

DOCKET NO. 108 - An Application of the : Connecticut  
Connecticut Light and Power Company for a :  
Certificate of Environmental Compatibility : Siting  
and Public Need for the construction of a : Council  
69-kV transmission line to interconnect the :  
14-MW Southeastern Connecticut Regional :  
Resources Recovery Authority Project in :  
Preston, Connecticut. : August 30, 1989

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

1. On March 10, 1989, the Northeast Utilities Service Company (NU), acting as an agent for Connecticut Light and Power Company (CL&P), 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 and operate a 69-kV transmission line to interconnect the proposed 14-MW Southeastern Connecticut Regional Resources Recovery Authority Project (SCRRRA) to CL&P's existing #400 transmission circuit at Hallville Junction in Preston, Connecticut. (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 Mental Health filed written comments with the Council pursuant to CGS Section 16-50j.
4. Notice of the application was given to the general public by publication in the New London Day, on March 6 and 7, 1989, and in the Norwich Bulletin, on March 5 and 6, 1989, as prescribed in CGS section 16-50l(b). (NU 1; NU 4; NU 5)
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 proposed line route on April 27, 1989. (Record)
7. The Council, after giving due notice thereof, held a public hearing on this application on April 27, 1989, beginning at 2:00 p.m. (Transcript 1) and continuing at 7:00 p.m. (Transcript 2), as prescribed in CGS Section 16-50m. The hearing was held in the Poquetanuck Fire House, Route 2A, Preston, Connecticut. (Record)

#### Overview

8. On October 6, 1987, the Council issued its Decision and Order, Opinion, and Findings of Fact in Docket No. 74, approving an Application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of the SCRRRA resource recovery facility in Preston, Connecticut. (Record; NU 1, p. 4)
9. American Ref-Fuel is the project developer, owner, and operator of the SCRRRA facility, and would be responsible for designing and constructing the proposed transmission line under the supervision and approval of CL&P. The costs of constructing and operating the proposed transmission line would be paid by the developers of the SCRRRA facility and participating towns in the resource recovery project. (Record; Transcript (Tr.) 1, p. 28)
10. CL&P proposes to construct, operate, and own the new electric transmission line and associated equipment interconnection. (NU 1, p. 1; NU 3 Set 1, Q-3; Tr. 1, p. 28)

11. The proposed transmission line and a manually operated disconnect switch would be installed at a new connection location at Hallville Junction. Two existing 69-kV circuits, #100 and #400, pass through Hallville Junction to interconnect CL&P's Tunnel, Gales Ferry, and Montville Substations, and the Borough of Groton's Buddington Substation. (NU 1, pp. 5, 27, Figure 1)
12. The transmission facility is proposed to be constructed partially-overhead and partially-underground. The overhead portion and the underground portion would each be 1.35 miles long, totalling 2.7 miles. (NU 1, pp. 7, 27)
13. Most of the proposed route would be within and would follow existing Connecticut Department of Transportation (DOT) highway right-of-way (ROW) along Routes 12 and 2A in Preston, Connecticut. (NU 1, pp. 22, 29)
14. The overhead portion would proceed from the SCRRRA plant northerly along the west side of Route 12 and easterly along the south side of Route 2A to a transition point several hundred feet west of the intersection of Harris Fuller Road and Route 2A. From that point easterly to Hallville Junction, the line would be constructed underground within the Route 2A right-of-way. The Hallville Junction interconnection would be located near the intersection of Lincoln Park Road and Route 2A. (NU 1, pp. 7, 27)
15. Existing distribution facilities run along the east side of Route 12, north from the SCRRRA to an intersection with Route 2A, and continue easterly along the north side of Route 2A, crossing to the south side of Route 2A and re-crossing to the north side near the vicinity of the Hallville Junction site. The proposed 69-kV line would be opposite the existing distribution lines. (NU 1, p. 23; NU 3 Set 1, Q-12)

16. Approximately five percent of the overhead route would require acquisition of additional rights immediately adjacent to Route 2A; about 395 linear feet within State of Connecticut property and 275 linear feet within private property in this area. These rights would permit pole structures to be set further back from the road and would minimize guying requirements. (NU 1, pp. 34-35; NU 1, Figure 9; Tr. 1, p. 79)
17. Approximately 3900 feet (0.75 miles) of overhead line would be constructed along the westerly side of Route 12. Eleven wood pole structures would be used, some placed behind existing guardrail. The exact location of these structures has not been determined. About four wood pole structures would be placed adjacent to Route 12 in an open area fronting the Norwich Hospital property and a nearby bus depot. The overhead portion would cross Route 12 near its junction with Route 2A near the Hospital. (NU 1, pp. 34, 41)
18. Approximately 2500 feet (0.47 miles) of overhead line would be constructed along Route 2A. Six pole structures would be set 15 feet from the edge of the pavement, some behind existing guardrail. (NU 1, p. 34)
19. The aboveground portion of the proposed facility would have a predominantly forested backdrop. (NU 1, p. 41)
20. The wood pole structures would range in height from 60 feet to 90 feet and average approximately 70 feet high. These would be spaced about 400 feet apart. Angle structures would be either guyed wood pole structures, or self-supporting steel pole structures on reinforced concrete foundations. (NU 1, pp. 25-26)
21. The overhead portion of the proposed line would consist of three vertical 336.4 kcmil Aluminum Core Steel Reinforced (ACSR) 69-kV conductors, supported by polymer line post insulators, and one shield wire. The conductors would be 28 to 30 feet above the ground as measured at the lowest point midspan between the structures. (NU 1, pp. 26, 30)

