

DOCKET NO. 97 - AN APPLICATION : Connecticut Siting
SUBMITTED BY NORTHEAST UTILITIES :
SERVICE COMPANY, AS AGENT FOR THE : Council
CONNECTICUT LIGHT AND POWER COMPANY, :
FOR A CERTIFICATE OF ENVIRONMENTAL : February 14, 1989
COMPATIBILITY AND PUBLIC NEED FOR
THE RECONSTRUCTION OF AN OVERHEAD
115-KV TRANSMISSION LINE BETWEEN
FARMINGTON SUBSTATION IN FARMINGTON
AND NORTH BLOOMFIELD SUBSTATION IN
BLOOMFIELD.

F I N D I N G S O F F A C T

1. The Connecticut Light and Power Company (CL&P), represented by its agent, the Northeast Utilities Service Company (NU), in accordance with provisions of sections 16-50k and 16-50l of the Connecticut General Statutes (CGS), applied to the Connecticut Siting Council (Council) for a Certificate of Environmental Compatibility and Public Need (Certificate) to reconstruct an overhead 115-kV electric transmission line along a route between Farmington Substation in Farmington and North Bloomfield Substation in Bloomfield. (Record)
2. The application fee was submitted as prescribed by section 16-50v-1 of the Regulations of Connecticut State Agencies (RSA). (Record)
3. The application was accompanied by proof of service as prescribed by CGS section 16-50l(b). (Record)
4. The Department of Environmental Protection (DEP) and the Office of Consumer Counsel (OCC) filed written comments with the Council pursuant to section 16-50j of the CGS. (Record)
5. Notice of the application was given to the general public by publication in the Hartford Courant, on June 25, 1988, and June 26, 1988, as prescribed in section 16-50l(b) of the CGS. (Record, NU 1)
6. The parties to the proceeding include the applicant and those persons and organizations whose names are listed in the Decision and Order which accompanies these Findings. (Record)

7. Members of the Council and its staff made a public field inspection of the proposed line route on October 31, 1988. (Record)
8. The Council, after giving due notice thereof, held public hearings on this application on October 31, 1988, beginning at 2:50 P.M. and continuing at 7:00 P.M., and on November 1, 1988, beginning at 10:03 A.M. as prescribed in CGS section 16-50m. The hearings were held in Room 314 of the West Hartford Town Hall, West Hartford, Connecticut. (Record)

Overview

9. NU is proposing to construct and operate a new 115-kV electric transmission line to replace an existing 115-kV line (#1726) built in 1955, entirely within an existing 11.7 mile CL&P right-of-way. No additional right-of-way would need to be acquired for the proposed reconstruction. No existing easements would need to be modified or updated. (NU 1 Introduction, pp.1-2; NU 3, Q.41, Q.46; NU 5, p.5, 18)
10. The #1726 line routinely supplies the Farmington Substation with 115-kV current. This flow can vary depending upon load level, generation dispatch, and contingencies. (NU 3, Q.15)
11. The existing right-of-way is located in Farmington (0.8 miles), Avon (0.6 miles), West Hartford (3.2 miles), Simsbury (4.9 miles), and Bloomfield (2.2 miles). (NU 1, pp.1-2)
12. The proposed new line would be constructed from Farmington Substation to North Bloomfield Substation generally next to and paralleling the existing line. The existing line uses wood-pole H-frame structures approximately 40-61 feet in height, with a single circuit horizontal configuration, and two lightning shield wires on top. (NU 1, p.1, pp.3-4, p.22; NU 5, pp.5-6)
13. The proposed line would have a similar configuration, but with wood-pole H-frame structures constructed approximately 57-70 feet in height, generally 10-15 feet taller, and one-foot wider at the base. (NU 1, p.1, pp.3-4, p.22; NU 5, pp.5-6)
14. The minimum practical distance between centerlines of the proposed and existing line is 60 feet. (NU 3, Q.74)

15. Most span lengths would remain approximately 500-600 feet between structures, and new structures would be set generally opposite the old structures on about a one-for-one basis. (NU 1, pp.4, 22)
16. Conductor size would increase from 336.4 kcmil Aluminum Cable Steel Reinforced (ACSR) 0.75-inch diameter on the existing line to 1272 kcmil ACSR 1.25-inch diameter for the new line. The existing 336.4 kcmil ACSR conductor, installed in 1955, is the maximum standard size that can be accommodated on the existing structures. It is not structurally or technically feasible for CL&P to heighten and strengthen the existing structures to facilitate larger conductors. (NU 1, pp.4-5; NU 3, Q.11, Q.12, Q.13; NU 4, Q.6; NU 5, pp.5-7)
17. The proposed line would be temporarily connected to the existing North Bloomfield-Canton #1784 line where the two lines share the same right-of-way for approximately 0.5 miles west of the North Bloomfield Substation. (NU 1, p.4)
18. Upon connection of the new line at the substations, the existing line and the temporary connection on the #1784 line would be disconnected and removed from the right-of-way. The two substations would remain unchanged. (NU 1, pp.1, 4)
19. On October 12, 1988, the Simsbury Board of Selectman voted unanimously to oppose the proposed reconstruction through the Town of Simsbury. (Tr. 10/31/88, pp.16-17; Town of Simsbury 1; Town of Simsbury 2; Town of Simsbury 3)
20. The Town of Simsbury Conservation Commission Inland Wetlands and Watercourses Agency's position concerning the line rebuild is, in the event there are no alternatives which would not involve any reconstruction of the #1726 line, they would favor construction constraints for the entire line in the Town of Simsbury that would utilize the existing cleared portion of the right-of-way and pole locations. (Town of Simsbury 3)

Need

21. A Long-Term Emergency (LTE) rating is an amperage rating that can be used during emergency conditions for up to 24 hours at a time. A Short-Term Emergency (STE) rating is a higher amperage rating which can be used where facilities are available to reduce the circuit flow below the LTE rating within fifteen minutes. The existing line has LTE and STE ratings of 825 amps. (NU 1, pp.9-14; NU 3, Q.13)

