DOCKET NO. 115 - An application of The United Illuminating Company for a Certificate of Environmental Compatibility and Public Need for the construction of two 115,000/13,800 volt substations and connecting underground transmission lines in New Haven, Connecticut.

Connecticut

Siting

Council

February 5, 1990

ORIGINAL

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

1. On June 23, 1989, The United Illuminating Company (UI), in accordance with provisions of sections 16-50k (a), 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 construct two new 115,000/13,800 volt substations and two 115,000 volt underground transmission lines connecting these two substations into the UI transmission system, and to modify two existing substations. (Record)

2. The application was accompanied by proof of service as prescribed by CGS Section 16-50l (b). (Record)

3. The Department of Environmental Protection (DEP) and the Department of Health Services filed written comments with the Council pursuant to CGS Section 16-50j. (Record)

4. Notice of the application was given to the general public by publication in The New Haven Register, on June 14, 19, and 21, 1989, as prescribed in CGS Section 16-50l (b). (UI 1, Proof of Notice)

5. 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)

6. Members of the Council and its staff made a public field inspection of the two proposed substations, the two existing substations, and the transmission line routes on October 4, 1989. (Record)

7. The Council, after giving due notice thereof, held a public hearing on this application on October 4, 1989, beginning at 2:00 P.M., and continuing at 7:00 P.M., as prescribed in CGS Section 16-50m. The hearing was held in the Public Hearing Room, New Haven Hall of Records, 200 Orange Street, New Haven, Connecticut. (Record)

Overview

8. UI is the electric utility that generates, transfers, and distributes electricity to the New Haven area. Key components to UI's electric generation and transmission system are the English Generating Station which is 60 years old and the Grand Avenue Substation, which serves English Station and is approaching 50 years of age. These facilities have served and continue to serve a great portion of Central and Eastern New Haven. Both have experienced equipment problems in the past which continue to the present. (UI 1, Exhibit D, p. 2-1)

9. In 1987, UI initiated engineering studies which examined problems within its generating and transmission systems, particularly at the English Generating Station and the Grand Avenue Substation Complex serving the station. These problems concerned operations and maintenance, service reliability, equipment and personnel safety, and the need to service future load growth in New Haven. (UI 1, p. 3; UI 1, Exhibit D, p. 2-1)

10. The 1987 study identified reliability issues including complex operating procedures, deterioration of substation and transmission line equipment, high maintenance costs, and high equipment failure rates. The costs of making repairs of the existing equipment would be lower than building new substations but would fail to address other concerns regarding future customer services and expansion of system capacity. (UI 1, Exhibit A, p. 2; UI 1, Exhibit D, pp.2-2 and 2-3).

11. As a solution to the systemic problems, UI proposes to build two new 115,000/ 13,800 (115/13.8 kV) volt substations (Broadway Substation and Mill River Substation), construct two new 115 kV volt underground transmission lines, and construct modifications to UI's existing Water Street Substation and Grand Avenue Substation, all within the City of New Haven. This proposed Grand/Goffe Project (Project) would resolve these problems. (UI 1, Exhibit A, pp. 2-3)

12. With the new and improved substations at Grand Avenue, Mill River, Goffe Street, and Water Street, UI's transmission system would form a connected ring around the Central New Haven area. This closed loop design allows the system to support a substation from one cable if problems occur in another substation. (Tr. p. 33)

13. UI contends that the proposed Project would conform to long range plans to expand the electric power grid serving the State, would improve the reliability of the UI system, and would provide future capacity for the projected load growth in New Haven. (UI 1, Exhibit D, p. 3)

