DOCKET NO. 95 - AN APPLICATION OF THE CONNECTICUT LIGHT AND POWER COMPANY FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION OF A NEW SUBSTATION IN THE TOWN OF DARIEN, CONNECTICUT.	:	Connecticut Siting Council
	:	June 22, 1988

FINDINGS OF FACT

1. The Connecticut Light and Power Company (CL&P) applied to the Connecticut Siting Council (Council) for a Certificate of Environmental Compatibility and Public Need (Certificate) to construct a new substation and its connection to an existing 115-kV transmission line in Darien, Connecticut, on February 29, 1988. (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 Connecticut General Statutes (CGS) section 16-501(b). (Record)
4. The Department of Environmental Protection (DEP) 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 February 19, 1988, and February 24, 1988; the Norwalk Hour, on February 26, 1988; the Stamford Advocate, on February 18, 1988, and February 25, 1988; and the Darien News-Review, on February 18, 1988, and February 25, 1988, as prescribed in section 16-501(b) of the CGS. (Record, CL&P 4)

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 field inspection of the proposed site on May 9, 1988. (Record)

8. Pursuant to CGS section 16-50m, the Council, after giving due notice thereof, held a public hearing on this application on May 9, 1988, beginning at 7:00 P.M.. The hearing was held in the auditorium of the Darien High School, Darien, Connecticut. (Record)

9. The proposed substation would be a bulk supply substation on a site owned by CL&P in the Town of Darien, Connecticut. A bulk supply substation is a facility which converts electricity from transmission voltage to distribution voltage. (CL&P 1, Introduction; CL&P 3, pp. 2-3)

10. The proposed substation would connect to an adjacent 115-kV transmission line and to an existing 13.2-kV distribution system. (CL&P 3, pp. 2-3)

11. On October 7, 1986, the Department of Public Utility Control (DPUC) approved a program and schedule established by CL&P to further assure the reliability of service in the Stamford/Darien area because of growing load demands and reliability problems. (CL&P 1, p. 2, Exhibit 2; CL&P 2, Q. 2)

12. In November of 1986, CL&P proposed to the DPUC to eliminate a 13.2-kV aerial cable in Darien, and to build a new substation in Darien on the proposed site in this application. On December 9, 1986, the DPUC approved the proposed changes and stated that "it appears that the new substation would greatly enhance the reliability of the system in this area." (CL&P 1, p. 2, Exhibit 2; CL&P 2, Q. 2)

13. The proposed Darien Substation would improve the quality of the Darien power supply because bulk substations which feed Darien are all outside Darien. The present distances associated with the current bulk supply substations limit voltage regulation. The shortened feeder length resulting from the proposed Darien Substation would decrease exposure to various causes of feeder failure, which would increase reliability of service. (CL&P 1, p. 1; CL&P 3, pp. 5-6)

14. The design features of the proposed Darien Substation would contribute to power supply reliability. The substation would be supplied by two 115-kV transmission lines; upon an outage of one of the lines, the line would automatically be shut off from the substation and the substation would be switched over and supplied by the other line with only a few seconds of interruption to half of the customers supplied by the Darien Substation. (CL&P 1, p. 2, Exhibit 1; CL&P 3, pp. 8-10, Supplement pp. 1-3)

15. There are no bulk supply substations in Darien. The area is supplied mainly from the 115/13.2-kV Glenbrook Substation in Stamford, and the 115/13.8-kV Flax Hill Substation in Norwalk. (CL&P 1, p. 1; CL&P 2, Q. 17)

16. A growing load in the area served by the Glenbrook Substation, which currently partially serves Darien electrical needs, would bring the substation over its capacity limit by the summer of 1989. (CL&P 1, p. 1; CL&P 3, pp. 5-6)

17. Glenbrook Substation had a 1987 summer peak load of 85 MVA. By the 1989 summer peak load period, the forecasted load on this substation would be 97 MVA, in excess of its rated capacity of 96 MVA. (CL&P 1, p. 1; CL&P 3, pp. 5-6)

18. Glenbrook Substation cannot be expanded because its output is limited by the capability of its 13.2-kV switchgear from which originate 18 distribution feeders now supplying parts of Stamford and Darien. Load would be removed from Glenbrook to allow room for new load that occurs closer to Glenbrook. Approximately 25 MVA would be transferred from Glenbrook to the proposed Darien Substation; this represents the amount currently supplied from Glenbrook Substation to Darien. (CL&P 1, p. 1; CL&P 2, Q. 14; CL&P 3, p. 6, p.11)