22. Planning for overlapping line outages is required by the "Basic Criteria for Design and Operation of Interconnected Power Systems," which have been developed and adopted by the member companies of the NPCC in 1967. Additional criteria were subsequently set forth by NEPOOL. Individual companies within the pool also maintain standards for themselves. (Tr. 10/31/88, pp.44-45, 49, 56; NU 5, pp.14-16)
23. The proposed line reconstruction is sought to avoid overloading the #1726 line during an overlapping outage of the Millstone-Southington #348 and Haddam Neck-Southington #362, 345-kV east to west transmission lines, which are adjacent on a common right-of-way for 18.6 miles. Under the aforementioned scenario, NU fears a cascading, widespread blackout. The intent of the #1726 rebuild is to ensure such a blackout would not occur. (Tr. 10/31/88, pp.38-40, 48-49, 56; Tr. 11/1/88, p.177; NU 1, pp.9-12; NU 3, Q.6, Q.8; NU 4, Q.14; NU 5, pp.9-10, 16-17)
24. Should such an overlapping outage scenario occur, it would result in overloading the existing #1726 circuit by the summer of 1990 at:
 - a) 70 percent summer peak-load levels (900 amps, 9% overload);
 - b) 90 percent summer peak-load levels (890 amps, 8% overload); and
 - c) 100 percent summer peak-load levels (930 amps, 13% overload) under the following assumed generation dispatch:
 - 1) At the 100 percent summer peak-load level, with at least three of the four Connecticut nuclear powered generating facilities operating fifty percent of the time, and all four operating twenty percent of the time on an annual basis;
 - 2) with Seabrook available by November 1989 and Hydro-Quebec II available by 1991; and
 - 3) at the ninety and seventy percent summer peak-load levels, with fossil fuel generating facilities economically dispatched, and the summer off-peak dispatch used for hydro-electric generating facilities. (NU 1, pp.9-15; NU 3, Q.8; NU 5, pp.7, 10, 17)

25. With Seabrook and Hydro-Quebec Phase II available as NU assumed, less generation would normally be dispatched from the generating units in Connecticut. Those units which are directly connected to the 115-kV system south of Farmington Substation generally tend to reduce the contingent flows on the #1726 line for loss of the #348 and #362 lines. If Seabrook does not operate, additional Connecticut generation and New York purchases would reduce the #1726 line flows, and the line would not exceed its ratings until 1992 or 1993. In this case it would be possible to postpone the project by two or three years. (NU 1, p.13; NU 3, Q.5; NU 4, Q.15)
26. New England Power Pool (NEPOOL) and Northeast Power Coordinating Council (NPCC) criteria specify that such overlapping outages shall not result in loading any circuit in excess of its LTE or STE rating at or below the 100 percent peak load level. (Tr. 10/31/88, pp.44-45, 49, 56; NU 1, pp.9-14; NU 3, Q.13; NU 5, pp.8-9, 17)
27. The proposed reconstruction would increase the conductor summer rating to 1490 amps under normal conditions, 1920 amps under the LTE rating, and 2180 amps under the STE rating. The line's ratings would be limited to 1600 amps STE due to line terminal ratings at North Bloomfield Substation and Farmington Substation. (NU 1, p.15)
28. Exceeding emergency ratings could result in a power outage and could present a safety hazard as well as physically damaging the conductors, resulting in reduced reliability for the system. Also, the line could sag below safe ground clearances, presenting safety hazards and a short circuiting potential. (NU 5, p.8, pp.11-12)
29. The #1726 line has not overloaded to date, and there has never been an overlapping simultaneous outage of the #348 and #362 lines. (Tr. 10/31/88, p.43; NU 4, Q.5, Q.9, Q.31)
30. Over the 12-year period from January 1976 to December 1987 there have been 120 forced outages of individual 345-kV lines. Of these, 83 occurred when no other 345-kV line was concurrently forced out of service. In the remaining 37 cases, overlapping forced outages occurred. In the 11-year period from January 1977 to December 1987 there were 761 scheduled outages of 345-kV lines in the state. (NU 3, Q.4)
31. There have been 16 outages of the #348 line from 1985-1987 totalling 449.75 hours. Of these, 19 hours were due to forced outages. There have been five outages of the #362 line from 1985-1987, totalling 38 hours. Of these, 0.88 hours were due to forced outages. (Tr. 10/31/88, pp.50-51; Sunridge 21; NU 4, Q.65, Q.66, Q.67, Q.68)

Right-of-way Land Use

32. The existing CL&P right-of-way has a minimum width of 150 feet. North of the Farmington Substation and south of Connecticut Route 185, there are portions which exceed 200 feet in width. (NU 1, p.4)
33. In the existing right-of-way, CL&P holds a little fee title, but mostly easement interests. No parcels of the existing right-of-way were acquired by eminent domain. The right-of-way is maintained by CL&P. (Tr. 11/1/88, p.33; NU 1, p.4; NU 3, Q.43; NU 11)
34. The proposed line would be visually separated from the Farmington and Connecticut River valleys by a low ridge line to the west, and by Talcott Mountain from the east. (Tr. 10/31/88, p.16; NU1, p.18)
35. Topography is irregular along the right-of-way. Elevations along the route range from 350 feet at Farmington Substation to over 770 feet on Talcott Mountain in West Hartford and 160 feet at North Bloomfield Substation. (NU 1, pp.18-19)
36. Two major traffic routes are crossed by the right-of-way: U.S. Highway Route 44 and Connecticut Route 185. Secondary routes crossed by the right-of-way include Old Mountain Road, Wintonbury Road, and Hoskins Road. No airports are located within one mile of the proposed line. (NU 1, p.16, Appendix A)
37. General land uses within the right-of-way and within one mile of the proposed line include agricultural, commercial, industrial, institutional, open space, recreational, and residential. (NU1, pp.16-18, 25-30)
38. In the Town of Simsbury north of Connecticut Route 185, rural residential development areas abut or are traversed by the right-of-way. The Simsbury Plan of Development identifies these rural residential areas as two-to-four acre development units. (NU 1, p.33; NU 3, Q.89)
39. Residential land use within or abutting the right-of-way includes:
 - a) Six residences on Highwood Road abutting the right-of-way in Simsbury;
 - b) Two residences in the Roskear Farm Subdivision abutting the right-of-way in Simsbury;
 - c) Eight new residences, and lots in and next to the Hallview Subdivision along Hunting Ridge Drive traversed by and abutting the right-of way in Simsbury; and

- d) Two residences on Wintonbury Road 50 feet from the right-of-way in Simsbury.

