DOCKET NO. 103 - AN APPLICATION OF BIO-GEN TORRINGTON PARTNERSHIP FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION OF A 15.0 MW (GROSS) WOOD-BURNING ELECTRIC GENERATING FACILITY IN THE CITY OF TORRINGTON, CONNECTICUT.

CONNECTICUT

SITING

COUNCIL

NOVEMBER 22, 1989

ORIGINAL

FINDINGS OF FACT

1. Bio-Gen Torrington Partnership (Bio-Gen) applied to the Connecticut Siting Council (Council) for a Certificate of Environmental Compatibility and Public Need (Certificate) to construct a 13 (net) megawatt (MW) electric generating facility in the City of Torrington, Connecticut, on December 5, 1988. (Record)

2. The application was accompanied by proof of service as prescribed by Connecticut General Statutes (CGS) Section 16-501(b). (Record)

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

4. 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)

5. The Council and its staff made a public field inspection of the proposed site on February 6, 1989. (Record)

6. Pursuant to CGS Section 16-50m, the Council, after giving due notice thereof, held public hearings on this application on February 6, 1989, beginning at 1:30 P.M.; on February 7, 1989, beginning at 10:00 A.M., on February 8, 1989, beginning at 10:00 A.M.; on February 9, 1989, beginning at 10:00 A.M.; on February 10, 1989, beginning at 10:00 A.M.; on February 28, 1989, beginning at 10:00 A.M.; on March 29, 1989, beginning at 10:00 A.M.; on March 30, 1989, beginning at 10:00 A.M.; on March 31, 1989, beginning at 10:00 A.M.; on April 11, 1989, beginning at 10:00 A.M.; on April 13, 1989, beginning at 10:00 A.M.; on May 17, 1989, beginning at 10:00 A.M.; and on May 18, 1989, beginning at 10:00 A.M. All hearings were held in the auditorium of the Torrington City Hall, Torrington, Connecticut. (Record)

7. Bio-Gen is a partnership based on oral agreement between CCF-6, a subsidiary of Flagg Energy Development Corporation (FEDCO), and Bio-Gen Torrington, Inc., owned

by the developers of the proposed facility. FEDCO would be the turnkey developer. FEDCO would design, build, and operate the plant, meeting the technical requirements of Bio-Gen. The operating entity would be Kennetech Facilities Management Corp., a wholly-owned subsidiary of Kennetech Corporation. (Bio-Gen 1, p. 2; Bio-Gen 1, Ex. E, p. 5; Tr., 3/29/89, pp. 98-99, p. 180)

Project Description

8. The proposed facility would be a 15 MW nameplate (Gross) 13 MW (net) electrical generating plant to be fueled by wood chips. (Bio-Gen 1, p. 1)

9. The electricity generated by the proposed facility would be purchased by the Connecticut Light and Power Company (CL&P) pursuant to a proposed electrical purchase agreement approved by the Department of Public Utility Control (DPUC) on September 10, 1987. The contract between CL&P and Bio-Gen would be executed when the proposed project goes to financing. (Bio-Gen 1, p. 50; Tr., 2/28/89, p. 73; Tr., 3/29/89, p. 91)

10. The proposed facility would have an expected useful life of at least 30 years before needing a complete overhaul. (Bio-Gen 2, Q. 53)

11. Power would be generated at 13.8 kV and stepped up to 27.6 kV for delivery to CL&P. The proposed facility would tie-in with an existing CL&P 27.6 kV circuit which passes through the proposed site. (Bio-Gen 1, pp. 24-25)

12. The proposed facility has been classified by the DEP as a solid waste treatment facility which would purchase fuel from a solid waste handling facility. (City 2, Q. 22a)

13. Kerosene would serve as an auxiliary fuel during boiler start-up and flame stabilization. (Bio-Gen 1, Ex. BE, p. 8)

Need

14. On September 10, 1987, the proposed facility was approved by the DPUC as part of a 450 MW block of private power projects. In its decision, the DPUC found that CL&P electric ratepayers would be purchasing power from the project at 86 percent of CL&P's avoided costs. At the time the DPUC approved the Block One Projects, the electricity from Block One projects was projected to prevent an electricity shortfall in the mid-1990's within the State of Connecticut. (Bio-Gen 1, p. 50, Exhibit E, Exhibit F; CL&P 1, Q.1)

15. Due to lower oil prices, CL&P's latest projection of the avoided costs of this project over the 25 year contract would be 112 percent, representing an additional cost to ratepayers of $10,000,000. on a present worth basis. (Tr., 2/28/89, pp. 15-16; CL&P 1, Q.4)

16. CL&P believes the proposed project's effect on its transmission system would be neutral. However, if cogeneration and small power production facilities continue to be added to the existing CL&P electric system, transmission line loading problems and limitations would eventually appear. (Tr., 2/28/89, p. 28, p. 32; 1988 Northeast Utilities Forecast of Loads and Resources, p. II-6)

17. The proposed project would be located in an area where the transmission line system can accommodate the electricity generated by the proposed project. (Tr., 2/28/89, p. 62, p. 84; CL&P 1, Q. 1, pp. 1-2)