14. In 1988, the peak load at the English/Grand Facilities was 114 Mega Volt Amperes (MVA). These existing facilities currently serve about 24,000 customers. Projections of load growth indicate that the maximum transformer rating of 130 MVA would be exceeded by year 1991 and that a load of 148.4 MVA could occur by the summer of 1994. To meet this load growth, UI determined that the two new substations, rated at approximately 100 MVA capacity each, should be constructed by 1991. (UI 1, Exhibit B, p. 3; UI 1, Exhibit D, p. 2; UI 6, Q-42 Exhibit 1 and Exhibit 11, UI 6, Q-43)

15. The existing transformer rating of 85.5 MVA at the existing Water Street Substation is not expected to be exceeded until beyond the year 2002. An upgrading of this substation would still be needed in the future and would not be affected by the construction of the proposed transmission lines. (UI 6, Q-42 Exhibit 4, Exhibit 12; UI 6, Q-43)

16. The proposed Mill River Substation, with proposed transformers rated at 116.0 MVA, is forecasted to reach summer maximum peaks of 114.6 MVA in year 1998 and 118.2 MVA in year 1999. The winter maximum peaks would be respectively 92.8 MVA and 96.9 MVA for 1998 and 1999. (UI 6, Q-42 Exhibit 3 and Exhibit 11)

17. The proposed Broadway Substation, with an initial transformer rating of 58.0 MVA, is forecasted to reach summer maximum peaks of 56.8 MVA in year 1999 and 59.4 MVA in year 2000. The winter maximum peaks would be respectively 46.0 MVA and 48.0 MVA for 1999 and 2000. This substation would be upgraded to 116 MVA in year 1996 or as load growth necessitates. (UI 6, Q-42 Exhibit 2 and Exhibit 10)

Land Uses

18. The proposed Mill River Substation would be located in an area zoned IH, Industrial District (Heavy Industry) adjacent to the existing Grand Avenue Substation; the proposed Broadway Substation would be located in Business District BB, Automotive Sales; and the Water Street Substation is located in zoning area Business District BE, Wholesale and Distribution. No re-zoning would be necessary for the proposed Project. (UI 1, Exhibit D, pp. 5-22, 5-26, and 5-27.)

19. The proposed transmission routes pass through areas zoned for industrial, commercial, residential, and mixed uses. (UI 1, Exhibit C, p. 2; UI 1, Exhibit D, p. 5-22)

20. The predominant man-made features in the proposed Project area are Yale University and Interstate 91. (UI 1, Exhibit C, p. 2)

Substations

21. UI studied eighteen potential locations for new substations including the proposed Broadway Substation on Goffe Street and the Mill River Substation on Grand Avenue. Comparisons between sites included distribution costs, land procurement, reliability, and system interconnections relative to a growing load center identified in the Goffe Street area. (UI 1, Exhibit B, pp. 3 and 4; UI 1, Exhibit C, p. 2; Tr. pp. 29-32)

22. Based upon UI's location analysis, 60-80 Goffe Street was chosen as the most viable site for the new Broadway Substation, and the Mill River Site on the Grand Avenue Substation property as the best location for a second new substation. Both properties are presently owned by UI. (UI 1, Exhibit C, p. 4)

23. UI narrowed the potential substation sites to seven locations. UI rejected five potential alternate sites as a viable substation site for one or more of the following reasons: delays created by relocation of distribution feeders, conversion of 2.4 kV and 4.16 kV circuits to 13.8 kV, insufficient size to accommodate a substation, additional distribution costs greater that the cost of the proposed facilities, time-consuming property acquisition, unavailability of property, excessive distance from the Goffe Street load center, surrounding residences, and potential soil contamination. (UI 1, Exhibit D, pp. 3-3 to 3-6)

24. The proposed Mill River Substation would be located on the west bank of the Mill River and south of Grand Avenue in Eastern New Haven. UI owns and operates the 115/69/13.8 kV Grand Avenue Substation at this site and would construct the new substation on approximately 1.0 acre of land between the existing substation facility and the Mill River. Portions of the existing Grand Avenue Substation would be removed following construction of the new substation. (UI 1, Exhibit D, p. 2-2)

