short term rating of the subject line is exceeded, the line would sag below safe clearances and could short circuit, causing an interruption in service. (Tr. Vol. I, p. 19)

44. The existing sag in the subject line is the result of the original design and not evidence of overloading. (Tr. Vol. I, p. 131)

45. The proposed reconstruction would replace the existing wood pole H-frame structures with new wood pole H-frame structures and the existing electrical conductors which are fifteen sixteenths of an inch in diameter with larger conductors one and three-eighths inches in diameter. (Tr. Vol. I, p. 15; NU Exhibit 1, p. 1)

46. Use of the proposed larger conductors would eliminate a weak link in the southwest Connecticut 115 kV transmission system. (Tr. Vol I, p. 16)

47. The existing structures are not strong enough to support larger, heavier conductors. (Tr. Vol. I, p. 16)

48. Single wood poles are not strong enough to support the proposed conductors. Smaller conductors would result in higher line losses. (NU Exhibit 2, Q. 2, 40)

49. There are no other practical system alternatives to the proposal. (NU Exhibit 2, Q. 20; Tr. Vol. I, p. 25)

50. The Peaceable to Norwalk line (#1470) is not a limiting factor in the risks of overload which the proposed reconstruction is intended to prevent. (NU Exhibit 2, Q. 23 & Q. 24)

51. The Devon to Weston (1730), Devon to Old Town (1710), and Plumtree to Newtown 115 kV circuits will also be rebuilt to reinforce the system in this area. (Tr. Vol. I, p. 129; F-82 NU Forecast, Table III-5)

52. Increasing the capacity of the other lines in the area will not help solve the problem presented by the low rating of the subject line. (Tr. Vol. I, p. 25; NU Exhibit 2, Q. 21)

53. Planned outages during reconstruction will usually be during off peak periods with high demand period outages limited to daily occurrences and with provisions made to re-energize on a few hours' notice. (NU Exhibit 2, Q. 19)

54. Upon completion of the construction proposed in this application, the subject line will be adequate until at least the late 1990's. (Tr. Vol. I, p. 24)

55. A council certificate issued in early December would allow the rebuilt line to go in service in December, 1984, while any delay in Council action would cause an in-service delay until spring of 1985. (NU Exhibit 2, Q. 3)

56. Reconstruction will also provide an economic benefit by reducing NU's system losses and its need to run uneconomic generation. (Tr. Vol. I, p. 24-25)

57. The Council found in its Docket No. 9 that the cost for each kWh of service interruption to industrial and commercial customers could range from $1.00 to $6.00, and that an interruption of service in the southwestern Connecticut area could cost millions of dollars to such customers. (Tr. Vol. I, p. 20)

58. The losses that could be incurred if the proposed reconstruction is not done are estimated by NU to total $17-$22 million over the 1985-1995 period. This includes

1) A loss of reduction in system watts through 1985, amounting to $1.7 million;

2) Uneconomic generation increases over 10 years, which are estimated to cost $13 million over that time;

3) The cost of loss of load, whereby the system is sectionalized

and load flow is reduced, which could be as much as $4.25 million greater under certain circumstances without the new line. (Tr. Vol. II, p. 3 & 4)

59. This $17 to $22 million reflects economic penalties due to outages and uneconomic generation. (Tr. Vol. II, p. 5 & 6)

60. The methodology used in estimating the dollar values for losses due to uneconomic generation assumes that $17 to $22 million invested in 1985 at a present worth rate of 15.4 percent would pay for this loss over the following ten years. (Tr. Vol. II, p. 7)

61. Costs of inconvenience and hardship attributable to line outages are not readily measurable. (Tr. Vol. I, p. 20)

62. The proposed reconstruction will cost $4.7 million (1984$). (Tr. Vol. I, p. 25; NU Exhibit 1, Summary, p. 2)

63. The cost of replacing the conductors is three-fourths or more of the estimated cost of reconstruction. (Tr. Vol. II, p. 40)

64. At 1981 average material cost, the following dollar values, exclusive of Connecticut sales tax, are assigned to the 115 kV line:

    a) Structures $1850/structure;

    b) Insulators and devices $350/structure;

    c) Conductors and shield wires $25,000/circuit mile;

    (NU Exhibit 2, Q. 38.)