18. The actual future prices of oil and gas would play a part in determining the effect of the payments required by the contract between CL&P and Bio-Gen on the ratepayers of CL&P. (Bio-Gen 1, Ex. E, p. 9)

19. It is the opinion of the DPUC that there is a reasonable likelihood that over the term of the contract between Bio-Gen and CL&P, the CL&P ratepayers would not be adversely affected by making payments required under the contract. (Bio-Gen 1, Ex. E, p. 11)

Policy Considerations

20. The DPUC has found it appears likely that the Bio-Gen - CL&P contract is consistent with State and federal law, utilizes a high priority renewable fuel source, and would benefit ratepayers over the term of the contract. (Bio-Gen 1, Ex. E, p. 14)

21. The General Assembly has declared it is the policy of the State of Connecticut to conserve energy resources by avoiding unnecessary and wasteful energy consumption; consume energy resources in the most efficient manner feasible; develop and utilitze renewable energy resources, such as solar and wind energy, to the maximum practicable extent; and, where practicable, replace energy resources vulnerable to interruption due to circumstances beyond the State's control with those less vulnerable. (CGS Section 16a-35k, 1-5)

22. The generation of electricity from the proposed facility would further the State's energy policy of developing and utilizing renewable energy resources. By using renewable, indigenous fuel, the proposed project would advance the objective of encouraging new methods of generating electricity. (Bio-Gen 1, pp. 50-51, Exhibit G, p. 8; City 2, Q. 55a)

23. The proposed facility would diversify the State's energy mix, and reduce the State's dependence on fossil fuel by 9,711,131 gallons of oil per year. (Bio-Gen 1, Ex. E, p. 6, p. 15; City 2, Q. 55a)

24. The proposed project could help create a wood fuel harvesting industry in Connecticut, and thereby have a positive effect on the State's forests. The project could also reduce the amount of material deposited in the State's landfills. (Bio-Gen 1, Ex. E, p. 5, p. 15)

25. The proposed facility would ease the New England region's energy shortage and help enhance the ability of CL&P to make short-term capacity sales. (Tr., 2/28/89, pp. 41-45, p. 48)

Schedule

26. CL&P's current forecast which includes Block One projects shows that additional electrical generating capacity would not be needed until the year 2001. (Tr., 2/28/89, p. 28, p. 32)

27. The proposed facility's planned date to begin commercial operations is January 1, 1991. The lead-time for the construction of base-load electrical generating plants is typically six to ten years. (Bio-Gen 1, p. 50, p. 87; Tr., 2/28/89, pp. 32-33)

28. The addition of new capacity ahead of need would create an imbalance between supply and demand and could negatively impact ratepayers until such time as increases in demand absorb the additional capacity. (CL&P 1, Q. 3)

Site Selection Criteria

29. In its search for a potential site, Bio-Gen considered factors which included the route of existing transmission facilities, the proximity to Route 8, availability of water, availability of sewer lines, existing land use, existing zoning, land availability, the location of forest stands in the northwestern portion of the state, the location of the Waterbury bulky waste landfill, suitable acreage and soils, environmental impact, and site visibility. (Tr.,2/8/89, pp. 27-29, p. 37; Bio-Gen 1, p.43)

30. Bio-Gen investigated seven sites in the Northwestern Connecticut area. Five of these were rejected. A six-acre site in Canaan owned by the Tallon Lumber Company was rejected due to unacceptable traffic impact and access problems. A 27-acre site in Watertown was eliminated when Bio-Gen was unable to come to terms with the property owner. A 16-acre site in Torrington owned by CL&P was rejected because the site is within a flood zone and CL&P required the site for future substation use. A 17-acre site in Torrington was eliminated when Bio-Gen was unable to come to terms with the property owner. A 22-acre site in Harwinton was rejected due to unsuitable topography and flood plain limitations. A three-acre site in Torrington owned by the Connecticut Department of Transportation (DOT) satisfied the selection criteria. A 10-acre site in Torrington owned by the United Auto Workers (UAW) satisfied most of the selection criteria, despite disadvantages such as the impacts of increased truck traffic, and residential and state forest lands across the road from Route 800. The 10-acre site in Torrington owned by the UAW became the proposed site. (Bio-Gen 1, pp. 43-46)

31. Bio-Gen withdrew the three-acre DOT site in Torrington on February 6, 1989, after the DOT leased this site to the City of Torrington in January 1989. (Applicant's notice of site withdrawal, 2/6/89; Tr., 2/6/89, p. 66)

Proposed Site

32. The proposed site is a 10-acre parcel of land 500 feet west of Route 8 and adjacent to Route 800 in the northern portion of the City of Torrington. (Bio-Gen 1, pp. 36-37; Bio-Gen 2, Q. 3)

33. Bio-Gen has an amended option agreement for the proposed site with the UAW until May 13, 1990. (Bio-Gen 1, p. 36)

34. The proposed site has a base elevation of 736 feet above mean sea level (AMSL) and is within a valley through which the Still River flows. The proposed site is within a DEP Natural Areas Inventory Site due to the presence of a glacial feature feature called an esker; however, due to disturbance of this area, the value of this site as a geologic feature to the public is limited. (Bio-Gen 1, p. 10; City Ex. 6, p. 41. Figure 11)