19. Flax Hill Substation, which currently feeds the eastern part of Darien, cannot be expanded for the Darien load because it is remote from the Darien load and cannot supply the areas of Darien presently fed from Glenbrook Substation without creating reliability and voltage regulation problems; Flax Hill expansion should be reserved for the growing Norwalk area load; and the distribution voltage at Flax Hill is 13.8-kV instead of 13.2-kV, and special regulating equipment would therefore be required. (CL&P 1, pp. 1-2; CL&P 3, pp. 6-8,11)

20. The installation of the proposed Darien Substation would transfer 10 MVA from Flax Hill to Darien Substation. (CL&P 1, p. 2)

21. The transfer of 25 MVA to Darien Substation would defer the need for reinforcement of the Glenbrook Substation to about 1996. To further defer any work at Glenbrook, load in addition to the 25 MVA would be transferred to Darien Substation as needed; therefore, Glenbrook Substation would not need any reinforcement at least until the turn of the century. No load transfers to the proposed substation are proposed from substations other than Glenbrook or Flax Hill. (CL&P 2, Q. 15; Tr. 5/9/88, p. 42)

22. Three other system alternatives to building the proposed Darien Substation through upgrading other substations were considered and rejected because South End Substation would soon reach its capacity limit, and Cedar Heights and Waterside Substations are too far from the Darien load. All of these substations are in Stamford. (CL&P 1, p. 13, Exhibit 1; CL&P 3, pp. 11-12)

23. Alternate sites to the proposed substation were considered with the following criteria:

- availability of 5-6 acres of land;
- minimal environmental impact;
- proximity to the 115-kV transmission line to minimize the cost and environmental impact of the connection to the system;
- a site near the Darien load to minimize the cost and optimize the reliability of the connection to the distribution system; and
- availability at a reasonable cost and at a time compatible with the project schedule.

(CL&P 1, p. 13; CL&P 3, p. 12; Tr. 5/9/88, pp. 18-19)

24. Five sites were subsequently investigated by CL&P. Three were eliminated because they were of inadequate size and south of the New Haven Line railroad track, which would entail considerable expense to connect to the distribution system. Also, the time needed to acquire any of the properties would have delayed the in-service date of the proposed substation. (CL&P 1, p. 14, Exhibit 9)

25. The other two sites were investigated more closely. The first site was eliminated because considerable costs were associated with distribution feeders required to reach the load, which was substantially west of the site; an extremely long road would have been needed to access the site along the edge of a transmission right-of-way or through town property; the site was found to have shallow depth to bedrock; and a large stand of trees would have had to be removed. The land was designated permanent open space and an aquifer protection area by the Town of Darien. The estimated total cost to design and construct a substation at this site would be $9,184,000. (CL&P 1, p. 14, Exhibit 9; CL&P 2, Q. 6; CL&P 3, pp. 12-13, attached Land Use Plan Map)

26. The second site was eliminated because it was too far from the load; the cost of connection to the distribution system was too high; the time needed to acquire the property would have delayed the in-service date of the substation; and extensive grading and blasting would have been needed for site preparation. The property is a nature preserve owned by the Town of Darien, and it is designated as an aquifer protection area. The estimated total cost to design and construct a substation at this site would be $10,028,000. (CL&P 1, p. 14, Exhibit 9; CL&P 2, Q. 6; CL&P 3, pp. 13-14, attached Land Use Plan Map)

27. The proposed substation would be built on a 6.719 acre wooded site located between West Avenue to the north and the New Haven Line railroad tracks to the south. The property was purchased in three separate transactions: 4.499 acres in January 1966; 1.27 acres in October 1966; and .95 acres in September 1967. (CL&P 1, p. 4, p.6, Exhibit 3; CL&P 2, Q. 1, Q. 3)

28. The elevation of the site ranges from 54 feet to 94 feet with some rock outcrops in the higher areas; there are four wetland areas on the property. Two small streams flow from north to south across the ends of the property, Stony Brook to the west and Cummings Brook to the east. (CL&P 1, p. 6; CL&P 3, p. 17; CL&P 6)