65. A step down substation with the auto transformer that would be needed to accept 345 kV energization on the Ridgefield-Redding line would cost $10-15 million. (Tr. p. 138)

66. A 345 kV rebuild of the subject line would cost $6.5 million

(1984$) exclusive of the cost of building a substation at the southerly end. (NU Exhibit 2, Q. 39)

67. The 1981 average material costs for 345 kV equipment exclusive of Connecticut sales tax are:

a)	Structures	$6,300/structure
b)	Insulators and devices	$ 770/structure
c)	Conductors and shield wires	$43,000/circuit mile

(NU Exhibit 2, Q. 39)

68. NU states it could not economically justify building a 345 kV circuit on this line at this time. (Tr. Vol. II, p. 10 & 11)

69. A steel composite, single pole capable of supporting a 345 kV line and a 1272 kcm 115 kV cable could be used instead of wood poles. This would rise about 125 feet above ground. (Tr. Vol. I, pp. 136, 197)

70. A delta structure supporting 115 kV line would rise about 75 feet above the ground. (Tr. Vol. I, p. 196)

71. A delta structure supporting 345 kV line would rise about 110 feet above ground. (Tr. Vol. I, p. 197)

72. The cost of a composite steel pole line supporting only a 115 kV circuit, exclusive of right-of-way, would be over $14 million (1984$). (Tr. p. 137)

73. NU computes line loss savings from 1272 kcmil line to be $125 million over the expected life of the line. (Tr. Vol. I, p. 148)

74. Gross line loss savings tend to decrease over time due to the effect that decreasing carrying charges has on increasing energy costs over time. (Tr. Vol. I, p. 149)

75. The cost to relocate the line in the vicinity of the Johnson and Rockwell schools is estimated between $15,000 to $20,000 for the option #3 relocation. (NU Exhibit 2, Q. 33)

76. Salvage value of the conductors and structures is $15,000. (NU Exhibit 2, Q. 35)

77. According to NU analysis, 1272 kcmil cable is judged to be the most economic size to use in this project. (NU Exhibit 2, Q. 40)

78. NU testified that any alternate overhead route would require extensive land acquisition, involve much higher costs, and have significant adverse environmental effects. (Tr. Vol. I, p. 25)

79. The alternative railroad bed overhead route would cost $14.8 million, exclusive of land acquisition, and is not environmentally practical. (Tr. p. 25; NU Exhibit 1, p. 2; Nims pre-filed testimony p. 14)

80. Undergrounding the line would cost an estimated $16 million dollars in pipe cable alone. (Tr. p. 25; NU Exhibit 1, p.2; Nims pre-filed testimony p. 14)

81. CL&P made plans in 1978 to upgrade the line at a cost of $200,000, which would have postponed the need for reconstruction until 1987. However, detailed engineering revealed the need for complete reconstruction. (NU Exhibit 1, p. 3)

82. NU states that there is no practical alternative route for the proposal since all alternate corridors would require new right-of-way acquisition and clearing. (NU Exhibit 1, p. 2; NU Exhibit 2, Q. 20)

83. At the time of the hearing, NU had not yet acquired an easement

on a 2.5 acre parcel which affects a .06 mile stretch of the circuit.