35. A CL&P transmission line 250 feet in width cuts across the proposed site from the southeast to the northwest. A dirt road leads into the proposed site from Route 800, terminating at an abandoned cinder block building. This building was previously used as a restaurant and then a garage. (Bio-Gen 1, p. 38; Bio-Gen Ex. BH; Bio-Gen 2, Q. 56)

36. The proposed site has a variety of natural habitats on it. These include a stand of evergreens, featuring pine and hemlock; a stand of deciduous trees, including oak, maple, and beech; a staghorn sumac grove; a tall forb and blackberry meadow; a power line-cut meadow; a sapling shrub swamp; an aquatic shrub swamp, which comprises 40 percent of the proposed site; the main channel of The Still River, and a wet meadow with a small stream. The aquatic shrub swamp contains many snag trees presently being used by birds and is considered excellent wildlife habitat. (Bio-Gen 1, Ex. D, pp. 2-5)

Geology of Site

37. Wetland soils on site consist of Saco, Scarboro, and Walpole soils. Non-wetland soils on site include Hinckley, Ninigret, Hollis, and Charlton soils, and rock outcrop components. Other soil features present include borrow and fill land, and terrace escarpments. Borrow and fill land consists of areas where the original soil has been disturbed or removed during construction, and consist of sand over gravel or coarse glacial till. Terrace escarpments consist of gravelly and sandy material with slopes exceeding 15 percent. (Bio-Gen 1, pp. 40-41; Bio-Gen Ex. BT)

38. There has been no recorded seismic activity in the area of the proposed site. (Bio-Gen 1, p. 36, p. 42)

39. Subsurface materials at the proposed site consist of glacial deposits of till and stratified drift. Test pits were dug on the proposed site. Nearly all of the tested areas contained soils suitable for the construction of the proposed facility. (Bio-Gen 1, Ex. L, pp. 1-2)

40. Analysis of material from the test pits at the proposed site indicated slightly elevated levels of 1, 2 - dichloroethane, trichloroethane, and tetrachloroethylene in one sample. All of the concentrations were above the action level for a Phase II (drilling, soil, and water sampling) site investigation. A Phase II site investigation would determine the degree and extent of the contamination and whether further investigation is needed. Following DEP approval, this soil would be removed and disposed of. (Bio-Gen 1, Ex. L; Bio-Gen 3, Q. 88)

Surroundings of Proposed Site

41. The proposed site is zoned Industrial. Properties to the north and south are zoned residential (R-15). Property across Connecticut Route 800 to the southwest is zoned industrial, as is property to the east and northwest. The maximum building height allowed in an Industrial Zone in Torrington is 70 feet. (Bio-Gen 1, p. 39; Tr. 3/31/89, p. 7, p. 116; Tr. 5/17/89, p. 160; Bio-Gen 1, Q. 41, p. 25; Bio-Gen, Ex. CA)

42. Within a Zone C industrial area in the City of Torrington, any use is permitted, except junk yards and piggeries; slaughter houses, trailer camps, storage or tanning of rawhides; plants producing glue from animal refuse, sulfuric, nitric, picric, carbolic or hydrochloric acid, or rubber. No new uses are permitted which emit into the air excessive dust, dirt, fly ash, smoke or other material which is not confined to the lot containing the use; emit into the air offensive odors or noxious, toxic, or corrosive fumes or gases; transmits noise which is objectionable due to volume, intermittance, beats, frequency or shrillness. No new use is permitted which transmits light objectionable due to brightness or which casts direct or alternating lighting upon adjacent property, or discards offensive wastes into streams, watercourses or sewers. Within an industrial zone, minimum area requirements are as follows: for industrial buildings, no area requirements; front yard depth, 10 feet; side yard depth - adjacent to residential zone - 20 feet; all others, 10 feet; rear yard - abutting residential zone - 20 feet; all others, 10 feet. (Bio-Gen 2, Q. 41, pp. 10-11, p. 25)

43. The City of Torrington has a draft Master Plan of Development Goals and Policies, dated November 16, 1988, and updated November 30, 1988. The draft Master Plan of Development is not legally binding but is intended rather as an advisory document. Although this draft has not been approved by the Town, its purpose is to serve as a guide for intelligent land use decision making by the Torrington Planning and Zoning Commission. (City, Ex. 17)

44. A goal of the draft Master Plan of Development is to protect the environmental quality of the City including air, wetlands, flood hazard areas, water courses, and water bodies. Policies of the draft Master Plan of Development include provisions to establish in Town regulations a non-buildable area around wetlands, establish in town regulations the distance of a non-buildable area adjacent to stream belts which must be kept in a natural state, and encourage appropriate intensity of development on land containing steep slopes to reduce erosion potential. (City Ex. 17, p. 7)

45. Another goal of the draft Master Plan of Development is to promote a diversified and stable economy by encouraging industrial development and encourage the operation of existing industries, including objectives to encourage appropriate industries in suitable locations, and to locate industrial development in areas zoned for such use and with consideration given to the environmental suitability of the land, and to the compatibility of surrounding land uses. (City, Ex. 17, p. 11)

46. The proposed site is bordered on the south by the Sons of Jacob Cemetery. The proposed facility buildings would be 400 feet from this cemetery. (Bio-Gen 2, Q. 9)