25. Construction at the proposed Mill River Substation would include termination facilities for taps to two existing 115 kV overhead transmission lines and one new underground 115 kV transmission line, two 115 kV power circuit breakers, four 115/13.8 kV power transformers, associated disconnect switches, instrument transformers, and interconnecting buswork. The height of the overhead termination structures would be about 55 feet above grade, approximately five feet lower than existing structures of the Grand Avenue Substation. The switchyard bus and associated equipment would be 26 feet above grade. A new single-story control/switchgear building would be erected to house 13.8 kV, indoor metal-clad switchgear and associated equipment for 29 distribution feeders. The maximum distribution rating of the new substation would be 116 MVA. The entire substation would be enclosed by a chain link fence (UI 1, Exhibit B, pp. 5-7; UI 1, Exhibit C, p. 1-1; UI 1, Exhibit D, pp. 2-6, 2-7, Figure 2-3)

26. The Broadway Substation would be constructed on the west side of New Haven's downtown area at 60-80 Goffe Street. The site is approximately 1.1 acres in size and contains a three-story brick and frame building previously used as a bakery, warehouse, and distributorship. This building would be demolished and a new equipment building constructed. The building would be razed by mechanical means, and no blasting would be necessary. (UI 1, Exhibit D, p. 1-2; UI 6, Q-35)

27. Construction of the Broadway Substation would initially include a low-profile 115 kV switchyard containing termination facilities for two new underground 115 kV transmission lines, one 115 kV power circuit breaker, two 115/13.8 kV power transformers, associated disconnect switches, instrument transformers, and interconnecting buswork. The maximum height of the switchyard bus and equipment would be about 26 feet above grade. A new equipment building would be constructed approximately 15 feet high above grade. The new building would contain termination facilities for twelve distribution feeders. In the future, the facility could accommodate two additional transformers and associated equipment. The maximum distribution rating of the new substation would be 116 MVA. (UI 1, Exhibit D, pp. 2-7, 2-8)

28. The proposed Broadway Substation's appearance would be similiar in appearance to neighboring buildings' architecture. A 20-foot high, brick veneered architectural wall would be constructed to surround the substation on three sides. The wall along the west (fourth) side would be 14 feet tall. Vegetative screening would be planted between the rear of the proposed wall and the back of an adjacent apartment building fronting on Whalley Avenue. (UI 1, Exhibit D, pp. 1-5, 2-8, 5-11; UI 6, Q-38)

29. The perimeter walls would reduce ground level noise at the property lines but would not have a mitigating effect at the upper stories of a nearby apartment building. (UI 6, Q-38)

30. All construction debris, including the demolished brick and frame structure, would be removed to an approved disposal area. UI would employ a specialized demolition contractor to raze the existing structures. Building asbestos would be removed and disposed of by an approved contractor prior to building demolition. (UI 1, Exhibit D, p. 2-19)

31. Suitable fill would be transported to the site to fill the excavated basement area of the razed building and level the site, then construction of the substation would commence. (UI 1, Exhibit D, p. 2-19)

32. The existing Water Street Substation is located on the north side of Water Street between Olive and Union Streets in the southeast part of New Haven. The substation would receive modifications to its existing equipment to terminate the second section of the proposed 115 kV underground transmission line. No acquisition of additional land would be necessary. All electrical and structural additions would occur within the confines of the existing facility with no increase in height or elevation. No external modifications are planned for the existing control/switchgear building. (UI 1, Exhibit D, pp. 1-1, 1-2, and 2-11)

33. At the existing Water Street Substation, UI would construct a new, 115 kV power circuit breaker, associated disconnect switches, interconnecting buswork, and a termination facility for the new, 115 kV underground transmission line. (UI 1, Exhibit B, p. 6; UI 1, Exhibit D, p. 1-2)

34. The Mill River Substation's transformers would be designed with the capability to contain all transformer oil in the event of an oil leak. (UI 1, Exhibit D, p. 5-4)