(Tr. Vol. 1, p. 115; NU Exhibit 1, Summary; NU Exhibit 2, Q. 1)

84. The cost of the right-of-way through the 2.5 acre parcel is estimated to be $1,000.00. (Tr. Vol. I, pp. 187-188)

85. The existing poles range from forty feet to sixty feet in height. (Tr. Vol. I, p. 78)

86. The new structures will be located along the same centerline generally replacing the old structures on a one-for-one basis. These new structures will range from 50 feet to 80 feet above ground, will average 60 feet above ground, and will be four and one half feet wider than the existing structures. (NU Exhibit 1, p. 9; Tr. Vol. I, p. 15)

87. Reconstruction of the line on single steel poles is possible, but this would create some construction and possibly some legal problems since some of the right-of-way consists of centerline rights only. (Tr. Vol. I, pp. 115, 194, 196; NU Exhibit 2, Q. 2)

88. Wood pole H-frame structures offer visual benefits of low height and a minimum of change in the visual character of the right-of-way when compared to other structures. (NU Exhibit 1, p. 7)

89. The new structures will be screened from nearby houses by the existing trees. (Tr. Vol. I, p. 167)

90. No additional right-of-way clearing is required, but some danger tree clearing may be necessary. (Tr. Vol. I, pp. 26, 112; NU Exhibit 1, p. 13)

91. There is some bog turtle habitat in the vicinity of the route, but there are no rare and endangered species known to exist along the route. (Tr. Vol. I, p. 108)

92. One and one half miles or sixteen percent of the route crosses wetland soil types. (Tr. Vol. I, p. 31; NU Exhibit 1, p. 13)

93. Some structures will be located in wetlands. (Tr. Vol. I, pp. 154-155)

94. The proposed reconstruction may require building access roads across 3300 to 5400 feet of wetlands. This construction would require filling approximately 1.1 to 1.7 acres of wetland. (Tr. Vol. I, pp. 85,86)

95. The proposed reconstruction may require building a temporary bridge across the Saugatuck River and some clearing of an old wood road. (Tr. Vol. I, pp. 161, 162)

96. Construction impacts on wetlands will be minimized by the use of existing wood roads on and off the right-of-way, and by constructing new access ways on upland portions of the right-of-way where it would be environmentally advantageous to do so. (Tr. Vol. I, p. 26)

97. During construction, accepted erosion control measures will be used, such as surfacing the travel portions of the access road with processed stone; seeding road edges; and installing water bars, culverts, and hay bale check dams. (NU Exhibit 1, pp. 9, 10)

98. Corduroy roads, surge stone, and culverts will be used in wetlands, where necessary, to preserve adequate drainage and minimize construction impacts. (NU Exhibit 1, p. 9; Exhibit 7)

99. At a minimum, if off right-of-way access can be obtained, four of sixteen watercourses and seven of twenty two wetland areas would be affected by the proposed reconstruction. (Tr. Vol. I, p. 185; NU Exhibit 1, p. 14)

100. The Redding Conservation/Inland Wetlands Commission and the Redding Land Trust expressed their desire to participate and comment on the Development and Management (D&M) Plan. The applicant agreed to submit copies to them for review and comment before the Council acts on the D&M Plan. (Tr. Vol. I, pp. 35-58, 73; Applicant's Post Hearing Memorandum; Vol. II, p. 23)

101. Mr. Tartaglia, a party to the proceeding, expressed concern about television interference and construction impacts on brooks and a stone wall on his property. (Tr. Vol. I, pp. 168-176)

102. Mr. Dingwall, a party to the proceeding, expressed concern about the location of a structure on his property. (Tr. Vol. I, pp. 176-179)

103. NU had no objection to consulting with Mr. Tartaglia and Mr. Dingwall in the development of the D&M Plan. (Tr. Vol. 1, p. 180)

104. The proposed reconstruction will reduce or eliminate radio and television interference emanating from the existing line. (Tr. Vol. I, pp. 26, 27, 165; NU Exhibit 2, Q. 14)

105. Individuals responsible for the care and management of land trusts and nature preserves in Redding and Bethel will be contacted during the development of the D&M Plan by Northeast Utilities. (NU Exhibit 2, Q. 13)