47. The proposed site is approximately 400 feet from the nearest section of the Paugnut State Forest, which lies across Route 800 to the west. (Bio-Gen 1, p. 37; Bio-Gen 2, Q. 58)

48. The terrain within the Paugnut State Forest rises to 1000 feet AMSL. Terrain to the east of the proposed site rises to 1100 feet AMSL. (Bio-Gen 1, p. 40)

49. There are nine residences within a 2000-foot radius of the proposed facility buildings. The nearest residence is approximately 500 feet from the proposed facility buildings, on Route 800. A group of condominiums is under construction on Route 800 about one mile to the south of the proposed site. A proposed 600,000 square foot shopping mall is planned to the north of the proposed site on Winsted Road within an industrially zoned area. A zoning change would be required before the mall could be built. (Bio-Gen 1, p. 40; Bio-Gen 2, Q. 75; Tr., 3/31/89, pp. 13-14)

Access

50. Access into the proposed site would follow the path of an existing dirt road 20 feet in width from Route 800. This would be paved and widened to approximately 25 feet to accommodate a planned truck scale. An area 100 feet to the north of the proposed site is a wetland. Another smaller wetland area is located immediately south of the access road near the entrance from Route 800. (Bio-Gen 1, p. 38, Ex. BH; Bio-Gen 2, Q. 4)

Wetlands

51. Approximately five of the ten acres of the proposed site are wetlands. These wetlands have been altered by, but not destroyed by, previous human activities. These wetlands are contiguous to the Still River and continue to the northeast and southwest of the proposed site for one mile in each direction. (Bio-Gen 1, pp. 39-40; Bio-Gen 1, Ex. D, p. 2)

52. This wetlands complex, which includes the wetlands on site, is a large high quality system of wetlands which is classified as palustrine scrub/shrub with an emergent understory that is seasonally saturated. (City Ex. 6, Fig. 10; DEP Comments, 1/25/89)

53. The DEP has classified the Still River water as "BC" meaning the river is suitable for swimming, agricultural uses, industrial processes, fishing, and the spawning, growth, and passage of cold water fishes. The flow of the Still River during low flow periods is very small. (Bio-Gen 1, p. 41; Bio-Gen 2, Q. 52; City Ex. 6, p. iv; City Ex. 14, p. 4)

54. No construction would take place within the wetlands, but construction activities would occur within 10 feet of the wetlands. All paving equipment and structures would be at least 20 feet from the existing wetlands. No excavation or filling of wetlands would be required. (Bio-Gen 3, Q. 79; Bio-Gen 3, Q. 80; Bio-Gen 1, Ex. BH)

55. The City of Torrington's Inland Wetland regulations require an inland wetland setback of 40 to 100 feet depending on the soil type. Proposed filling of wetlands and encroachment of wetlands within the setback must have an environmental evaluation made by a qualified wetland specialist deemed acceptable to the Torrington Inland Wetland Agency. (Torrington Inland Regulations, pp. 9-11)

56. During construction near wetland areas, the applicant's general contractor would install erosion and sediment control devices as necessary. (Bio-Gen 3, Q. 79)

57. Storm water runoff from the proposed site might be routed to the main body of the Still River. This runoff would originate only from paved areas of the proposed plant. (Bio-Gen 3, Q. 79; Tr. 2/6/89, pp. 68-73))

58. The 100-year flood elevation from the Still River is 729 feet AMSL on the proposed site. (Bio-Gen 1, Ex. BH)

Site Buildings

59. The main facility buildings would be constructed on an elevated area comprising approximately one-third of the proposed site in the eastern corner of the property. The use of existing cleared areas is limited by the existing CL&P right-of-way. Facility buildings would be immediately adjacent to this right-of-way. (Bio-Gen 1, p. 39, Ex. BH; Bio-Gen 3, Q. 80)

60. The boiler and turbine building would be 75 feet by 90 feet, with 40-foot and 80-foot high building sections. A dry cooling structure would be 36 feet by 108 feet by 50 feet high. Two wood chip storage silos would be 52 feet in diameter and 80 feet in height. The stack would be 180 feet in height and 6 feet in diameter. An ash storage building would be 35 feet by 45 feet. A fabric filter baghouse would be 30 feet by 35 feet. A water tank would be 30 feet in diameter and 30 feet in height. The substation would be about 20 feet by 50 feet. The plant itself would occupy approximately two acres. (CAP Ex. 15; Tr., 5/17/89, p. 149; Tr., 2/8/89, p. 167; Bio-Gen 1, Ex. AH, Ex. BH)

61. The power generating equipment would consist of a wood-fired spreader-stoker boiler and a steam-turbine generator system. It would be housed within the four-story boiler building. (Bio-Gen 1, p. 10, Ex. BH)

Boiler

62. The combustion boiler would be a watertube unit with continuous spreader-stoker and have a maximum continuous rating of 140,000 pounds per hour of steam at 1250 pounds per square inch, ambient pressure, and 950^{o}F when burning wood. (Bio-Gen 1, p. 10)

63. The boiler would be cleaned out once every three to five years, using an alkaline cleaning solution. All spent cleaning solutions would be transported off-site by a subcontractor and appropriately disposed. (City Ex. 2, Q. 5)