22. At the transition point from the overhead section to the underground section, CL&P would use a steel pole transition structure 75 to 89 feet high supporting a pothead installation, lightning arrestors, and related equipment. (NU 1, p. 26; NU 3 Set 1, Q-15)
23. The property, on which the proposed transition structure would stand is owned by the State of Connecticut and is within the DOT transportation corridor. (NU 3 Set 1, Q-7)
24. From the transitional structure to Hallville Junction, the underground section would be a 69-kV cable system consisting of three 2-1/8 inch diameter solid dielectric insulated conductors installed in a two-foot by two-foot concrete-encased duct bank buried at a depth of five feet and covered by two feet of fill material. The conductor placement in concrete-encased duct banks would reduce the risk of a third party digging in and damaging the cable. The duct bank would be installed within the shoulder of Route 2A with cuts into the paved surface only at road crossings where necessary. (NU 1, pp. 26, 36, 43, 48)
25. The precise location of structures and other details of the overhead and underground portions would be coordinated with the DOT since the proposed facility would be located within DOT corridors. (NU 1, pp. 34, 36)

Need

26. A NU integrated generation-transmission study performed in 1987 indicated a limit to the amount of non-dispatchable generation that can be added to the transmission system without additional transmission facilities being added. Eastern Connecticut, where the proposed project is located, has excess generation and normally exports large amounts of power to other areas.

- If additional large sources of generating capacity were sited in Eastern Connecticut, CL&P might need to add additional transmission capacity. (NU 1, p. 9)
27. The existing CL&P transmission system would be able to accommodate the 12.9 MW (net) capacity from the SCRRRA resource recovery facility for its expected service life, without transmission line overloads or loss of transmission reliability. (NU 3 Set 1, Q-3; Docket 74 Finding Number 28)
  28. The proposed 69-kV line would enable the SCRRRA project to sell power to CL&P and purchase power over the same line when the plant's turbine generator is out-of-service. (NU 1, pp. 6-9; SCRRRA 1; CRRRA 1; Tr. 2, pp. 42-43)
  29. The plant would also be connected to an existing 13.8-kV distribution line from Gales Ferry Substation for emergency back-up power. (Tr. 2, pp. 42-43)
  30. The existing 13.8-kV distribution facilities servicing the area are not adequate to deliver this generation to the grid. (NU 1, pp. 6, 8; Tr. 1, p. 19)
  31. The proposed SCRRRA plant and the transmission line interconnection were identified in the Northeast Utilities System 1988 Forecast of Loads and Resources, 1988-1997 and 1998-2207. (Record; NU 1, p. 6)

#### System Design

32. Factors considered in the selection of an overhead or underground system included: system protection; real estate acquisition requirements; construction techniques; impacts on the environment, residents, and traffic during construction; regulatory approvals; capital and operating costs; and system reliability and performance. (NU 1, p. 30)

33. Generally an overhead line could be constructed, operated, maintained, and repaired easier and more quickly than an underground line. Traffic flow restrictions during installation and repair would be minimal and temporary. (NU 1, p. 31)
34. An underground cable was chosen for the portion of the proposed route in close proximity to Poquetanuck Cove to avoid long-term visual impacts to the panoramic landscape of the Cove and the Village of Poquetanuck. (NU 1 pp. 33, 40)
35. No structures for overhead lines or underground duct banks would be placed directly in any wetland area regulated by local, State, or federal law. (NU 1, p. 33; Tr. 2, p. 62)
36. Three streams along Route 2A would be crossed by attaching the conductor to girders on the sides of the existing roadway bridges. (NU 1, p. 43)
37. The existing #400, 69-kV line has a failure rate of approximately one per two years. The 1.35 mile section of the proposed overhead line would have a failure rate of one per 25 years. (NU 3 Set 1, Q-14)
38. CL&P has in its underground transmission system, approximately 29 circuit miles of 115-kV High Pressure Oil Filled (HPOF) cable and 390 feet of 115-kV Low Pressure Oil Filled (LPOF) cable. CL&P has no existing underground solid dielectric cable in its transmission system, but will add about eight miles of this type cable over the next five years. CL&P has no High Pressure Gas Filled (HPGF) or Low Pressure Gas Filled (LPGF) underground lines in its system. (NU 3 Set 1, Q-11, Q-14; NU 3 Set 2, Q-3)
39. The insulating fluid used in the proposed alternative HPOF system would total 11,900 gallons of Alkylbenzene/polyisobutylene/Butane. (NU 3 Set 2, Q-5)