Transmission Line Route

35. After determining the new substation sites, UI conducted a transmission line study which analyzed ten transmission system alternates and twenty underground route options for interconnecting the new substations to the grid. Some factors considered for route selection included the feasibility of using existing bridges to cross railroad tracks; line length, configuration, cable bends, and cost; vehicular and pedestrian traffic volume and control; construction time restrictions; environmental impacts; and effects on historical and educational districts. The proposed underground routes linking the new and existing substations were selected as having the lowest installed cost, would be buried mostly in city streets, would be least disruptive to city traffic and other utilities, and would be the most reliable system available. (UI 1, Exhibit B, pp. 4-5; UI 1, Exhibit D, pp. 3-11 to 3-14)

36. Potential transmission route options were selectively reduced to the proposed and two alternate routes for each of the two line segments. All alternate routes would be longer, more costly to construct, and potentially more disruptive to the City of New Haven than the proposed routes. (UI 1, Exhibit D, pp. 3-14 to 3-20)

37. Selection of a proposed route for the transmission system required the crossing of railroad tracks. Of the seven bridges studied, five were targeted for replacement or destruction. The other two are being studied for replacement. Consequently, construction of a new crossing of the Amtrack railroad, located at Osborn Street, was proposed. (UI 6, Q-30, Q-32)

38. One transmission line segment would connect the proposed Mill River Substation and the proposed Broadway Substation and would measure approximately 1.66 miles long. The second segment would connect the new Broadway Substation to the existing Water Street Substation and would measure 1.49 miles long. The total distance of both segments would be about 3.15 miles long. (UI 1, Exhibit B, p. 7; UI 1, Exhibit D. pp. 2-14, 2-15)

39. The proposed underground 115 kV transmission line would exit the Mill River Substation and proceed west on Grand Avenue and cross under a Conrail railroad track. A steel pipe casing, later containing the cable, would be bored under the track at a minimum depth of 5-1/2 feet below the rail bottom and extending about 25 feet beyond each outside rail. UI would comply with all railroad specifications. (UI 1, Appendix A; UI 6, Q-10, Q-33; Tr. pp. 20, 41)

40. The proposed line would continue along Grand Avenue, pass under Interstate 91, and turn north, proceeding along land now owned by two private parties that once was part of Bradley Street. The City of New Haven has retained a utility easement through the previously designated street corridor. UI has applied to the City for an assignment of the easement to place the proposed line through the area. (UI 1, Appendix A; UI 6, Q-35, Q-54; UI Exhibit 8)

41. UI would replace, at its own expense, any part of the existing pavement and a wooden fence crossing the Bradley Street property displaced by construction of the proposed line. (UI 6, Q-54)

42. The line would proceed along Bradley Street, turn west onto William Street, then north along Osborn Street. At the end of Osborn Street, UI would construct a 59-foot long, box-type or pyramidal-shaped pipe bridge crossing over Amtrak railroad tracks. The new, enclosed bridging structure, containing the electric cables, would extend from one existing concrete abutment to another on the opposite side of the tracks. UI has considered several shapes for the bridging structures. A structural wall about 14 feet high would be erected to prevent unauthorized access to the pipe bridge. The structure would be visible from Osborn Street and from the railroad. A license agreement to build a bridging structure has been given by Amtrak contingent upon Amtrak's final approval of the design. UI would comply with Amtrak's safety specifications. (UI 1, Exhibit B, p. 7; UI 1, Exhibit D, pp. 1-2, 2-14; UI 1, Appendix A; UI 6, Q-10, Q-32, Q-55; Tr. pp. 20, 37-39)