64. The boiler would be designed to operate with a 50 percent moisture fuel, burning 30 to 50 tons per hour. It would include an automated ash removal system. (Bio-Gen 1, p. 10; City, Ex. 2, Q. 19)

65. The boiler would have a thermal efficiency of 76 percent, and a net heat rate of from 13,931 to 14,472 BTU's per kilowatt hour. The overall efficiency of the proposed facility would be 23.9 percent. (Bio-Gen 1, p. 10; Bio-Gen 2, Q. 44; City Ex. 2, Q. 17)

66. Combustion temperatures in the boiler would exceed 1800 degrees F for a residence time of two and one half seconds assuming 50 percent moisture wood. Assuming 30 percent moisture wood, the boiler temperature would be at or above 1800 degrees^{F} for three seconds. (Tr., 2/6/89, p. 248)

Turbine Generator

67. The turbine generator would be a straight condensing single-flow unit. To achieve 13 MW's of net output, a turbine with a gross name plate rating of 15 MW would be designed to operate with a main exhaust pressure of 2.0 inches mercury atmospheric pressure (Hg A). (Bio-Gen 1, p. 15)

68. The turbine generator would be a three phase, 60 Hz, 13,800 volts AC air-cooled unit. It would be housed within the three-story turbine hall. (Bio-Gen 1, p. 15, Ex. BH)

69. A battery system would be used for emergency back-up power at the facility. (Tr., 2/8/89, p. 154; Tr., 2/28/89, p. 194)

Stack

70. Based on a turbine building height of 80 feet, a good engineering practice (GEP) stack height for the proposed stack would be 200 feet above grade. A GEP Stack for a turbine building 72 feet in height would be 180 feet. (Tr., 2/8/89, p. 162, p. 167)

71. Use of a GEP stack height would minimize potential aerodynamic downwash of the stack plume and decrease ambient air quality impacts, particularly in areas close to the proposed facility. (Bio-Gen 1, Ex. BC)

72. The elevation at the stack location would be 744 feet AMSL. The top of the stack would be about 105 feet above Route 8. (Bio-Gen 1, Ex. BH; Tr., 2/8/89, p. 173)

73. Generally, if stack height is less than 200 feet above grade, then obstruction marking and lighting are not required by Federal Aviation Administration (FAA). (Bio-Gen 2, Q. 10; Tr., 2/10/89, p. 217)

Substation/Switchyard

74. The proposed switchyard would receive the overhead transmission line at a dead-end structure and connect to a three-phase power transformer through a circuit breaker and gang-operated switch with a line grounding switch. (Bio-Gen 1, p. 26)

75. The proposed switchyard would include an outdoor power circuit breaker, high voltage potential transformers, three lightning arrestors, a main power transformer, a transformer neutral grounding resistor, two auxiliary transformers, supports, insulators, conductors, and a grounding mat. (Bio-Gen 1, pp. 26-27)

76. The facility would tie into the existing CL&P 27.6 kV circuit line near the site of the proposed switchyard. The interconnection would consist of 500 feet of 27.6 kV overhead line. This interconnection would require additional modifications to the existing Campville Substation at a cost estimated at $314,000. (Bio-Gen 1, p. 25, Ex. BH)

Construction

77. Construction of the proposed site would require the removal of approximately 3500 cubic yards of rock and gravel. (Bio-Gen 3, Q.81)

78. During construction, approximately one-half acre of forest would be removed to the east of an existing clearing on the proposed site. (Bio-Gen 1, Ex. BH; Bio-Gen 2, Q. 57; Tr., 2/28/89, p. 129)

79. Site work, including clearing and grubbing, would be expected to take approximately one half a month. (Bio-Gen 1, Fig. 9-1)

Cooling System

80. Bio-Gen would use one of three alternative cooling system technologies: a conventional cooling tower, a wet surface air cooled condenser, or a dry condenser. (Bio-Gen 1, Revised Ex. K)

Conventional Cooling Tower

81. A conventional cooling tower removes heat from a system by evaporating water. Water is recycled through a condenser to condense the steam coming off of the turbine. Cooling water is cycled to a cooling tower to dissipate the heat that has been taken up in the condenser. The cooling tower must be treated with chemicals to reduce the formation of algae. (Tr., 2/9/89, pp. 52-53)

82. Average daily water use with a cooling tower would be 250,560 gallons per day (g.p.d.). Peak water use would be 300,000 g.p.d. Average power use would be 53 kilowatts, with a total annual cost of $98,677. The cooling tower would be 30 feet by 90 feet in size. The facility would have a net output of 13.547 MW while burning 123, 248 tons per year of wood fuel. Assuming 100 per cent wood fuel, criteria air emissions in tons per year (t.p.y.) would be: 7.5 t.p.y. of particulates (PM), 203.8 t.p.y., of carbon monoxide (CO), 140.6 t.p.y., of nitrogen oxide (NOx), 60.4 t.p.y. of hydrocarbons (HC). Fogging from cooling towers can occur when plumes come into contact with the ground. (Bio-Gen 1, Revised Ex. K)