40. Based on nationwide data, the proposed 1.35 mile underground dielectric cable would have a failure rate of one per 10 years. An HPOF alternative for the complete distance would have a failure rate of one per 47 years. A solid dielectric facility for the complete distance would have a failure rate of one per 5 1/2 years. (NU 3 Set 1, Q-14; Tr. 1, p. 105)
41. CL&P has not experienced any forced outages due to problems associated with its existing HPOF underground facilities. (NU 3 Set 2, Q-5, Q-11)

Right-of-Way (ROW)

42. There are no central business districts in the proposed project area; however, scattered commercial developments occur along the proposed ROW. (NU 1, p. 20)
43. Residential development in the proposed project area occurs mostly along Route 2A in the Poquetanuck area. This area features colonial houses, a church, and firehouse. (NU 1, pp. 15-16)
44. No utility facilities would be retired or removed along the ROW. (NU 1, p. 50)
45. About two-thirds of the proposed line lies within Preston's coastal zone. The major water influence is Poquetanuck Cove, an estuarine embayment which is tributary to the Thames River. All of the wetlands crossed by or adjacent to the proposed facility are tributary or part of Poquetanuck Cove including:
  1. An outlet from Norwich Hospital Pond, a tidal watercourse, and wetlands;
  2. A freshwater shrub swamp on the north side of Route 2A, east of the Hospital pond's outlet brook;
  3. Dickerman Brook, on both sides of Route 2A, west of Poquetanuck Village;



4. A tidal estuary on the north side of Route 2A, east of Dickerman Brook;
  5. Poquetanuck Brook, a tidal watercourse on both sides of Route 2A in Poquetanuck; and
  6. Poquetanuck Cove with associated marshlands and mudflats located adjacent to the south side of Route 2A. These marshes are recognized by the DEP as a high quality, brackish tidal marsh. (NU 1, pp. 18-19; Tr. 1, p. 69)
46. The tidal marsh, mudflats, streams, and wooded areas of Poquetanuck Cove contain many species of birds and provide spawning grounds, feeding areas, and nesting habitats. (NU 1, p. 46)
  47. Two species of special concern have been identified by the Connecticut Department of Environmental Protection Natural Diversity Data Base as living in the area of Poquetanuck Cove. These plant species would not be affected by the proposed project. (NU 3 Set 1, Q-18)
  48. Approximately 3,280 feet of the proposed line would be located within a 100-year flood zone; however, no construction would occur directly within wetland areas. (NU 3 Set 1, Q-22)
  49. The mean water height of Poquetanuck Cove is about sea level at zero elevation. The elevation of the proposed facility's route ranges from six to ten feet above sea level. The bottom of the underground line's trench would not be below the mean water level of Poquetanuck Cove. (Tr. 1, pp. 73-74)
  50. The proposed location of the transition structure on the south side of Route 2A would be almost directly across from an inland wetland. The structure would be located in an area within a coastal zone boundary, but not in an inland wetland. (NU 1, Exhibit 2A; Tr. 1 p. 43-44)

51. The applicant could locate the proposed transition structure further to the west along Route 2A and away from the wetlands area; however, this would require the use of more underground cable which would increase project costs. (NU 3 Set 2, Q-3; Tr. 1, p. 44)
52. Because the entire facility would be placed on or in the shoulders of existing roadways, no natural areas would be lost to construction. Any grasses damaged during the construction would be rehabilitated and replanted. (NU 1, p. 46)
53. Wooded areas are located adjacent to both sides of Route 12 and Route 2A along the proposed ROW. Tree trimming and clearing would be required along a 2,300-foot section of Route 2A and along a 2,750-foot section of Route 12. Most tree trimming would be within the DOT ROW. The total area to be cleared would be approximately 2 1/4 acres. (NU 1, pp. 35-36; Tr. 2 pp.41, 79-81)
54. Selective tree-trimming and removal of trees 13 to 23 feet high would be confined to a 15-foot lateral distance on each side of the overhead conductor. In the area south of Route 2A, trees adjacent to the overhead conductor would be trimmed 30 feet from the edge of the road. Diseased and danger trees outside the trimming area would also be removed. Maintenance trimming and clearing would be done every four years. (NU 1, pp. 24, 30-31, 43-44; Tr. 2, pp. 68-70)
55. A wooded area west of the proposed transition structure and adjacent to the tidal and freshwater wetlands along Route 2A, which serves as a buffer for wildlife and birds, would be selectively tree trimmed. The terrain would be prepared for vehicle access by removing low shrubs if necessary. Danger trees would be cleared. (Tr. 1, 50-52)

56. Brush growing from cut stumps along roadsides would be treated with approved herbicides applied through a hand-held spray bottle and spread directly to stumps. Herbicides would not be broadcast. As much understory as possible would be left intact. (NU 3 Set 1, Q-19); Tr. 2, pp. 50-51)