106. The existing route passes near or crosses several designated open space areas: the Jackson Tract, Gallows Hill Natural Area, Saugatuck Falls Natural Area, the Archers Land Grant, the Rock Lot, and the Scott Preserve. (NU Exhibit 1, p. 12; Tr. Vol. I, p. 160)

107. The proposed route does not pass through any areas identified on the state Natural Area Inventory. (Tr. Vol. I, p. 108)

108. The proposed reconstruction will have no impact upon architectural, historical, or archaeological resources listed on or eligible for the National Register of Historic Places. (NU Exhibit 1, Appendix A)

109. An archaelogical reconnaissance survey of the project area was conducted by the Public Archaeology Survey Team, Inc. No evidence of archaelogical resources that could be adversely affected by the proposed reconstruction was found within the project area. (NU Exhibit 5; NU Exhibit 1, Appendix)

110. Alternative alignments around the Johnson School in Bethel, Connecticut, were considered to minimize visibility, safety hazards, and vegetation clearing. (Tr. Vol. I, pp. 90-101)

111. One alternative, option 3, would relocate the line between structures 2840 and 2842 away from the Johnson School and the athletic field. This alternative would require removing two large ash trees in front of Johnson School, topping or removing a stand of cedars, and clearing approximately 650 feet of right-of-way. This alternative would place the line higher on the slope, provide a long view of the right-of-way, and remove much of a buffer between the line and Whittlesey Drive. (Tr.

Vol. I, pp. 89-96; NU Exhibit 6, Exhibit 2, Q. 4)

112. One alternative (not numbered) would begin at structure 2841, cross Whittlesey Drive and end near structure 2843. This alternative would require a structure between Whittlesey Drive and the upper athletic field. The location of this structure might present a safety hazard and would be visible from the athletic field and Whittlesey Drive. This alternative would (a) continue to use a natural depression which helps hide the line, (b) reduce the visibility of the whole line in the Johnson School area as compared with the other alternative, (c) limit long views down the right-of-way, (d) require less clearing than the other alternative, thereby leaving a natural buffer; and (e) would preserve the two large ash trees and all or part of the cedar stand in front of the Johnson School. (Tr. Vol. I, pp. 89-96)

113. Another alternative, option 5 in the applicant's post-hearing memorandum, proposes to relocate the line slightly to the west of the existing line between structures 2840 and 2843, and slightly to the east of the existing line between structures 2843 and 2845. This option would (a) continue to use the natural depression which helps hide the line; (b) preserve the two large ash trees in front of the Johnson School; and (c) require less clearing than option 3 and thereby preserve the stand of cedars and much of the woods along Whittlesey Drive which help screen the line. This option would keep the line near its present position near the athletic field northwest of the Johnson School. (Applicant's post-hearing memorandum,

Exhibit A, 9/3/82)

114. Bethel officials did not express a route preference at the hearing. (Tr. Vol. I, pp. 96, 100)

115. The presence of extensive residential and other development, combined with the widespread distribution of open spaces, makes it impossible to find another route that would not displace other established uses. (NU Exhibit 1, p. 7)

116. The existing route crosses three state highways and eleven local roads. (NU Exhibit 1, p. 12)

117. Gates or other barriers will be used as necessary to limit unauthorized use of the right-of-way. (NU Exhibit 1, p. 9)

118. The proposed reconstruction will not result in the creation of an undue hazard to persons or property. (Tr. Vol. I, p. 28)

119. The proposed reconstruction is consistent with the Federal Power Commission "Guidelines for the Protection of Natural, Historic, and Scenic Recreational Values and the Design and Location of Rights-of-Ways and Transmission Facilities." (Tr. Vol. I, p. 27)

120. The proposed reconstruction will be in full accordance with the standards of the National Electric Safety Code and the regulations concerning method and manner of construction of the Connecticut Department of Public Utility Control. (Tr. Vol. I, pp. 28, 29)