83. Ground fogging would not occur beyond 200 meters from the cooling tower. (Bio-Gen 2, Q. 61)

Wet Surface Air Cooled Condenser

84. Average daily water use with a wet surface air cooled condenser would be 178,560 g.p.d. Peak water use would be 250,000 g.p.d. Average power use would be 102 kilowatts, with a total annual cost of $191,747. The condenser would be 35 feet by 70 feet in size. The facility would produce net power to the grid of 13.498 MW while burning 126,598 tons per year of wood fuel. Assuming 100 percent wood fuel, criteria air emissions in tons per year would be: 7.8 t.p.y of PM, 210.4 t.p.y of CO, 145.1 t.p.y of NOx, and 62.3 t.p.y. of HC. (Bio-Gen 1, Revised Ex. K)

85. A wet surface air cooled condenser would cause little or no fogging. (Bio-Gen 2, Q. 61)

86. A reverse osmosis system would be used to purify incoming water before being injected into the steam cycle. With this system, no regeneration waters would be generated, and discharge to the city sewer would not be necessary. (Bio-Gen 1, Ex. 1, p. 60)

Dry Condenser

87. Average daily water use with a dry condenser system would be 9288 g.p.d. Peak water use would be 25,000 g.p.d. Average power use would be 208 kilowatts, with a total annual cost of $312,936. The dry condenser would measure 36 feet by 108 feet. The facility would produce net power to the grid of 13.395 MW while burning 126,598 t.p.y. of wood fuel. Assuming 100 per cent wood fuel, criteria air emissions would be: 7.8 t.p.y of PM, 210.4 t.p.y. of CO, 145.1 t.p.y of NOx, and 62.3 t.p.y of HC. (Bio-Gen 1, Revised Ex. K)

88. Fans on the condenser would draw air through the bottom of the system and blow it upwards through a 50-foot high heat frame exchanger assembly. (Tr., 3/30/89, p. 153)

89 The dry condenser system is designed to use three 30-foot fans, but Bio-Gen is considering the use of six 20-foot fans to reduce power consumption, increase reliability, and gain more precise control. (CAP, Ex. 16; Tr., 5/18/89, p. 137)

90. Bio-Gen prefers the dry condenser method of cooling. (Bio-Gen 1, Ex. BW)

Other Water Uses

91. In addition to the cooling water requirements, the proposed facility would require water for boiler make-up, sanitary uses, and fire protection. Boiler make-up would average 5,760 g.p.d., with a peak use of 25,000 g.p.d. Potable water needs would average 250 g.p.d. with a peak use of 2,000 g.p.d. (Bio-Gen 1, p. 58)

Water Supply Source

92. The proposed facility would obtain its water either from the Torrington municipal water supply or from wells which would be constructed on-site. (Bio-Gen 1, p. 58)

93. All of the water in the nearby City-owned water line along Route 800 is provided by the Torrington Water Company as a result of a contract between it and the City of Torrington. The City purchases water from the Torrington Water Company and distributes it for resale in the area of the proposed facility. (Tr., 2/10/89, pp. 19-30; Bio-Gen 1, Ex. AU)

94. The Torrington Water Company has a safe yield capacity of 4.60 million gallons per day. This is the amount of water that can be taken from the reservoir system on an average daily basis for an extended period of time. The average daily demand on this system is 3.77 million gallons per day. (Tr., 2/9/89, p. 166; Tr., 2/10/89, p. 17, p. 78, p. 92; City Ex. 11)

95. Subsequent to stating in 1987 it could provide 250,000 g.p.d. to the proposed facility, the Torrington Water Company entered into a commitment to provide 200,000 g.p.d. to the Bridgeport Hydraulic Company in Litchfield. (Tr., 2/10/89, p. 48)

96. The Torrington Water Company stated it could supply the proposed facility with water for domestic and sanitary uses, and for cooling purposes, in an amount not to exceed 50,000 g.p.d. in the aggregate. (Bio-Gen 1, Ex. AK; Bio-Gen 3, Q. 83)

97. Groundwater in the area of the proposed site is classified by DEP as "GA". According to this classification, groundwater at the proposed site may be suitable, or is presently being used, for public or private drinking water purposes without treatment. (Bio-Gen 1, p. 41; City, Ex. 6, p. iv)

98. According to the King's Mark Environmental Review Team Report of May 1987, hydrogeologic data for most of the Still River Valley is incomplete. Further testing would be required before a determination could be made as to how much groundwater for wells is available in this area. (City Ex. 6, p. 12)

99. Bio-Gen proposed to conduct a hydrogeologic study of the proposed site. Without such a study, it would not be possible to determine whether the drawdown from a well on the proposed site would reduce the low flow of the Still River, what its effect would be on the nearby wetlands, or whether the proposed facility is located over a ground water aquifer to be used as a water supply. No such study was submitted to the Council. (Tr., 2/6/89, pp. 244-246; Record)

100. It is not known how many private wells exist in the vicinity of the proposed site. (City Ex. 2, Q. 43)

101. The DEP has documented water use conflicts in the area of the proposed site during seasonable low flow periods. During low flow periods, 100 percent of the flow from ground water sources is needed to meet existing allocations. On-site wells could cause conflicts with the existing allocations. (Tr., 2/7/89, p. 31; DEP Comments, 1/25/89)

102. It is the policy of the DEP to minimize the use of publicly supplied water for non-potable purposes to the greatest extent possible. (DEP Comments, 1/25/89)