ROW - Wildlife

57. Poquetanuck Cove has been identified as a "natural area" primarily because of its value as a fish spawning ground. The Cove was established as a bird sanctuary by the Connecticut General Assembly in 1969 and is classified as a sensitive wetland area. (NU 1, p. 22, 47; Tr. 2, p. 84)
58. The Desire Parker Preserve located on Poquetanuck Cove in Ledyard, which provides habitat for shoreline wildlife, would be less than one mile south of the proposed project. (NU 1, p. 17)
59. Disturbance from construction to wildlife would be temporary. (Tr. 2, p. 70)
60. Construction would be scheduled for times that would not interfere with any wild bird nestings in the area of Poquetanuck Cove. A NU field review did not identify any bird nesting areas that would be of concern along the ROW. The applicant would take special measures to either relocate or preserve any nesting areas along the proposed line alignment (Tr. 2, pp. 85-86)

Historic and Archaeological Resources

61. The Connecticut Historic Preservation Office (Office) was consulted regarding the proposed project. The Office stated that the area possesses a high sensitivity for prehistoric and historic archaeological resources. The

Village of Poquetanuck is an old colonial settlement with several individual structures within the village having historical significance. The Office stated that the proposed project would have no effect to the historical ambiance of the Village of Poquetanuck, but recommended that an archaeological survey be conducted of the proposed project area. (NU 1, pp. 20-21; NU 3 Set 1, Q-34; Tr. 1, pp. 41, 70)

62. No building along the proposed route appears on historic registers. Several old structures located close to the proposed route would warrant precautionary measures should blasting be required. (NU 3 Set 1, Q-25)
63. The applicant would secure the services of an archaeological consultant to conduct an archaeological survey of the proposed route following certification by the Council. The results of this survey would be reviewed by the Connecticut Historical Commission, and any resulting recommendations would be incorporated in a Development and Management Plan (D&M Plan). (NU 1, pp. 20-21; NU 3 Set 1, Q-34; Tr. 1. p. 70)
64. The applicant has not determined if alternative routes possess a high sensitivity for historic or prehistoric archaeological resources. (Tr. 1, pp. 31-32)

#### Scenic and Recreational Resources

65. Two scenic viewpoints in the general area of the route of the proposed line were identified by the Southeastern Connecticut Regional Planning Agency in the Proposed Coastal Area Management Plan, dated 1981. One is 2,000 feet west of the Route 12/Route 2A intersection and looks westward over the Thames River. The other is about 1,000 feet south of 2A and 1,000 feet west of the intersection of Route 2A and Harris Fuller Road overlooking Poquetanuck Cove. (NU 1, pp. 19-20, 41-42; Tr. 1, p. 33)

66. The nearest public recreation areas to the proposed project are the Milton Green Memorial Field on Lincoln Park Road, east of the junction of Route 117 and Route 2A, and the Rose Hill Wildlife Management Area, located behind Milton Green Memorial Field. Both areas are within 1,000 feet of the proposed facility. (NU 1, p. 17)
67. A playground is located at the Poquetanuck School, approximately 3/4 mile north of the proposed line. (NU 1, p. 17)

#### Public Agencies

68. The Town of Preston Planning and Zoning Commission disapproves of the proposed line and recommends that the line be built totally underground. (Tr. 2, pp. 11, 17)
69. Applications would be made to the Department of Public Utility Control (DPUC) for approval of the method and manner of construction and energizing, and to the DOT for construction permits. (NU 1, p. 13)
70. The DOT and the Town of Preston have been consulted regarding permits to open the streets for the underground portion of the proposed line. Permits would not be required for Route 12 and for Route 2A west of the transition structure. (NU 3 Set 1, Q-31)
71. The DOT has been consulted regarding the attachment of the cables to the sides of bridges over Dickerman Brook, Poquetanuck Brook, and the tidal estuary crossing on Route 2A. (NU 3 Set 1, Q-30)
72. The applicant does not presently possess an easement on property owned by the State of Connecticut at the intersection of Route 12 and Route 2A, upon which an angle structure would be placed for the proposed line. The applicant would need to obtain a permit from the State to use this land. (NU 3 Set 1, Q-16)
73. CL&P has notified the Department of the Army, Corps of Engineers, of the proposed project. (NU 3 Set 1, Q-33)

74. Applications for permits would be made to the US Army Corps of Engineers pursuant to the Federal Water Pollution Act, Amendment of 1972, Section 404, and Crossings Affecting Navigable Waters, Section 10. (NU 1, p. 13)

Construction Activities

75. Approximately 20 months would be needed for engineering, ROW development and management plan, ROW acquisition, material acquisition, regulatory approvals, construction, testing, and final rehabilitation. (NU 1, p. 12, Figure 2)
76. Construction would begin after receipt of agency approvals and would continue for approximately 13 months or more, followed by 3 months for rehabilitation of the route. (NU 1, p. 13; Tr. 1, p. 71)
77. The proposed date of the SCRRRA plant's operational test is January 1, 1991. (Tr. 2, p. 61)
78. During construction, normal traffic flow and access by adjacent property owners would be disrupted. Such disruptions during construction of the undergrounded portion on the line would be temporary. Traffic impacts along the overhead portion would be limited to equipment set-up areas at structure locations. (NU 1, pp. 36, 48-49)
79. Residents whose driveways would be obstructed during construction would be notified beforehand and arrangements made to minimize the inconvenience to them. (NU 3 Set 1, Q-23)
80. A DOT 1987 traffic report indicated a 6,000 car per day flow rate along a 1.7 mile stretch of Route 2A from Route 12 to Route 117. During construction, all DOT guidelines regarding traffic control, safety, and protection would be followed. (NU 1, p. 33)