29. The property consists of an interwoven mixture of wooded wetland and upland areas with deciduous trees predominating, ranging up to 54 inches in diameter and 100 feet in height. A sparse understory of shrubs representing dry land and transitional species predominates except in the wetlands, where a dense understory of wetland species occur. (CL&P 1, p.6; CL&P 6; DEP comments 5/20/88)

30. Major tree canopy species include red oak, tulip poplar, and ash. A large number of secondary species occur on the site including black locust, sugar maple, sassafras, black birch, yellow birch, tree-of-heaven, Norway maple, red maple, pin cherry, and white oak. Many large grape vines extend into the canopy. Pepperbush, viburnum, and multiflora rose are the chief understory species. Lesser species include barberry, chokeberry, and holly. Several very large trees occur on the site, the most notable being a 54-inch diameter breast height tulip poplar on the knoll near the western end of the parcel. (DEP comments 5/20/88).

31. The CL&P property is zoned residential and is an interior lot bordered on the north, east, and west by residences along West Avenue and on the south by the New Haven Line railroad tracks. (CL&P 1, p. 6; CL&P 2, Q. 4, Q. 5; CL&P 6)

32. There is an existing 600-foot, man-made drainage channel crossing the substation site from west to southeast in a wetland area near the middle of the property. The channel is clogged and stagnant most of the year, but it was designed to collect runoff during wet periods and drain easterly to the lower area of Cummings Brook. The runoff disperses in this area about 200 feet from the brook and does not enter the brook directly. This function would be retained by diverting runoff around the proposed substation yard in grass swales and channels to the same wooded area where it now disperses. Where the proposed channel crosses the access road, piped culverts would be used. (CL&P 1, p. 6; CL&P 2, Q. 23; CL&P 3, p. 16; CL&P 6; Tr. 5/9/88, p. 22, pp. 46-47)

33. The dense shrub cover in the wetland areas, combined with the interspersion of wetland and uplands, creates a desireable area for wildlife on the site. (DEP comments 5/20/88).

34. Wildlife habitat values in the wetland areas around the proposed substation would be supplemented with the addition of trees and shrubs that provide food and cover for wildlife. (CL&P 1, p. 6; CL&P 3, p. 16; Tr. 5/9/88, pp. 50-52)

35. The proposed project is not within the 100-year flood hazard zone or stream-channel encroachment lines. (CL&P 1, p. 6; Tr. 5/9/88, p. 44)

36. There are no known Federally Endangered and Threatened Species or Connecticut Species of Special Concern on the property. (CL&P 1, p. 6, Exhibit 10)

37. The proposed substation installation would consist of two power transformers, one 115-kV circuit breaker, a mobile transformer position, a relay and control enclosure, and six 13.2-kV feeder positions located in a metal clad switchgear enclosure. (CL&P 1, p. 4, Exhibit 4; CL&P 5)

38. The proposed installation would be within a 132-foot 6-inch by 400-foot fenced and graded area with trap rock aggregate surface, except for two 70-foot guyed wood pole structures outside of the fenced area. Most of the proposed substation would be situated on wetlands. All of the buildings and structures within the fenced area of the site would be situated on wetlands. The water table throughout these wetlands is located virtually at the surface, at least during the spring. (CL&P 1, p. 4; CL&P 3, p. 18; CL&P 5; CL&P 6; DEP comments 5/20/88)

39. The existing access to the site crosses wetlands and is used by the abutting 127 West Avenue property owner on a right-of-way as a driveway, and space would be provided to allow this use to continue during and after the proposed construction. The bend in the access road would be maintained, and existing vegetation along with planted screening would be used to reduce visual impacts from West Avenue and adjoining residences. (CL&P 1, p. 6; CL&P 3, pp. 14-15; CL&P 6; Tr. 5/9/88, pp. 54-57)

40. The access road to the proposed substation would be gravel, allowing rain water to drain through. The only impermeable surfaces of the proposed substation would be the roofs of the two enclosures and the concrete pads which would support the substation equipment. (CL&P 1, p. 6)

41. The proposed substation would include two main transformers and a mobile transformer position. Upon failure of one main transformer, the customers supplied by the transformer would automatically be transfered to the other main transformer, which would be capable of supplying all of the Darien substation load for short periods of time. (CL&P 1, p. 3; CL&P 3, Supplement pp. 1-3)