Water Treatment

103. Raw water would be treated prior to injection into the steam cycle and cooling water loops. Boiler water would pass through a carbon filter to remove organic compounds, suspended solids, and residual chlorine. A reverse osmosis system would then be used to demineralize the make-up water to prevent the formation of deposits within the boiler. Chemical inhibitors would be injected into the circulating water loop to prevent corrosion and scale formation. The application of biocides would control microbial deposits. (Bio-Gen 1, p. 16)

104. In boiler water treatment, diethlyhydroxyamine would be used to prevent oxygen scavenging, polymethracrylate added for iron dispersion, a coordinated phosphate program used for corrosion control, and a blended neutralizing amine added for pH control. (Bio-Gen 1, Ex. AB)

105. All water treatment chemicals would be stored inside the main buildings and within diked areas. Any spills of chemicals would be reported to the DEP and Environmental Protection Agency (EPA) and cleaned up. (Tr., 2/6/89, p. 77; Tr., 2/8/89, pp. 9-10)

Water Discharges

106. Although process wastewaters are typically treated and discharged to surface water bodies, there would be no process wastewater discharges to the Still River or the surrounding area. If a wet condenser system is used, blowdown from waste water would be discharged to the City sewer system. If a dry cooling system is used, all waste water would be used for ash quench and the de-NOx system. The City of Torrington has by ordinance reserved the unused capacity of its treatment plant for domestic sewage. (City 2, Q, 65; Tr., 2/8/89, p. 8; Tr., 3/29/89, p. 72; Tr., 3/31/89, pp. 142 to 143; Tr. 3/29/89, p. 72)

107. An on-site subsurface sewage disposal system would be used for wastewater from the toilets and showers used by the 15 Bio-Gen employees. The design flow is estimated at 490 g.p.d. A primary leaching field of 446 square feet would be required. (Bio-Gen 1, Ex. BO; Tr., 2/8/89, p. 20)

108. Bio-Gen does not propose to collect stormwater. However, through the DEP National Pollution Discharge Elimination System (NPDES) to be filed by Bio-Gen, DEP might direct Bio-Gen to collect this rainwater prior to discharge to the Still River. (Tr., 2/6/89, pp. 68-69, p. 73)

109. Concentrations of impurities in boiler blowdown discharges would be monitored at sampling points in the steam cycle and cooling water cycle. Analyzers would measure water pH, temperature, and inorganic pollutant concentrations. Deviations in concentration would be adjusted by control of the blowdown or chemical feed. (Bio-Gen 1, p. 86)

Wood Fuel

110. The proposed facility would be designed to burn a maximum of 572 tons per day of wood chips having a moisture content of 50 percent. Based on an average moisture content of 30 percent, the facility would burn approximately 125,000 tons per year of wood chips. (Bio-Gen 1, p. 20, Ex. I, p. 1; Tr. 2/7/89. p. 76)

111. The proposed facility would receive an average of 450 tons per day of chipped wood, delivered six days a week. (Bio-Gen 1, p. 16)

112. The wood chips would each measure approximately two inches by two inches. Under contractual agreement, no more than five percent of a shipment could contain wood chips over two inches in size. If more than five percent of a sample were over two inches, the screening mechanism would shift that oversized material to a fuel hog for chipping and return it to the fuel stream. (City 2, Q. 60; Tr., 2/6/89, p. 90)

113. The average initial price for wood chips is expected to be $16.00 to $17.00 per ton. (City 2, Q. 106)

114. No bulk chipping would take place on the proposed site. The only chipping on site would be by the fuel hog to reduce oversize chips to the proper size. This chipper would be designed to handle 10 percent of the fuel stream and would be housed within a concrete building. (Bio-Gen 2, Q. 16)

115. Bio-Gen would not limit the amount of green wood to be burned. The resulting mix is expected to have a 30 percent moisture content; however, the boiler would operate more efficiently on drier wood. (Bio-Gen 2, Q. 36; Tr. 2/8/89, pp. 207-208; Tr. 5/14/89, p. 224)

Wood Fuel Sources

116. The wood fuel supply would be obtained from construction and demolition activities, forest land management, land-clearing operations, sawmills, and bulky wood waste supplies. Chips from forest management, land clearing, and sawmills are expected to comprise 15 to 50 percent of the fuel stream. Recycled wood from construction companies would make up 50 to 85 percent of the fuel stream. (Bio-Gen 1, pp. 20-22; Bio-Gen 2, Q. 17)

117. Bio-Gen has filed a letter of intent with the Sanitary Refuse Company of Manchester to receive 70,000 tons of wood waste per year. Bio-Gen has contracts including over 8,000 tons per year of wood fuel from Great Mountain Forest and Tallon Lumber. (Bio-Gen 1, pp. 20-22, Ex. E, p. 11)

118. The supply radius for wood fuel sources for the proposed facility is expected to be approximately 50 miles. (Bio-Gen 2, Q. 28)

Forestry Operations

119. Connecticut presently has 1,800,000 acres of forest land. Because of historical abuse or neglect, much of this forest land is stocked with low quality hardwoods, which if harvested, are suitable only for fuel. (Bio-Gen 1, Ex. P, p. 13, Ex. Q, p. 3)