81. The applicant has identified the types and locations of other utilities occupying the proposed route of the line, including Southern New England Telephone facilities, roadway culverts, and surface water drains. These facilities would not be affected by construction of the proposed line. The buried remnants of a trolley line could exist along portions of the north side of Route 2A in Poquetanuck. (NU 3 Set 1, Q-20; Tr. 1, p. 99)
82. During construction, the "Call Before You Dig" program would be notified as work progresses. After surface material is excavated by a backhoe, hand excavation would pinpoint the location of any underground installation, and work would be done by hand if necessary. (NU 3 Set 1, Q-21)
83. Overhead conductor installation would proceed at a rate of one mile per week. (NU 3 Set 2, Q-14)
84. Underground construction in public roads would begin with excavating a trench approximately two feet wide by five feet deep. Rock would be removed by mechanical means, aided by blasting if necessary. Excavated materials would be removed from the site and properly disposed. Plastic conduit would be installed in the trench and the trench bottom backfilled with concrete. New sand and gravel would be compacted into the trench. A temporary asphalt patch would cover the trench within the paved roadway. (NU 1, p. 48)
85. From 100 to 400 feet of trench would be excavated per normal workday. Pipe or conduit installation would occur immediately following trench opening. The trench would be refilled as soon as the pipe was laid down, within one or two days. (NU 3 Set 2, Q-14)
86. The length of trench open at any time or left overnight would be limited to 100 feet, which would minimize traffic flow impacts. Open trench sections would be barricaded and marked by warning lights and signs. All work would be coordinated with DOT and in accordance with the requirements for traffic control. (NU 1, p. 48; NU 3 Set 1, Q-20)

87. Pre-cast concrete manholes for splicing conductors would be installed at approximately 1000-foot intervals for cable pulling and splicing. (NU 1, p. 48)
88. After installation of the conduit and manholes, and backfilling of the trench, the cable would be installed and spliced; then the temporary patch would be removed and replaced with permanent material according to DOT specifications. (NU 1, pp. 48-49)
89. The entrenched portion of the proposed line would not be affected by spring tides and variations in the water table level after construction. The applicant would not service the proposed lines from manholes if Route 2A were underwater. (Tr 1, pp. 77-79)
90. Installing the proposed cable under the existing bridges would be more difficult than the proposed connections along the side of the bridges and it would expose the cable to damage from flooding and flood debris. NU 3 Set 2, Q-11)
91. The underground portion of the proposed line would be constructed under roadway drainage culverts wherever necessary. (NU 3 Set 1, Q-20; Tr 1, pp. 75-76)
92. During construction, there would be no obstruction to stream flow on Poquetanuck Cove and its wetlands. (NU 1, p. 43)
93. The DOT has no plans to widen Route 12, but the Route 12 bridge crossing the Poquetanuck Cove is being replaced. This replacement bridge would not be affected by proposed or alternative construction between the SCRRRA Plant and Hallville Junction. (NU 3 Set 1, Q-20)
94. The construction schedule for an alternative HPOF or solid dielectric system would be about 13 months, approximately the same time as the proposed facility's construction period. (NU 3 Set 2, Q-14)



ROW Mitigation and Restoration

95. The applicant would use established practices for sedimentation control during construction and dewatering of the underground line's trench. (NU 3 Set 1, Q-32; Tr. 1, pp. 47-48)
96. Any road affected by construction of the proposed underground line would be restored to a pre-construction condition as directed by the DOT. (NU 3 Set 1, Q-22)
97. Rehabilitation measures to disturbed areas off the roadway would include raking, top dressing where required, and reseeded. (NU 1, p. 49)
98. In the event of any leaks in the proposed alternative underground HPOF system, NU would comply with the policies and procedures for oil spill cleanup required by State and federal regulations. (NU 3 Set 2, Q-5)
99. A fluid loss in the proposed alternative HPOF system would be detected by a loss of pressure in the system or by a loss-of-fluid detection system located in the pumping plant control. The effects of a leak would be mitigated by reducing pressure in the system, locating the leak, making repairs, removing and disposing contaminated soil, placing new soil, and restoring the road surface. (NU 3 Set 2, Q-5)

Costs

100. The costs for the proposed project are estimated as follows:

o Overhead line (1.35 miles)	\$486,000
o Transition structure	\$100,000
o Underground line (1.35 mile)	\$1,512,000
o Equipment at Hallville Junction	\$390,000
o Line protection	\$70,000
o Engineering	<u>\$225,000</u>
Total (1990\$)	\$2,783,000

On a long-term (30-year), present worth basis, initial costs plus value of line losses, at 0.4 percent, are estimated at \$3,600,000. (NU 3 Set 1, Q-35; NU 7; Tr. 2, pp. 35-36)