(Tr. 11/1/88, p.159; NU 1, p.31, 34-36, Appendix A; NU 3, Q.81, Q.106; Hunting Ridge 3)

40. All residences near the line between Farmington Substation and North Bloomfield Substation are served by private domestic wells. These wells occur on or are adjacent to the right-of-way along Highwood Road and could be developed near or on the right-of-way at Hallview Subdivision, currently under construction. No public supply wells occur within 1/4 mile of the right-of-way. (NU 1, p.39)
41. The distances between the six houses in the Highwood Road area and the western edge of the right-of-way range from 10 to 50 feet. (Tr. 10/31/88, pp.84-85, 88-89, 108; Sunridge 15, p.2; Sunridge 16, p.2)
42. At Roskear Farms, the corner of one house falls approximately 26 feet from the edge of the right-of-way. (Peter Stich Associates, Inc. 3; NU 3, Q.88; Limited Appearance of John J., and Barbara M. Gilles of 11/9/88)
43. The Roskear Farm Plan of Subdivision was originally drawn in March 1985, the Hallview Subdivision Plan was originally drawn in October 1986, and the Highwood Road Subdivision Map was approved in November 1970. The CL&P easements in these areas were acquired prior to 1955 when the #1726 line was constructed. (Tr. 10/31/88, p.111; NU 3, Q.81, Q.88; NU 5, Exhibits F, G, H, and I)
44. The commercial land uses closest to the right-of-way are approximately 500 feet south of the existing Farmington Substation along Farmington and Notch Roads in the Town of Farmington. The Exchange Shopping Mall is approximately 1,000 feet south of the Substation. No commercial land uses abut the existing right-of-way. (NU 1, Figure 5, Appendix A; NU 3, Q.70)
45. The nearest industrial land uses to the right-of-way are approximately 1.1 miles north of the right-of-way in Tarriffville. No industrial land uses abut the right-of-way. (NU 1, Figure 5, Appendix A; NU 3, Q.70)
46. The West Hartford bulky waste landfill is adjacent and west of the line, 1,500 feet north of U.S. Highway Route 44. The landfill is at a lower elevation than the right-of-way, on an unimproved road. (NU 1, p.39. Figure 5, Appendix A; NU 3, Q.72)
47. North of Wintonbury Road in Simsbury distribution transmission lines share the right-of-way. The proposed reconstruction would not affect the distribution lines. (NU 1, Appendix A; NU 3, Q.85)

48. A gas pipeline parallels and crosses the right-of-way in Bloomfield, Farmington, and West Hartford. The proposed reconstruction would not affect the gas pipeline. (NU 3, Q.40)
49. The right-of-way does not traverse any active agricultural land. (NU 1, p.32)
50. Dedicated recreational and open space lands near the right-of-way include:
 - a) Metropolitan District Commission (MDC) watershed areas in Avon, Bloomfield, Farmington, Simsbury, and West Hartford;
 - b) Penwood and Talcott Mountain State Parks in Bloomfield and Simsbury;
 - c) Batterson Park in West Hartford;
 - d) Marion K. Wilcox Park in Bloomfield;
 - e) Darling Wildlife Sanctuary in Simsbury; and
 - f) Talcott Mountain Forest Protective Association Lands.

(NU1, pp.16-18, 26-32, 51-52, Appendix A)
51. Talcott Mountain State Park is crossed by the right-of-way. (NU 1, pp.17, 33)
52. Open space within the right-of-way accounts for the greatest acreage of all land uses, of which a preponderance is owned by the MDC. (NU 1, pp.32, 51-52)

Archaeology

53. There are no known recorded historic or archaeological sites within the right-of-way. The right-of-way does not pass through any designated historic districts. (NU 1, p.8)

Vegetation

54. At the time of construction more than one-half of the right-of-way route between Farmington and North Bloomfield was almost entirely cleared from a point approximately 1900 feet south of Connecticut State Highway 185, where the Metacomet Trail intersects with the right-of-way, to the Farmington Substation (6.6 miles). From Farmington Substation to Connecticut Route 185, the cleared right-of-way is approximately 150 feet wide, and existing structures are about 40 feet from the east edge of this clearing. (NU 1, pp.4-5, 49; NU 3, Q.44)

55. The cleared portion of the right-of-way north of Connecticut Route 185 to North Bloomfield substation is typically 80 feet wide. (NU 1, p.50)
56. Upland portions of the cleared portion of the right-of-way are maintained in shrubs and/or low growing vegetation. Surrounding lands are almost entirely unbroken forest. (NU 1, pp.19, 49)
57. Upland forest bordering the cleared right-of-way is a diverse mixture of hemlock and hardwoods. Mixed hardwood forest with some hemlock characterizes the forest south of Kilkenny Rocks. From Kilkenny Rocks to U.S. Highway 44, dense hemlock stands are dominant, interspersed with mixed hardwoods, white pine, and mixed oak forests. (NU 1, pp.49-50, Appendix A)
58. Upland forest bordering the cleared right-of-way north of Connecticut Route 185 consists of mixed deciduous hardwoods and hemlock-hardwood stands along Penwood State Park, with well-developed hemlock stands north of Penwood State Park. (NU 1, p.50, Appendix A)