43. After crossing the railroad, UI has preliminary permission from the Connecticut Department of Transportation (DOT) for the line to proceed through DOT property adjacent to an Interstate 91 entrance ramp towards State Street. The line would proceed southwest in State Street approximately four feet westerly of the eastern curb, to an intersection with Grove Street. The route would turn west along Grove Street, proceeding about ten feet south of the north curb, cross the buried Farmington Canal, proceed along Tower Parkway to Goffe Street, where it turns northwest in Goffe Street approximately 700 feet to the site of the proposed Broadway Substation. (UI 1, Exhibit B, p. 7; UI 1, Exhibit D, pp. 1-5, 1-6, 2-14 and 2-15; UI 1, Appendix A; UI 6, Q-10, Q-32; Tr. pp. 39-40)

44. The section of the proposed underground transmission line connecting the new Broadway Substation to the existing Water Street Substation would exit the Broadway Substation to the south, using an existing UI easement, ten feet wide and 71.5 feet long, along an existing concrete drive between an apartment building and a commercial business. The route would cross Whalley Avenue, proceed south along Dwight Street to an intersection with North Frontage Road, turn southeast and proceed along North Frontage Road, cross Metro-North railroad tracks within an existing cable support truss bridge, and proceed along Water Street to the Water Street Substation. (UI 1, Exhibit D, p. 2-15; UI 1, Appendix A; UI 6, Q-31, Q-55; Tr. p. 30)

Transmission Line Specifications

45. The proposed underground 115 kV transmission line would be a three-phase, 60 hertz, 115 kV single circuit line comprised of three, 1500 kcmil copper conductor cables installed in an 8-5/8 inch diameter, coated steel pipe. The line would initially be a high pressure gas filled (HPGF) system pressurized at 200 pounds per square inch by nitrogen. The cable pipe would be installed in a thermal backfilled trench measuring about 30 inches wide by five feet deep. A five-inch diameter, steel dielectric fluid return pipe would be entrenched above the thermal backfill, to be used for future circulation of cable dielectric cooling fluid within the pipe. A 1-1/4 inch diameter, polyethylene fiber optic cable near the bottom of the trench would be used for company communications between the Project's substations. UI expects the proposed pipe type cable system would last from 30 to 40 years. (UI 1, Exhibit B, p. 6; UI 1, Exhibit D, pp. 1-2, 2-15, 2-16, and Figure 2-8; UI 6, Q-26; Q-28; Tr. p. 44)

46. Conversion from a HPGF system to a dielectric fluid filled system would occur when the summer load exceeds 1161 amperes, approximately 15 years after commissioning the line. The synthetic dielectric fluid would be a low viscosity polybutene which is classified as a non-petroleum oil, is chemically inert, and presents no health hazards. (UI 6, Q-26)

47. The HPGF cable system pressure would be monitored by gas pressure gauges, with relay contacts wired to alarms if pressure changed beyond acceptable limits. At low pressure, the system would be automatically de-energized. External gas detectors would be used to detect any leaks. UI has installed five miles of underground HPGF pipe-type cable in its system since 1959 and has not experienced any underground leaks or outages due to cable failure. (UI 6, Q-24, Q-29)

48. Based on UI's experience with pipe type, HPGF cable systems, the utility industy's operating experience, and cost factors, the HPGF system was selected as meeting all of UI's present and future load requirements to year 2002. The gas dielectric system would have lower initial cost and lower maintenance costs than other system types. (UI 1, Exhibit D, p. 2-19; UI 6, Q-29; Tr. pp. 44, 64, and 65)

49. The proposed 115 kV transmission line's load ratings in amperes (amps) are as follows:

	Summer	Winter
Normal	943 amps	982 amps
Long Term Emergency (LTE)	1161 amps	1254 amps
Short Term Emergency (STE)	3074 amps	3169 amps

The proposed cable cannot be upgraded to 345 kV. (UI 6, Q-25)