101. Ref-Fuel would incur the first \$710,000 of the cost of the proposed facility. The balance would be passed on to the participating towns of the SCRRRA project. Any increased costs due to the construction of an alternative line would also be passed on to the towns through increased tipping fees. (Tr. 1, p. 42; Tr. 2, pp. 59-60, 66-67, 71-72)
102. An increase of \$1 million for any alternative line construction would result in \$100,000 to \$125,000 additional cost per year over the projected 25 year life of the SCRRRA's service contract. This cost, distributed on a per ton basis for 180,000 tons of waste disposed per year, would increase the disposal cost per ton by approximately seventy cents (\$.70). (Tr. 2, pp. 59-60, 66-67, 71-72)

#### Alternative Routes and System Designs

103. Throughout the proceeding the applicant considered three other route alternatives and eighteen system designs as alternatives to the proposed facility, designated as the proposed alternative underground HPOF line and here listed as alternatives A-1 to A-11, B-1 to B-5, and C-1. (Record)

#### Alternative Routes

104. No other reasonable transmission alternative route exists for an interconnection of the SCRRRA resource recovery facility with the grid for which CL&P has franchise rights, right-of-way, or fee ownership for a 69-kV line. (NU 1, pp. 28,58; Tr. 1, p. 34)

105. One alternative route between the SCRRRA plant site and CL&P's proposed Hallville Junction connection would run totally overhead, north from the SCRRRA plant along Route 12 and easterly on Route 2A along the proposed route to Middle Road, then would leave the existing DOT ROW, cross Route 2A, and proceed along future easements through private properties north of Poquetanuck to Hallville Junction. A variation of this route, would run totally overhead north from the SCRRRA plant along Route 12 to the intersection with Route 2A, and easterly, north of Route 2A, to Hallville Junction. (NU 1, pp. 28, 45; NU 3 Set 1, Q-1, NU 3 Set 2, Q-15; Tr. 1, pp. 33-35; Tr. 2, pp. 55-56; DEP Comments, April 3, 1989)
106. Another route would run easterly from the SCRRRA plant, either overhead or underground, crossing Poquetanuck Cove and passing through a low density population area in Ledyard to an intersection on an existing transmission line between Hallville and Gales Ferry. (NU 1, p. 28; NU 3 Set 1, Q 1; NU 3 Set 1, Q-1, Exhibit 3; Tr. 1, pp. 34-38)
107. These three alternative route configurations were considered and rejected by CL&P for reasons of impracticality or as being environmentally unacceptable. They would require the creation of a new corridor, require extensive acquisition of easements across private properties, cross undisturbed natural areas including wetlands and forests, involve extensive ROW clearing, and create visual impacts to the landscape. (NU 1, pp. 29, 45; NU 3 Set 1, Q-1)

108. A third route that was considered and rejected by CL&P, would proceed south on Route 12 from the SCRRRA plant, either overhead or underground, about 3.3 miles to Gales Ferry Substation. Poquetanuck Cove would be crossed by laying conduit within the bridge structure, which is scheduled for replacement in 1989 by DOT. This route would create a new transmission ROW, be difficult to align, introduce visual impacts to the landscape, require additional ROW easements outside DOT property, necessitate additional substation equipment and land easements, would be longer than the proposed route, and would experience greater line losses. (NU 1, p.11; NU 3 Set 1, Q-9; Tr. 1, pp. 36-39, 58-67)

#### Alternative System Designs

109. The applicant proposed one totally underground HPOF alternative system along the proposed route from SCRRRA to Hallville Junction. It would consist of three, 1-3/4 inch diameter insulated cables contained in a single six-inch diameter, steel pipe buried in a five-foot trench. Concrete manholes would be installed for pulling and splicing the cable. The transition from underground to overhead at Hallville Junction would require an approximately 50 feet by 60 feet transition facility contained in a fenced area. An oil pumping plant would be installed at either Hallville Junction or the SCRRRA plant. (NU 1, pp. 20, 30, 53-54 ; NU 3 Set 1, Q-37; NU 3 Set 2, Q-9; Tr. 1, p. 108)
110. Easement rights would be needed for an underground transmission facility from the SCRRRA plant substation to Route 12. No easement rights for undergrounding a line would be needed along Route 12 to the Route 2A Hallville Junction connection. Permits to open the streets would be required from the DOT. (NU 3 Set 1, Q-21; NU 3 Set 2, Q-2)

111. The estimated cost of the alternative underground HPOF system would be \$3.35 million for construction plus \$100,000 for additional line protection at remote substations, totaling about \$3,445,000 (1990\$) or approximately \$754,000 more than the proposed facility. All costs above an initial \$710,000 paid by American Ref-Fuel would be borne by the project's participating towns. (NU 3 Set 1, Q-37; Tr. 1, pp. 28, 45, 48-49, 92; Tr 2, pp. 59-60, 66, 67, 104, SCRRRA 1, p. 2; CRRRA 1, p. 2)
112. The applicant considered 17 other alternative designs for the interconnection including:

A. Hallville Junction Route

1. Overhead 69-kV line along proposed route and using underground HPOF cable instead of dielectric cable. (NU 3 Set 1, Q-10; Tr. 1, pp. 105-106);
2. Overhead 69-kV line along proposed route to a new ROW north of Poquetanuck Village at Middle Road. (NU 1, pp. 28, 45; NU 3 Set 1, Q-1)
3. Overhead 69-kV line along proposed route to an overbuild on shared poles with the existing 13.8-kV line at Harris Fuller Road, and through Poquetanuck. (NU 1, p. 51; NU 3 Set 1, Q-27, Q-36);
4. Overhead 69-kV line along the north side of Route 12 with a separate, parallel 13.8-kV ROW and line. (Tr. 2, pp. 55-56);
5. Overhead 69-kV line along Route 12 to an overbuild on shared poles with the existing 13.8-kV line on north side of Route 2A. (NU 3 Set 2, Q-15; Tr. 2, pp. 52-54);
6. Overhead 69-kV along Route 12 and north side of Route 2A, with an undergrounding of the existing 13.8-kV line along Route 2A. (Tr. 2, pp. 56-57);

7. Overhead 69-kV along proposed route with underground transition structure located further west on Route 2A. (Tr. 2, p. 57)
8. Overhead 23-kV as dedicated line overbuilt on existing 13.8-kV line. (NU Exhibit 7; Tr. 2, pp. 29-33, 54)
9. Underground 69-kV line using dielectric cable over the entire distance. (NU 1, p. 30; NU 3 Set 1, Q-10, Q-11, Q-37)
10. Underground 69-kV line and underground 13.8-kV line over the entire distance. (NU 3 Set 1, Q-27)
11. Underground 115-kV HPOF line over the entire distance. (NU 3 Set 1, Q-37)

#### B. Gales Ferry Substation Route

1. Upgrading of existing 13.8-kV overhead line with an interconnection at DOW Chemical Company. (Tr. 1, pp. 60-62, 64-65, Tr. 2, p. 23)
2. Overhead 13.8-kV dedicated line on existing 13.8-kV ROW to substation. (Tr. 1, pp. 39, 54; Tr. 2, pp. 18-24, 35-36)
3. Overhead 23-kV dedicated line as an overbuild on the existing 13.8-kV line. (Tr. 1, pp. 53-54; Tr. 2, pp. 18-24, 35-36)
4. Overhead 69-kV line along new ROW on opposite side of Route 12 from existing 13.8-kV line. (NU 3 Set 1, Q-1, Q-28; Tr. 1, pp. 30, 59)
5. Underground 69-kV line along Route 12 to substation. (NU 3 Set 1, Q-23)

#### C. Ledyard Interconnection Route

1. Overhead or underground 69-kV line across Poquetanuck Cove to a new interconnection on existing #400 line in Ledyard. (NU 1, pp. 28, 45; NU 3 Set 1, Q-1, Exhibit 3; Tr. 1, pp. 34, 38; Tr. 2, pp. 82-83)

113. The environmental effects of a totally underground alternative would include traffic flow disruptions during construction on Route 2A and Route 12, and a potential increased risk of siltation from excavated spoil piles entering brooks and Poquetanuck Cove. An underground alternative would not require tree clearing or periodic trimming of ROW vegetation. (NU 1, p. 54)
114. An underground transmission line is less prone to forced outages from external forces, but could require several weeks more time to locate and repair a fault than an overhead line. (NU 3 Set 1, Q-11)
115. In the proposed 69-kV overhead and underground system, use of HPOF cable instead of dielectric cable (Alternative A-1), would require a larger transition facility on Route 2A located near Harris Fuller Road. This would be contained in a fenced area, approximately 50 feet by 60 feet which would require ROW rights outside the DOT property line, and would be less manageable due to oil handling at the terminators. (NU 3 Set 1, Q-10; Tr. 1, pp. 105-106)
116. The alternative overhead 69-kV line proceeding along the proposed route to Middle Road and continuing along future easements across private properties north of Poquetanuck to Hallville Junction (Alternative A-2), would create a visual intrusion from the new 69-kV corridor, remove three to five acres of woodland, and would be difficult to construct due to shallow bedrock. (NU 1, pp. 28, 45; NU 3 Set 1, Q-1, Exhibit 3)
117. The overhead 69-kV line along the proposed route as an overbuild on shared poles with the existing 13.8-kV line at Harris Fuller Road and through Poquetanuck (Alternative A-3), would impose additional visual impacts on Poquetanuck. The estimated construction cost would be \$1,941,000. (NU 1, pp. 30, 51; NU 3 Set 1, Q-27, Q-36)