Hydrology

59. Notable surface water resources of the nearby area include the Farmington River; MDC Hartford Reservoirs 1, 2, 3, 5, and 6; Ely Pond; Hoe Pond; Welles Pond; Gale Pond; and Lake Louise. Lake Louise is a bog pond which lies in Penwood State Park. All of these water bodies either lie upgradient of the line or are otherwise beyond 1,000 feet from the right-of-way. (NU 1, p.19, 40, Appendix A)
60. Eight small streams are crossed by the right-of-way. Three unnamed streams cross the line between Farmington Substation and Little Phillip Mountain and drain eastward to MDC Hartford reservoirs 1, 2, 3, and 6. King Phillip Brook, Lucy Brook, and unnamed stream #'s 13, 14, and 18; cross the northern portion of the line; and drain west or north to the Farmington River. (Tr. 10/31/88, p.80; NU 1, pp.26-30, 40-46, Appendix A; NU 3, Q.60, Q.64)
61. On the west side of Talcott Mountain in Simsbury, the right-of way crosses an upstream drainage area to the Farmington River. (NU 1, Appendix A; NU 3, Q.52)
62. The small streams may support small populations of darters, blacknose dace, small minnow species, and brook trout in some segments, but no appreciable habitat exists to support well-developed sport fisheries in the immediate area of the right-of-way. (NU 1, p.40)
63. A narrow flood hazard area is within the right-of-way along King Phillip Brook south of Connecticut Route 185. (NU 1, p.47, Appendix A)

64. There are 17 regulated wetland areas corresponding to poorly drained soils within the right-of-way. Approximately 30 percent of these areas are well drained and do not support a preponderance of wetland vegetation. (Tr. 10/31/88, p.80; NU 1, pp.41-47, Appendix A; NU 3, Q.64)
65. On wetland sites where the water table consistently lies at or above ground surface, plant communities on the cleared right-of-way are dominated by tussock sedge, Phragmites, skunk cabbage, sensitive fern, Joe-Pye-Weed, cattail, and minor stands of red maple, dogwood, alder, and winterberry. Wetland areas within the uncleared right-of-way consists of red maple swamp forest, spicebush, tussock sedge, skunk cabbage, cinnamon fern, sensitive fern, and associated wetland species. (NU 1, pp.47-48)
66. On wetland sites where soils are seasonally saturated or nearly saturated, but not inundated, the cleared portions of the right-of-way are dominated by woody vegetation commonly including dogwood, winterberry, meadow sweet, buckthorn, wild rose, and brambles, with a herbaceous layer including grasses, goldenrod, and other forbes. Elm, red maple, ash, sycamore, American hornbeam, and spicebush occupy the uncleared wetland portion of the right-of-way. (NU 1, p.48)
67. No bog or deep marsh habitat is present within the right-of-way. Two relatively large wetlands in the right-of-way, #8 and #13, have considerable value for erosion and sedimentation control, nutrient trapping, and perhaps groundwater recharge. (NU 1, pp.48-49, Appendix A)
68. Groundwater is available in various amounts from bedrock and unconsolidated deposits in the project area. Well yields and groundwater availability are higher in sedimentary rock aquifers and stratified drift aquifers. A low-yielding, fine-grained stratified drift aquifer occurs beneath the last approximately 1,000 feet of the line, near the North Bloomfield Substation. The rest of the line overlies lower-yielding igneous bedrock and glacial till aquifers. These aquifers yield sufficient amounts for domestic water supply only. (NU 1, p.39; NU 3, Q.52)
69. There are six deep wells within 50 feet of the proposed line in the Highwood Road area, corresponding to the number of residences. (Tr. 10/31/88, p.82, pp.108-109, 113-114)

Wildlife

70. The upland and lowland forest, shrubland, and forest edge along the right-of-way provide habitat for many wildlife species. Talcott Mountain is recognized for its value as a refuge for wildlife in an area that is otherwise highly developed. (NU 1, p.50)
71. None of the land traversed by the right-of-way is actively managed for wildlife. None of this land is open to hunting. (NU 1. p.51)
72. Several of the state's rare plant and animal species occur on Talcott Mountain. (NU 1. p.51)
73. There are no known records of Federally Endangered or Threatened species, or Connecticut Species of Special Concern for the areas affected by the proposed project. (NU 1, p.51; NU 2; NU 3, Q.55. Q.78)

Construction Details

74. Construction would occur in several stages which would overlap in time. First, access roads and structure work sites would be installed or improved where needed. Next, structures and conductors would be installed. When new construction was completed, the existing H-frame structures and conductors would be removed. Finally, all temporary wood poles would be removed, and the right-of-way would be rehabilitated. (NU 1, p.20)
75. Access for construction equipment would be needed for each new structure to deliver structure materials, set structures, install conductors, and remove existing structures and conductors. The equipment would range in size from 1/2-ton trucks to a 50-ton capacity crane. Equipment would also include bulldozers, backhoes, compressors, rock drills, trucks, and flat-bed trailers. (NU 1, p.20)
76. Gates or other barriers would be used as necessary to limit unauthorized use of the right-of-way. (NU 1, p.21)
77. The new wood poles would be set into mechanically-excavated holes approximately 36 inches in diameter and seven to 12 feet deep. Some controlled drilling and blasting of rock would be required in certain areas. Hole size would depend on pole height and soil condition. Excavated material would be replaced and excess material removed from the site. Holes would be backfilled and surface-graded to match existing contours. (NU 1, p.22; NU 3, Q.38)
78. Erosion and sedimentation control measures would be employed as needed along the right-of-way during construction. (NU 1, p.21)