42. A fully equipped position would be reserved in the proposed substation for connection of a mobile transformer. It would be installed if a main transformer had to be removed from service for a prolonged period of time. The mobile transformer would be brought to the substation, connected, and energized in less than 24 hours. (CL&P 1, p. 3; CL&P 3, Supplement p. 3)

43. The outdoor power transformers would be three-phase, 115-kV to 13.2-kV, 47-MVA transformers. The low voltage side of the transformers would be connected to the 13.2-kV switchgear by the use of a cable bus, which is a system of power cables enclosed in an extruded aluminum cover and mounted on top of ground support structures. (CL&P 1, p. 4; CL&P 5)

44. The oil used in the transformers would have a PCB concentration lower than 50 ppm. A common oil sump would be installed for the power transformers. The sump would surround the transformer foundations and would have a capacity equal to the approximate 8,000-gallon oil volume of one transformer. The sump would contain any spill until the arrival of CL&P maintenance personnel, who would immediately remove all of the spill. (CL&P 1, p. 8; CL&P 2, Q. 24; Tr. 5/9/88, p. 35)

45. Small transformer oil spills would be mitigated by the regular weekly visits of CL&P maintenance personnel. If a larger spill occurred, it would actuate alarms that would automatically alert the nearby Glenbrook dispatching center. An underground oil/water separator would add protection to the sump system. (CL&P 1, p.8; CL&P 2, Q. 24)

46. The proposed substation would be designed to accommodate an ultimate number of three transformers and associated equipment. The site would not be able to accommodate a 345-kV substation. (CL&P 2, Q. 20)

47. The output of the transformers is connected to an arrangement of 13.2-kV circuit breakers located in a metalclad switchgear. From these circuit breakers emanate the distribution feeder which would supply the Darien distribution system. Reliability of the metalclad switchgear equipment would be improved by CL&P by providing each feeder with a double supply from the switchgear. The double-bus switchgear design would allow quick restoration of power in case of a failure inside the switchgear. (CL&P 1, p. 3; CL&P 3, Supplement pp. 1-3)

48. The metalclad switchgear enclosure would be approximately an 86-foot by 38-foot by 23-foot high steel frame masonry block building. It would contain a metalclad switchgear which would include the units necessary for connection to the power transformers and six distribution feeder positions. (CL&P 1, p. 4,7, Exhibit 5; CL&P 5)

49. The relay and control enclosure, similar to the metalclad switchgear enclosure, would be approximately a 24-foot by 60-foot by 20-foot 6-inch high steel frame masonry block building. All relaying, control, and metering for the transmission lines, transformers, circuit breaker, and switchgear would be located in this building. (CL&P 1, p. 4,7, Exhibit 5; CL&P 5)

50. The two enclosures would partially conceal the substation equipment and transformers, and be designed to be visually compatible with the existing residences in size, proportion, color, and texture. The enclosures would have brick-colored, split-face concrete block walls with darker-toned, split-ribbed bandings along the eaves and on pilasters in the walls. The roofs would be copper-tone, anodized aluminum hip roofs with standing seams. The two enclosures would straddle the existing drainage channel. (CL&P 1, p. 7. Exhibit 5; CL&P 3, pp. 14-15; DEP comments 5/20/88)

51. Wood poles and steel structures would be required to connect the transmission line to the substation and to support the various electrical components. Two galvanized wide-flanged, A-frame structures, 65 feet high and 35 feet wide, would accompany the 70-foot guyed wood poles and existing 95-foot high transmission line structures. The legs of the A-frame are I-shaped columns 12 feet apart. (CL&P 1, p. 4,7; CL&P 5)

52. From the A-frame structures the 115-kV lines would be connected to the 115-kV substation bus which would consist of tubular aluminum conductors. The maximum height of the tubular aluminum bus would be 21 feet, 6 inches. (CL&P 1, p. 4,7, Exhibit 4; CL&P 5)

53. The power cables required to connect the metalclad switchgear to the distribution system outside the proposed substation would be installed in a system of underground ducts and manholes. (CL&P 1, p. 5)

54. The proposed substation area would be enclosed in an 8-foot high chain link fence which would run along the periphery of the substation, except at the two enclosures. An infrared perimeter security system would alert the nearby Glenbrook dispatching center of any intrusion. (CL&P 1, p. 5; CL&P 5)