Transmission Line Construction

50. Excavation of the trench would commence with pavement cutting and removal of concrete or bituminous portions of sidewalks, curbs, and street pavement by tractor mounted backhoe or by hand wherever necessary. All removed materials would be taken to an approved disposal area. The trench would be dug, the pipes set in place on thermal sand, manholes installed, the remaining open sections of trench backfilled and compacted, and street repaved. Then the conductors would be pulled through the pipe, spliced, pipe evacuated, pressurized with nitrogen, and tested. (UI 1, Exhibit D, pp. 1-16, 2-18)

51. During construction, the open trench would be dewatered by use of a well point system sloping the trench towards a sump with water evacuated by self-priming pumps. (UI 6, Q-18)

52. Where traffic conditions, public safety, or access to private property warranted, heavy steel plates would be placed over open trenches during construction. Safety barriers and fencing would be used as necessary and when acceptable to the City of New Haven. (UI 1, Exhibit D, p. 2-18).

53. The subsurface manhole structures used for cable pulling and splicing would measure about 16 feet long, nine feet wide, and eight feet high, and would be either precast concrete or be cast in place. (UI 1, Exhibit D, p. 2-16)

54. Following trench backfilling and restoration of vegetation, sidewalks, and curbs, street repavement would commence. Any grassed areas would be restored through replacement of the topsoil and reseeding of grasses. All repair work would be done according to City of New Haven specifications. (UI 1, Exhibit D, pp. 2-18, 2-19)

55. Property owners abutting the construction activities would receive advance notification by UI. Restrictions on access to abutting properties would be discussed with property owners to minimize disruption. (UI 6, Q-21)

56. Following Council consideration and Certification, final detail design, and agency approvals, construction would commence during the second quarter of 1990 and end with transmission line testing and energization during the third quarter of 1992. Total construction time would be approximately 18 months. (UI 1, Exhibit B, p. 7; UI 1, Exhibit E)

57. The substations' construction would proceed according to the following proposed construction schedule:

	Start	Finish
Mill River	June 1990	May 1991
Broadway	December 1990	November 1991
Water Street	March 1990	November 1991

(UI 6, Q-15)

58. Transmission line construction and restoration would begin in June 1990, and be completed by November 1990. Cable pulling, splicing, and termination would begin in April 1991, and be completed in November 1991. (UI 6, Q-15)

Environmental Effects

59. Construction effects on natural or cultural systems, land uses, and the population of the City would not be long-term. Most visual effects would be related to the presence of construction equipment on city streets. Other visual effects would be attributable to the new Broadway and Mill River Substations, and the Amtrack crossing at Osborn Street. No-long term visual impacts would be evident following construction and restitution of the transmission line route. Construction noise would be intermittent and typical of street construction and maintenance. Traffic flow disruption would be minor and temporary during construction. (UI 1, Exhibit C, p. 4; UI 1, Exhibit D, pp. 1-3, 5-21)

60. Adverse effects from street construction to residential land uses include temporary prohibition on street parking, temporary narrower traffic lanes, temporary closing of driveways and access to private property, temporary use of heavy steel plates, potential fugitive dust emissions, and construction noise. (UI 1, Exhibit D, pp. 5-7, 5-10)

61. Predicted operational sound levels at the Broadway Substation would be less than allowable standards for all octave bands under City Codes and State of Connecticut Noise Control Regulations. Existing ambient sound levels would not be increased to unacceptable levels by substation operation. The transformers would be the major source of noise during operation. (UI 1, Exhibit D, pp. 5-11 to 5-20; UI 6, Q-36, Q-37; Tr. pp. 51 and 52)

62. The dominant natural system in the Project area is the Mill River which flows adjacent to the Grand Avenue Substation. Because of pre-existing development and paving, there are no naturally occurring upland communities within the proposed Project area which includes both coastal and inland flood plains. The proposed Mill River Substation and a portion of the transmission line would be placed within the coastal flood plain, as defined by the Connecticut Coastal Management Act. The Project construction or operation would not be expected to disrupt the Mill River, or coastal floodplain. (UI 1, Exhibit C, p. 2; UI 1, Exhibit D, pp. 1-5, 5-4)