79. Should suspected archeological deposits be discovered during construction, construction would cease, the State Historic Preservation Officer would be contacted immediately, and construction would proceed according to his direction in the area of question. (NU 1, p.59)
80. CL&P does not anticipate needing any off right-of-way staging areas other than the yards of Farmington Substation and North Bloomfield Substation. (NU 3, Q.39)
81. Some structures would be supported by two to ten guy wires attached to anchors in the ground. The type of anchor installation would depend on loading and soil support capability. Excavation would be required to install the anchors. Guy wires and anchor rods would remain visible after rehabilitaiton. (NU 1, p.22)
82. The applicant expects that the same number of guys would generally be required for the new angle structures as presently support angle structures of the existing line. Guys would not be used for tangent structures in-line as are in place on some of the existing tangent structures. (NU 3, Q.33)
83. To minimize the possible encumbrance on the houses, the applicant would relocate structures by placing them as close as possible to the property lines perpendicular to the transmission line and between the houses in residential areas. (NU 3, Q.88; NU 5, pp.28-29)
84. The structures would be assembled, lifted by crane, and set in place in the right-of-way. (NU 1, p.22)
85. Insulators and wire supporting hardware, including metal bolts, shackles, clevises, and grips would fasten the conductor to insulators and insulators to supporting structures. Supported by pulling blocks, the shield wires and conductors would be pulled through the structures. Once a length of conductor was strung, the wires would be removed from the blocks and permanently attached to the insulator suspension or dead-end clamps. The wire stringing operation would require some light and heavy equipment traversing the right-of-way to transport reels of wire, perform overhead work at each structure, and facilitate conductor and shield wire pulling and tensioning. (NU 1, pp.22-23; NU 3, Q.34)
86. To provide power to the Farmington Substation, the existing line would remain energized most of the time during construction of the proposed line. (NU 1, p.23)

87. The new line would be built continuously from near the Farmington Substation to near the North Bloomfield Substation. The existing line would then be deenergized and disconnected, and the new line connected and energized. The existing line would then be removed. Conductors and shield wires would be removed and reeled. Structures would be dismantled and taken off site. Guy wire anchor rods would be cut to a level below grade. (NU 1, p.23)
88. Line outages and construction would be scheduled during off-peak load periods, generally in the spring and fall when electric loads are relatively low, to minimize the potential for loss of customer service. (NU 1, p.23; NU 3, Q.32)
89. Upon completion of construction and removal of the old transmission line, the right-of-way would be revitalized. Materials brought onto the right-of-way during construction, and not part of the new line, would be collected and removed. Holes and ruts would be filled or graded. Disturbed lawn areas would be repaired and seeded. (NU 1, pp.22-23)
90. During construction and conductor stringing, hikers on the Metacomet Trail might occasionally be forced to wait for short periods of time or be rerouted for short distances due to construction equipment usage in the right-of-way. Such interruptions to hikers are expected by the applicant to be infrequent and brief in duration. (NU 3, Q.65)
91. Once the proposed line is constructed, the Metacomet Trail would continue to function. (NU 3, Q.65)
92. The Town of West Hartford Conservation and Environment Commission proposed a relocation of the Metacomet Trail. The Connecticut Forest and Park Association, Inc. (CFPA), has indicated that the relocation would be feasible; however, the suggested route has not yet been negotiated with and approved by the MDC. (Limited Appearance, Connecticut Forest and Park Association, 11/18/88; Limited Appearance, Town of West Hartford Conservation and Environment Commission, 11/14/88)
93. The proposed new line would have a nominal useful life of 35 years. (NU 3, Q.20)
94. The proposed line reconstruction is consistent with 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." The method and manner of construction would accord with the National Electric Safety Code and the Regulations of the Connecticut Department of Public Utility Control (DPUC). (Tr. 11/1/88, p.55; NU 1, Introduction, p.1, 16)

Vegetation Clearing

95. The project would involve selective cutting and removal of woody vegetation on the right-of-way and along accessways to accommodate the proposed line and movement of equipment. Accessways currently in use or previously used would be employed to the greatest extent possible. (NU 1, p.53)
96. Only those woody plants that interfere with necessary vehicular movement and tall-growing species that have the potential of inhibiting line construction, maintenance, or reliability would be cleared. Shrubs and low growing tree species would be left where possible. Herbaceous vegetation would be removed only as necessary to develop fords, road beds, and structure placements. (NU 1, p.53)
97. CL&P easements permit the removal of danger trees on the sides of the right-of-way. (NU 3, Q.79)
98. Hand clearing of low vegetation would establish a level, open, work area near each structure for assembly and erection. (NU 1, p.20)
99. To provide construction access, most of the existing access roads used to maintain the existing line would require minimal clearing and improvements. (NU 1, pp.5, 8, 20)
100. In less developed areas new access roads would require vegetative clearing and gravel roadways 12 to 15 feet wide. (NU 1, p.20)
101. A continuous access road along the right-of-way would not be required. Typically a gap with no access road could be provided along each segment of right-of-way between structures with access, to access other structures. The gaps would be planned to favor developed residential areas, wetlands, and steep slope areas. Where rights do not exist, the applicant would request access permits from landowners. (NU 1, pp.20-21; NU 3, Q.31)
102. The existing cleared portion of the right-of-way from Farmington Substation to Connecticut Route 185 is sufficiently wide to accommodate the proposed line. This segment would only need selective removal of danger trees on the west side of the right-of-way and selective removal of woody vegetation within the cleared right-of-way. (NU 1, pp.53-54; NU 5, p.18)
103. A small group of trees on the western side of the right-of-way, just south of United States Highway Route 44, would be cleared. The trees immediately north of Old Mountain Road and on the western side of the right-of-way would also be removed. (NU 1, Appendix A; NU 3, Q.93, Q.97)