55. Design of the proposed substation installation would be in full accordance with the standards of the National Electrical Safety Code, and all applicable American National Standards Institute, Institute of Electrical and Electronics Engineers, and National Electrical Manufacturers Association standards. (CL&P 1, p. 5)

56. The elevation of the proposed substation yard would be approximately 75 feet, which is approximately the existing elevation. This would be approximately the same elevation as the land of the residences to the northwest, and 10 to 20 feet lower than the residences to the northeast. (CL&P 1, p. 7; CL&P 6)

57. Existing trees and shrubs would remain except for the 40-foot area around the substation perimeter fence needed for construction of the proposed substation and the area required by the access road. (CL&P 1, p. 7)

58. After construction activities, approximately 100 deciduous and evergreen trees and 150 shrubs would be planted along the access road and around the northeast and west sides of the substation to provide year-round screening. The perimeter of the substation would be seeded and kept mowed for security reasons. Cleared areas at a greater than 20-foot distance from the fence would be seeded and left to grow. (CL&P 1, p. 7; CL&P 3, pp. 14-15; Tr. 5/9/88, pp. 34-35, 49-50)

59. The tree removal from the property would have little effect on sound abatement from the railroad to the nearby residences. (Tr. 5/9/88, pp. 25-27, 57-59)

60. The transformers planned for the proposed Darien Substation would be specified with a sound level lower than the accepted industry standard for transformers of that size. This and the location of transformers behind the enclosures would reflect and attentuate some sound. (CL&P 1, p. 8; CL&P 3, pp. 15-16; Tr. 5/9/88, p. 62)

61. The sound level at the CL&P property line toward the neighboring homes would remain within one dBA of its present value during periods of surrounding area relative quiet. (CL&P 1, p. 8; CL&P 3, p. 16)

62. The 115-kV circuit breaker would emit a short, impulse-type noise. The breaker would not be expected to operate more than three or four times a year. (CL&P 2, Q. 22)

63. There would not be any television or radio interference associated with the proposed Darien Substation. (CL&P 1, p. 8)

64. Rock blasting would be done by a State-licensed contractor. For blasting near buildings and other structures, a pre-blast survey would be conducted, and seismic recording of the blasting operations would be performed. Adjacent landowners would be notified at least 24 hours in advance of any blasting activity. (CL&P 1, p. 12; Tr. 5/9/88, p. 41)

65. CL&P described an alternate stretch-out configuration of the proposed substation to show how far the substation could be from the abutting neighbors' property lines. (CL&P 7; CL&P 8; Tr. 5/9/88, pp. 19-21)

66. The stretch-out configuration would provide 10 more feet of distance from the abutting northern property owners while stretching the substation 115 feet more from east to west. Because of 510 more cubic yards of cut and fill, more site preparation, trap rock aggregate, fence work, bus support structures, and increased clearing, the stretch-out configuration would cost approximately $85,000 more than the project as proposed. (CL&P 7; CL&P 8; CL&P 9; Tr. 5/9/88, p. 20, pp. 27-28)

67. With the stretch-out configuration, the transformers would not be shielded from view by the two enclosures. With this configuration, NU proposed that the architectural treatment of the two enclosures be metal instead of steel frame masonry block. This would result in an estimated cost reduction of $92,000. This, combined with the $85,000 cost increase, would result in a net project reduction of $7,000. (CL&P 7; CL&P 8; CL&P 9)

68. The stretch-out configuration would not avoid the 600-foot drainage ditch running through the middle of the site; it would also require the man-made diversion around the proposed substation. (CL&P 7; CL&P 8; Tr. 5/9/88, p. 21)

69. Proposed project costs are estimated as follows:

Property Acquisition	$ No Cost
Access Road Improvement	37,000
Design and Engineering	291,000
Equipment	3,618,000
Site Preparation, Foundations, & Grounding	1,006,000
Transmission Tie-in	162,000
Distribution Tie-in	1,097,000
TOTAL PROJECT COST	$ 6,211,000

(CL&P 2, Q. 7)

70. Construction of the proposed substation would take 18 months. The in-service date is expected to be in December of 1989. (CL&P 1, pp. 10-11, Exhibit 8)

JAW

1475E