118. A 69-kV overhead line constructed along side the existing 13.8-kV distribution line on the north side of Route 2A (Alternative A-4), would require additional vegetative clearing, placement of structures outside the DOT ROW, and an additional 25-foot wide ROW acquisition. (Tr. 2, pp. 55-56)
119. A combined 69-kV overhead transmission and 13.8-kV overhead distribution line on the same structures (Alternative A-5), would present safety problems created by the 69-kV conductor placed above the 13.8-kV conductor. In addition, because no other feeders serve the area, service would be lost to about 400 customers during construction and future maintenance to the 69-kV line. (NU 3 Set 2, Q-15, Q-27, Q-36; Tr. 2, pp. 52-54)
120. Undergrounding the existing 13.8-kV distribution line along the north side of Route 2A to make room for an overhead 69-kV transmission line along the existing ROW (Alternative A-6), would cost an additional \$1.1 million and would present difficulties in connecting distribution customers, for both electric and telephone service. (NU 3 Set 2, Q-16; Tr. 2, p. 57)
121. Using the proposed 69-kV system with a relocated transition structure and dielectric cable entrenched further to the west along Route 2A (Alternative A-7), would cost an additional \$300,000. (Tr. 2, pp. 56-88)
122. An overhead, dedicated 23-kV distribution line along the proposed route (Alternative A-8), would require a new 23-kV to 69-kV transformer and attendant equipment at the substation. At present, the Hallville Junction substation is too small for additional equipment; therefore, more land rights would be needed. Estimated costs to construct the line and additional substation equipment would be \$1,890,000. On a long term (30 years), present worth basis, total costs including value of line losses at 2.0 percent, would be \$4,700,000. (NU 7; Tr. 2, pp. 29-33, 54, 95)



123. An underground 69-kV line using solid dielectric conductors contained in six-inch pipe and placed in a two-foot by two-foot concrete duct bank (Alternative A-9), requires more closely-spaced manholes and more cable splices than HPOF cable, and would cost approximately \$3,709,000 (1990\$), or \$900,000 more than the proposed facility. (NU 1, p. 30; NU 3 Set 1, Q-11, Q-37; Tr. 1, pp. 103-104)
124. An underground 13.8-kV distribution and 69-kV underground transmission line over the proposed route (Alternative A-10), would cost an additional \$1 million per mile to construct and would involve difficulties in connecting new customers. (NU 1, p. 30; NU 3 Set 1, Q-27, Q-36)
125. An underground 115-kV HPOF system along the entire proposed distance (Alternative A-11), would be only slightly more expensive than the 69-kV HPOF system. (NU 3 Set 1, Q-37)
126. The alternative to interconnect the facility with the 13.8-kV distribution line at the Dow Chemical Company from Gales Ferry Substation (Alternative B-1), would incur line losses of approximately 3.5 percent, require the rebuilding of the Gales Ferry Substation, would result in line faults, and would potentially cause the loss of power to the SCRRRA plant during outages of the line. (NU 1, p. 11; Tr. 1, pp. 36, 60-65; Tr. 2, p. 23)

127. Rebuilding the Route 12, existing 13.8-kV distribution line the entire distance to the Gales Ferry Substation (Alternative B-2), would require initial modifications to the Gales Ferry Substation, would result in line faults, would produce line losses of approximately 5.0 percent, and would potentially cause loss of power to the SCRRRA plant during outages of the line. (NU 1, pp. 11-12, 29; Tr. 1, pp. 64-65; Tr. 2, pp. 18-20, 23, 28, 35-37, 77-78)
128. Initial cost to rebuild the Gales Ferry Substation would be \$475,000. The total cost to construct the 13.8-kV line (Alternative B-2), would be about \$1,525,000. On a long-term (30 year) present worth basis, including initial costs and value of line losses, at 5.0 percent, the cost would be estimated at \$9.6 million. (Tr. 2, pp. 19-24, 35-37)
129. The alternative to rebuild the existing 13.8-kV distribution line as a dedicated 23-kV distribution line on the route of the existing line (Alternative B-3), would involve: replacement of structures with new, taller, and stronger poles; placement of a 23-kV to 69-kV transformer, circuit breakers, and protective relaying equipment; and acquisition of additional land rights to surrounding wetland property for the substation and associated equipment. Estimated costs to construct this option would include \$1.0 million to \$1.5 million for substation equipment, excluding land acquisition costs. The total cost would initially range from \$2.05 million to \$2.55 million. On a long-term (30 years), present value basis including the value of line losses at 2.0 percent, this option would cost \$5.4 million. (Tr. 2, pp. 19-24, 28, 33, 38, 43)

130. Separate underground or overhead 69-kV transmission lines along Route 12 to Gales Ferry Substation (Alternatives B-4 and B-5), would be longer than the proposed line, would create an awkward alignment, and would require additional land acquisitions from a wetland area for the modification of the Gales Ferry Substation. Estimated costs for these options were not developed. (NU 3 Set 1, Q-1, Q-28; Tr. 1, pp. 30, 50, 80-83; Tr. 2, pp. 43-44, 82-84)
131. An easterly overhead or underground 69-kV line from the SCRRRA plant (Alternative C-1), would cross Poquetanuck Cove, create a new ROW, eliminate approximately 10 to 15 acres of woodlands, require easements from 8 to 12 land owners, impose visual impacts to Poquetanuck, and necessitate drilling for structure or cable pipe system placements. (NU 1, pp. 28, 45; NU 3 Set 1, Q-1, Exhibit 3; Tr. 1, pp. 34, 38; Tr. 2, pp. 82-83)

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