104. The cleared portion of the right-of-way is about 80 feet wide in the 5.1 mile segment between Connecticut Route 185 and the North Bloomfield Substation. The cleared right-of-way would be expanded approximately 65 feet westward as a result of the new line. The 65-foot-wide strip is forested, except for a 800-foot-long segment cleared for the Hallview Subdivision, and the last 2,000 feet of the line, where the entire right-of-way is cleared. (NU 1, p.54, Figure II; NU 3, Q.71; NU 5, pp.18-19)
105. For the entire project, approximately 37 acres of forest within the right-of-way would be lost. Half of these woodlands would consist of hemlock-hardwood forest; the remainder is roughly evenly divided among white pine-hardwood, mixed hardwood, and in wetland areas, red maple-ash. Of the 37 acres, approximately 4.2 acres would consist of wetland forest, while the rest would consist of upland forest. (Tr. 10/31/88, pp.69-70; Tr. 11/1/88, p.87; NU 1, p.54; NU 5, p.19)
106. After removal of the existing line, most of the 75 acres now cleared under the line would be permitted to naturally revegetate. (NU 1, p.5, 54; NU 3, Q.84)
107. After removal of the existing line, unmaintained portions of the right-of-way would succeed from low growing pioneer species to a forest dominated by a diverse intermediate succession of trees and other vegetation within a 50-year time span. (NU 3, Q.84)
108. Merchantable timber resulting from clearing operations would be sold or disposed of in consultation with the respective landowners, and in accordance with CL&P established procedures. (NU 1, p.54)
109. Timber rights are usually retained by fee owners of property over which CL&P has easement rights. Sawlogs would be piled along the edge of clearing of these properties. Disposal of the timber is at the discretion of the fee owner. (NU 3, Q.91)
110. About 5.3 acres of forest would be removed behind the six residences in the Highwood Road area. (Sunridge 18, p.3)
111. About 2.13 acres of forest would be removed behind the area of the Roskear Farms Subdivision. (Peter Stitch Associates, Inc. 3)

Stream and Wetland Crossings

112. Effects from stream and wetland crossings would be minimized by constructing during dry or frozen periods, or by leaving gaps dependent on seasonal characteristics, time of construction, and availability of existing accessways. Wetland areas would be crossed as little as possible. (NU 1, pp.8, 21, 41-46, 57; NU 3, Q.31, Q.32)
113. About half of the access road, stream, and wetland crossings could be avoided by using accessways available on and off the right-of-way. (NU 1, pp.21, 41-46, 57)
114. Crossings of several streams and 4,500 feet of wetland would be required by heavy equipment, most prominently King Phillip Brook and associated wetlands just south of Connecticut Route 185 (wetland 8) and wetland 13 at the north end of Penwood State Park, where soils are saturated to slightly inundated. (Tr. 11/1/88, pp.156-157; NU 1, pp.41-46, 57, Appendix A)
115. Where wetlands could not be avoided, construction would be tailored to the type of wetland using a "mat/fill" procedure. Surge stone (traprock) would be used in hard-bottom shallow wetlands. Corduroy roads of wood slab or brush base with a gravel topping would be used in deeper wetlands. Watercourse crossings in deeper wetlands would use culverts. Culverts or surge stone would be used in wetlands where there is no water flow. Where needed, silt screens and filter dams would be used. (NU 1, pp.21, 41-46, 57; NU 3, Q.61)
116. The applicant conducted a preliminary avoidance/crossing evaluation of each wetland and stream that might be crossed during construction, assuming they could not be avoided by access over land where rights do not currently exist. The final D&M plan would specifically address each site which must be crossed. (Tr. 11/1/88, pp.156-157; NU 1, Appendix A, pp.41-46; NU 3, Q.64)

Soil Erosion

117. Soils that occur on steep slopes along the right-of-way are generally very rocky or stony silt loams. Areas along the route at greatest risk of erosion are those having 15 percent slopes or greater, approximately four miles of the 11.7 mile right-of-way. Of this approximately 1.3 miles traverse steep rocky land with relatively little soil and little or no erosion potential. Of the other 2.7 miles, soils that occur in such areas are generally very stony and are not considered highly erodible on the basis of criteria by the United States Department of Agriculture Soil Conservation Service for Hartford County. (NU 1, pp.38, 55; NU 3, Q.63)

118. No major soil disturbances other than vehicular crossings are planned adjacent to the tributaries and small streams which cross the right-of-way. (NU 3, Q.60)
119. Soil erosion potential in all areas would be minimized by leaving the root systems of woody vegetation subject to clearing, and by minimizing the removal of herbaceous vegetation. Specific erosion control measures would be developed in accordance with the Connecticut Council on Soil and Water Conservation guidelines detailed in the D&M plan. (NU 1, p.56)
120. Other potential erosion control measures would include:
- a) mulching and/or revegetation of denuded areas after disturbance;
 - b) seeding road edges;
 - c) surfacing travel portions of access roads with processed stone;
 - d) installation of water bars, culverts, and haybale check-dams;
 - e) keeping heavy equipment off extremely steep erodable slopes by leaving gaps or by using existing accessways on gentler slopes; and
 - f) seasonal scheduling of construction activities to drier periods.

Soil erosion control measures would be tailored to meet the specific needs of a given site. (NU 1, pp.8, 21, 41-46, 56; NU 3, Q.63)

121. After the construction phase of the project, access roads and work areas would remain for transmission line operation and maintenance. They would be rehabilitated and planted to reduce visibility and erosion potential. All areas sensitive to erosion would be monitored. (NU 1, p.23)
122. The right-of-way is upgradient of the six Highwood Road area residences. During periods of precipitation, surface water runoff flows in the direction of the houses. (Sunridge 14, p.2)
123. Erosion damage occurred during periods of high rainfall in the area of Highwood Road in 1980, 1981, and 1982. (Sunridge 1; Sunridge 10; Sunridge 16, pp.3-4; Sunridge 17, p.2)

Visibility Considerations

124. The location of greatest visual exposure to the valley is at the top of Talcott Mountain where the existing line crosses the Mountain in an easterly direction before entering North Bloomfield Substation. The actual crossing itself can be clearly seen from the intersection of Connecticut Route 185 and United States Highway Route 202 in the Town of Simsbury. The wood pole H-frame structure at the edge of the ridge is visible, as would be the new structure. Interrupted views of this same location are available to motorists and area residents in the vicinity of Terry Plains Road and United States Highway Route 202, which is nearly one mile distant. (NU 1, pp.17, 37, Appendix A; NU 3, Q.71)
125. Visually sensitive areas along the right-of-way include adjacent residential areas, recreational areas, scenic areas, and prominent ridgelines. (NU 1, p.34)
126. The proposed new structures would not be tall enough to rise above existing surrounding tree heights on the right-of-way. (NU 3, Q.69)
127. In visually sensitive areas, CL&P would attempt to retain as much existing vegetation as possible while not compromising the safety and reliability of the transmission line once operational. (NU 3, Q.37)
128. The additional vegetation removal on the northern 5.1 miles of the right-of-way would not expose the proposed line to viewers in the Farmington River Valley any more than the existing line. (NU 3, Q.71)
129. The new structures and lines would not be significantly more visible from the Heublein Tower. (NU 3, Q.69)
130. No additional impacts to the Metacomet Trail are expected when the proposed transmission line is operational. (NU 3, Q.65)
131. Visual impacts resulting from the proposal would vary with the local topography and vegetation. (DEP comments of 10/3/88)
132. The H-frame structures would be visible to the residential areas mentioned in Simsbury. (DEP comments of 10/3/88)
133. No significant, long-term dominant visual impacts to the public are generally anticipated by the DEP. (DEP comments of 10/3/88)