63. Groundwater in this proposed Project area is contained in a stratified drift aquifer underlying most of the area. Groundwater quality is classified as GB. There would be no present or planned uses of the stratified drift aquifer for drinking water uses within the Project area. The water supply is currently acceptable for industrial and commercial uses. Depth of groundwater in the Project area varies from eight feet to 26 feet below ground surface. (UI 1, Exhibit D, pp. 43, 44; UI 6, Q-14)

64. Soil borings taken along the proposed transmission line route indicate some groundwater could be encountered near the Mill River and Water Street Substations. The trench bottom would be about two feet above mean sea level; therefore, UI would not expect to encounter groundwater. (UI 6, Q-17)

65. No project construction activities would be expected to contaminate the presently degraded groundwater. No work would be conducted within the Mill River's channels. The Mill River Substation would be graded so that site water runoff would be directed away from the river and thereby avoid siltation of the river. (UI 1, Exhibit D, pp. 5-3, 5-4)

66. No important habitat or vegetation would be lost due to the proposed Project's construction or operations. Any vegetation removed during the crossing of the DOT ROW near Osborn Street and along the entrance to I-91 would be replaced in kind. (UI 1, Exhibit C, pp. 3-4)

67. Fugitive dust emissions created by construction activities would be mitigated by using water sprinklers, hoses, water trucks, or special equipment such as pavement cutting saws. Sedimentation and dust would be reduced by stockpiling excavated soils off-site and by using straw bale barriers to contain any soil from being washed into storm drains or water bodies during heavy rainfall. Excess unused soils would be disposed in an approved landfill. (UI 6, Q-19; UI 1, Exhibit D, pp. 5-3, 5-7)

68. Construction of the transmission line would require excavations totaling 7,700 cubic yards of material. There are no known areas of soil contamination within or adjacent to either of the proposed transmission line segments or any alternate routes. No contaminated oils were found on the existing and proposed substation sites. (UI 1, Exhibit D, pp. 4-3, 5-3)

69. Because the proposed Project is within an urban area, wildlife would be relatively tolerant to construction disturbances. UI anticipates that no adverse effects to wildlife would result from Project construction activities. (UI 1, Exhibit D, p. 5-5)

Electric and Magnetic Fields

70. UI measured the magnetic field strength outside the walls of the Water Street Substation at 59 milligauss, when the substation was operating at 43.5 MVA (218 amperes at 115 kV). (UI 6, Q-56)

71. UI contends that there is no known industry-accepted method to calculate magnetic field strength from a pipe type underground transmission line. UI measured the magnetic field strength of a double-circuit, 115 kV, pipe type cable system operating at 400 amperes per circuit. The maximum magnetic field at ground level was 0.8 milligauss. (UI 6, Q-56; Tr. pp. 55-57)

Scenic and Recreational

72. Visual and aesthetic resources identified within or in close proximity to the proposed Project area are the New Haven Harbor, the campus of Yale University, the historic New Haven Center Green, and East Rock Park. No other areas or features, natural or man-made, have been identified in the proposed Project's study area. (UI 1, Exhibit D, p. 4-29)

73. Construction activities would not adversely affect recreational areas or activities located near the transmission line route. (UI 1, Exhibit C, p. 4).