Safe Distances - Electric and Magnetic Fields

134. Safe distances between line conductors and residences are governed by the National Electric Safety Code. The 115-kV conductors, when blown sideways by 60 m.p.h. transverse winds, are not permitted to be closer than 10.67 feet to a structure. This is determined for the maximum span length associated with a given line design. A 29-foot, 6-inch standstill separation between outer conductors and right-of-way edges proposed by NU would be sufficient to meet this requirement for the proposed line. (Tr. 10/31/88, p.85; NU 3, Q.67)
135. Connecticut requires no limits on electric fields relative to long-term health effects. CL&P adheres to the New York State electric field exposure standard for 345-kV line designs of 1.6-kV/m at the edge of right-of-ways for all of its transmission lines. Magnetic field levels are not regulated or adhered to by any state, or by the applicant. (Tr. 11/1/88, p.90; NU 3, Q.66; NU 4, Q.50, Q.53)
136. At 60-Hertz, electric and magnetic fields are independent and non-propagating with 115-kV lines. Electric fields are associated with voltage while magnetic fields are proportional to current flow. Away from the power lines, the fields attenuate rapidly. (Tr. 11/1/88, p.57; NU 3, Q.66)
137. Existing electric fields immediately below the higher proposed conductor clearances would be reduced. Magnetic fields would also be influenced by line clearances, but would rise and fall with the daily cycle of current flow and with higher or lower exposures, depending on the distances to objects and current flow. (NU 3, Q.66)
138. Electric fields are shielded by intervening objects in their path. Magnetic fields pass through objects without change. (Tr. 11/1/88, pp.58-59; NU 3, Q.66)
139. Decreasing the distance between buildings and power lines would cause an increase in the electric field at the buildings where there is no shielding. There would be negligible change where shielding is preserved outside a building, or inside a building except in front of windows. (Tr. 11/1/88, p.58; Sunridge 3; NU 4, Q.24, Q.48)

Herbicide Usage

140. Normally CL&P maintains rights-of-way by spraying herbicides on selected woody plants as necessary to prevent short circuiting of overhead conductors, and to permit access to lines by maintenance crews. Selective use of herbicides perpetuates shrub communities on rights-of-way. (Tr. 10/31/88, pp.75-76; NU 1, p.55)

141. Stumps would be treated with herbicides to prevent regrowth. (NU 1, pp.54-55)
142. Herbicides would not be broadcast on the right-of-way. Approved herbicides would be stored, handled, cleaned up, and applied in accordance with approved and established procedures. Herbicides would not be used within 50 feet of private wells. (NU 1, p.55; NU 3, Q.54)
143. Herbicides would be applied at approximately five-year intervals. (NU 4, Q.20)
144. CL&P would seek approval and monitoring of herbicide applications on MDC lands by MDC personnel. (NU 1, p.24; NU 3, Q.75)
145. The CL&P herbicide maintenance program on transmission rights-of-way has not contaminated any private or public water supplies to date. (NU 4, Q.26)
146. CL&P has never been cited by any governmental agency, and has never had a claim filed against it because of its herbicide use. (NU 4, Q.29)
147. The Water Supply Section of the Connecticut Department of Health Services, Preventable Disease Division, Environmental Health Services has no restrictions on the application of approved herbicides adjacent to public or private water supplies. (NU 4, Q.35)

Cost and Schedule

148. Proposed project costs are estimated as follows, in thousands of dollars:

Construction Roads	313.2
Clearing	310.0
Survey	125.0
Wood Poles & Fixtures	1,418.7
Conductor & Devices	824.4
Right-of-way Rehabilitation	45.0
Regulatory Costs	25.0
State Sales Tax	53.3
Engineering	250.0
Contingencies @5%	168.2
Overheads	1,073.3
Administrative Salaries & Expenses @2%	92.1
Increase to 1989 Dollars	516.8
AFUDC @10.25%/year for 1 year	534.5
Existing Line Removal	<u>250.0</u>

TOTAL 5,999.5

(NU 1, p.6; NU 3, Q.42; NU 4, Q.32, Production Request 1)

149. The entire cost of the proposed reconstruction would be paid for by CL&P. (NU 4, Q.1)
150. The in-service date for the new line is expected to be June 1990. Some final right-of-way and access road rehabilitation and restoration would extend into the fall of 1990. (NU 1, pp.6-8)

Alternatives

151. There are no reasonable alternate routes for overhead construction from Farmington Substation to North Bloomfield Substation. (NU 1, p.60)
152. One alternative to the proposed project would be to install a high-pressure oil-filled 115-kV underground cable between the Southwest Hartford Substation and the Newington Substation. The cable installation and substation terminal requirements would cost, in total, approximately \$13.4 million. This circuit would provide a parallel path toward the Southington load center, relieving the flow on the #1726 line. (NU 1, p.15; NU 4, Production Request 2, Q.70)
153. The Southwest Hartford-Newington alternative would be constructed completely within the street line limits for a distance of 20,600 feet (3.9 miles). The trench would be 48" wide and have an average depth of 60". (NU 3, Q.101)
154. Installation of a solid dielectric underground line along the Southwest Hartford-Newington alternative route would cost, in total, an estimated \$22,927,900. (NU 3, Q.103; NU 14)
155. The Southwest Hartford-Newington alternative would have other system benefits beyond the need to reconstruct the #1726 line since it would provide an extra supply line to both the Newington and Southwest Hartford Substations. Under today's system configuration, enhancement is not needed for at least 20 years into the future. With the #1726 line rebuilt as proposed, a Southwest Hartford to Newington line would not be needed in the near future and probably would never be needed. (Tr. 11/1/88, pp.122, 124-125; NU 4, Q.17, Q.70)
156. Another alternative would be to underground the line using high-pressure oil-filled cable on the proposed route within the right-of-way. Two 1500 kcmil aluminum conductors would be needed. The total cost would be approximately \$28 million. Alternate cable systems are available; however, the high-pressure oil-filled choice was based on the applicant's operating and reliability record with this system. (NU 1, p.15, pp.60-61)

157. As a final alternative, pole-for-pole replacement from Connecticut Route 185 north to the temporary connection 0.5 miles from North Bloomfield Substation would eliminate the requirement to clear 65 feet of the western edge of the right-of-way. This would increase the project cost a net of \$586,900, for a total of approximately \$6,586,400. The average ratepayer using 500kWh per month would see no appreciable increase in monthly electric bills as a result of this cost increase. (Tr. 10/31/88, p.64; NU 3, Q.108)
158. About \$100,000 would be saved by not removing forest on the western side of the right-of-way from Route 185 to the temporary connection. (NU 3, Q.108)
159. Under this pole-for-pole replacement alternative, 372 additional person days and 231 equipment days would be needed for wood poles and fixtures; 611 person days and 480 equipment days for conductors and devices; and 34 person days and 125 equipment days for removal costs. (NU 3, Q.108; NU 12, Document I)
160. This pole-for-pole replacement alternative would take about one month more to complete than the line as proposed. (NU 3, Q.108)
161. A series of daily outages on the #1726 line plus six continuous outages of approximately three days would be required under this pole-for-pole replacement alternative. (Tr. 11/1/88, pp.112-113)
162. No reconstruction of other CL&P 115-kV facilities would provide as much reinforcement as economically as the proposed replacement. (NU 1, p.15; Town of Simsbury 2)
163. An alternate line route proposed by Sunridge Residents et al., referenced as Alternate 4, would locate the new structures along the existing line route in the Highwood Road area. This alternative would increase the project cost by an estimated \$176,000. (Tr. 10/31/88, p.86; Tr. 11/1/88, pp.68, 76; NU 4, Q.2, Production Request 3)
164. Alternate 4 would avoid the nearly total deforestation between the houses and the new transmission line in the Highwood Road area on the western side of the right-of-way in the applicant's proposal. (Tr. 10/31/88, pp.109-110; Sunridge 15, pp.2-3; NU 1, p.34; NU 4, Q.18, Q.25; NU 5, p.3, Exhibit G)
165. The average rate payer using 500kWh per month would see no appreciable increase in monthly electric bills as a result of the \$176,000 investment for Alternate 4. (Tr. 11/1/88, p.91; NU 4, Q.2; Sunridge 16, pp.8-9)
166. The six Highwood Road home owners would not be willing to pay for the incremental cost of the Alternate 4 construction. (NU 1, p.35)

167. Houses on lots 9, 10, and 11 at Roskear Farms are, or would be, located within 200 feet of the existing line. One house lies within 100 feet of the existing line. (NU 3, Q.88, Q.105; Peter Stich Associates Inc. 1; Peter Stich Associates Inc. 3; Limited Appearance of John J. and Barbara M. Gilles 11/9/88)
168. The applicant proposes to leave a variable band of trees ranging from 10 to about 40 feet wide between the transmission line and lot 9 of the Roskear Farm Subdivision. Lot number 10 would overlook a 40- to 50-foot wide clearing to the right-of-way. (NU 3, Q.88, Q.105)
169. The applicant has discussed with the builder of Roskear Farm alternatives that would minimize structure encumbrance near lots 9 and 10 on the right-of-way. As discussed with Peter Stich Associates, party to this record, Alternate 1, swinging the new line into the alignment of the existing line, would cost an additional \$100,000. Alternate 2, at no additional cost, could keep structures out of direct line of sight of the two homes on lots 9 and 10, with a span of about 650 feet on the northerly line of lot 9 and the southerly line of lot 10. (NU 3, Q.88, Q.105)
170. Peter Stich Associates' position concerning the two alternatives in the Roskear Farm Subdivision is, any relief granted to any of the other residential areas should similarly be granted to them. (Peter Stich Associates 3, p.2)
171. On lot 34 of Hallview Subdivision a house is currently being constructed. Trees have been cleared to the western edge of the right-of-way. (NU 3, Q.81, Q.106)
172. A proposal from Hunting Ridge et al. to move the line reconstruction toward the eastern side of the lots would cost approximately \$100,000 extra. (Tr. 10/31/88, pp.196-197, 198-199; Tr. 11/1/88, pp.158-159; Hunting Ridge 1; Hunting Ridge 2; NU 8)
173. Hunting Ridge et al. would not be willing to pay for the incremental cost of their proposed alternative construction. (Tr. 10/31/88, p.199)
174. Construction of the new line in the same location as the existing line would require the #1726 circuit to be taken out of service for varying periods of time during the reconstruction. (NU 5, pp.34-35)
175. During reconstruction of any of the alternatives in the location of the existing line, the possibility of failure of the #1783 line, the only other supply to the Farmington Substation, would jeopardize reliability unreasonably, according to the applicant. (Tr. 11/1/88, pp.77, 97, 98, 108; NU 3, Q.17, Q.18; NU 5, p.35)

176. The applicant asserts that the property owners rather than the rate payers should bear the incremental costs concerning the alternatives in that they accommodate private preferences as opposed to promoting a public benefit or value. (Tr. 11/1/88, pp.96, 98; NU 4, Q.2; NU 5, p.33)
177. The applicant would be willing to construct the alternative line rebuilds in the residential areas if the incremental costs were borne by the residents. (NU 1, p.35; NU 5, pp.32-33; NU 8)

2520E