Historic and Archaeological

74. Research conducted by the Connecticut Historical Commission and by the New Haven Preservation Trust indicated the presence of 26 sites on The National Register of Historic Places within the proposed Project area. Approximately 100 buildings or sites along the proposed transmission line route or adjacent to the substation sites are listed in the New Haven Historic Sites and Architectural Survey. (UI 1, Exhibit C, p. 3; UI 1, Exhibit D, pp. 4-34, 5-35; UI 6, Q-13)

75. The proposed Broadway Substation would be visible from one site listed on the National Register of Historic Places: the Goffe Street Special School for Colored Children. UI maintains the commercial/industrial nature of the surrounding area would indicate that the substation would have no permanent adverse effects on this or other known historic properties. (UI 1, Exhibit C, p. 3)

76. A review of archaeological site files maintained by the Connecticut Historical Commission indicated that no previously recorded prehistoric archaeological sites were known to exist within a one mile radius of the outer margins of the Project area. (UI 1, Exhibit D, pp. 4-33, 4-34)

77. The most typical type of historic or archaeological resources that could be encountered during construction would be associated with old New Haven architectural materials. UI proposes to employ a construction supervisor on site familiar enough with the recognition of cultural resources to halt construction and notify appropriate experts if necessary. (UI 6, Q-53)

Legal

78. Other than the Bradley Street area, the Project would not require any new easements across private lands for the proposed transmission line ROW. (UI 1, Exhibit D, pp. 1-5, 2-11)

79. UI would comply with all applicable local, State, and federal laws, regulations, codes, and other requirements regarding noise, excavation, and construction. All necessary permit applications would be submitted and secured for the substation facilities and the transmission line facilities. Such approvals would be acquired from the DPUC, the DOT, Conrail, National Railroad Passenger Corporation (Amtrak), the Metro-North Commuter Railroad, the City of New Haven, and the New Haven Water Pollution Control Authority. All major permits would be received prior to the start of construction. In addition, UI would acquire consent from all landowners abutting the transmission line route. (UI 1, Exhibit B, p. 7; UI 1, Exhibit D, pp. 6-1, to 6-3)

80. The Coastal Resources Management Division of the Connecticut Department of Environmental Protection (DEP) confirms that tidal wetlands do not exist within the Project area and no tidal wetland permit would be required for the proposed Project. (UI 1, Exhibit G)

81. The Project area lies within Connecticut's coastal boundary as defined in CGS Sections 22a-94 of the Connecticut Coastal Management ACT (CCMA). Under provisions of the CCMA, development on the property between the Grand Avenue Substation and the Mill River must be a water-dependent use. The DEP recommends the incorporation of a future public access way into the design plans of the Project. Any proposed public access easement would be deeded to the City of New Haven. Public access is a water-dependent use as defined in Section 22a-93(16) of the CGS. (Record, DEP Letter, October 4, 1989)

82. UI has applied to Amtrack for a permit to construct the Osborn Street pipe bridge and to Conrail for a crossing under the railroad track traversing Grand Avenue. Permission to retro-fit the existing pipe bridge at the Metro-North crossing would also be needed. (UI 1, Exhibit B, p. 7; UI 6, Q-55)

83. UI has developed its Project plans in consultation with City of New Haven, Yale University, State, and Regional governmental officials. (UI 1, Exhibit A, p. 3; UI 6, Q-13)

84. Discussions with Yale-New Haven Hospital officials would be held to formulate plans for emergency vehicle access when transmission line placement designs were completed. (UI 6, Q-23)

Costs

85. The estimated total cost of the proposed Project would be $28,500,000, including the following items:

Substations	$18,360,800
Transmission Lines	7,435,200
Distribution Costs	2,704,000

(UI 1, Exhibit B, p. 8)

86. Construction costs do not include the estimated $1 million (1989$) cost to convert the transmission system to a dielectric fluid-filled system in 1996 or the installation of two additional transformers. (UI 1, Exhibit B, p. 7; UI 6, Q-26, Q-50)

87. Cost estimates of the evaluated routes would exceed the costs of the proposed routes by amounts ranging from $64,000 to $676,000. (UI 1, Exhibit D, pp. 3-15 to 3-20)

88. Use of any of the six evaluated alternative substation sites would increase distribution costs, ranging from $400,000 to $1,600,000 over the distribution costs of the proposed sites. (UI 1, Exhibit D, pp. 3-2 to 3-6).