120. Connecticut's forests have been essentially unmanaged the last 60 to 70 years. As a result, the State's forests are far below their potential in terms of timber growth and wildlife habitat value. (Tr., 2/7/89, p. 88)

121. Management of Connecticut's forests could be more active if an improved market for low-quality wood material were available. (Tr., 2/7/89, p. 91; Bio-Gen Ex. 4)

122. Lack of forest management has created a backlog of two to two and one half million cords of wood in Connecticut. The total standing volume of trees in Connecticut, exclusive of this backlog, is 33 million cords. (Bio-Gen Ex. 4)

123. Bio-Gen would have a policy to accept delivery of whole tree chips only from those timber harvesting activities which have been certified by a registered forester as meeting the standards of good forest management practice. This would involve proper erosion and sediment control practices, considerations of visual impact in logging areas and evaluation of possible impacts on the habitats of rare and endangered animal and plant species. Guidance might be requested from the DEP Wildlife Unit or Connecticut Historical Commission where appropriate. (Bio-Gen 1, Ex. N, pp. 1-2)

124. Only modified forms of clear cutting would be considered an acceptable forestry practice by Bio-Gen. These would involve clearing narrow strips and small blocks under 10 acres. Snag trees would be left standing after tree harvesting to serve as wildlife habitat. (Bio-Gen 1, Ex. N, p. 4; Bio-Gen 2, Q. 46)

125. Bio-Gen would not purchase wood chips from land clearing companies unless such companies could demonstrate compliance with all laws. (Bio-Gen 1, Ex. N)

Recycled Wood

126. Recycled wood waste is wood which is separated from the solid waste stream, processed into a fairly uniform sized and consistent product, and reused for some other purpose. Sources of recycled wood would include municipal wood waste, demolition and construction debris. (Bio-Gen 2, Q. 18, Exhibit T, p. 11)

127. Demolition wood is expected to comprise 20 to 40 percent of recycled wood waste. (Tr., 3/29/89, p. 192)

128 Bulky wood waste is categorized as land clearing debris and demolition debris, with substantial metals removed. There is an estimated 1,400,000 tons per year of bulky wood waste generated in Connecticut. (Tr., 2/8/89, p. 42; Bio-Gen 2, Q. 60)

Wood Fuel Contracts

129. By contract, wood fuel sent to the proposed facility could not contain rotten wood in any form, dirt, rocks, steel, concrete, treated wood, leaves, or wood products made using glues or resins. (Bio-Gen 1, Ex. X)

130. By contract, wood fuel would consist of softwood and hardwood reduced to wood chips prior to combustion. Sources might include mill by-products, whole tree chips, pole peelings, pallets, crates, wood spools, timber, stumps, waste lumber, and any other agreed upon wood materials. (Bio-Gen 1, Ex. X)

Contaminants in Fuel Supply

131. On a worst-case basis, the applicant would try to limit the non-wood portion of the fuel stream to less than one percent, based on 100 percent demolition debris fuel. (Bio-Gen 2, Q. 20; Tr., 2/6/89, p. 235)

132. Pressure treated wood or creosoted wood are not acceptable at the proposed facility. Creosote treated material is classified in Connecticut as a non-hazardous material and can be disposed of in landfills licensed by the State. Pressure-treated wood might contain heavy metals such as chromium and copper, as well as hazardous materials such as arsenic and cyanides. (Bio-Gen, Ex. T, p. 85; Tr., 2/6/89, p. 234; City 13, p. 17)

133. In the worst-case situation that 100 per cent of the fuel stream were painted wood from demolition debris, about 0.1 percent of the material would contain lead. More typically, less than 0.01 percent of the expected fuel stream would contain lead. (Bio-Gen 3, Q. 87)

134. If metals were present in the fuel stream, they would be collected in the bottom ash or the fly ash, subject to the collection efficiencies of the air pollution control equipment. (Tr., 2/8/89, p. 197)

135. Wood fuel specifications for the proposed facility would stipulate that the fuel shall not contain or be derived from any material classified as hazardous waste by any State or federal agency. (Bio-Gen 2, Q. 20)

Fuel Screening and Sampling

136. Fuel processors would sort the wood and chip it to uniform size. The fuel processors would be obligated to remove non-wood material such as asbestos and plaster. Some wood which had been painted with lead-based paints would probably be processed. (Bio-Gen 2, Q. 22)

137. Upon reaching the proposed facility, all fuel trucks carrying loads of chips would undergo visual analysis for significant amounts of plaster, asbestos, and other non-wood material. Such material would be removed. If large amounts of contaminants were detected, the shipment would not be accepted. (Bio-Gen 2, Q. 22)

138. Several grab samples would be taken from each delivery of wood chips. A mechanical bucket-type device hinged to the upper section of the receiving hopper would be swung down by the scale operator during the fuel dumping to obtain a one cubic foot sample to be observed and archived. A sniff test would be done to indicate the presence of solvents, organics, creosote wood, pressure treated wood, rubber or paint in the fuel. The samples would be sealed and heated gently prior to being sniffed for unusual scents. The scale operator would also view these samples under a magnification system to determine if the samples contained an unusual level of contamination compared to acceptable samples. (Bio-Gen 2, Q. 34; Tr., 2/6/89, p. 87; City 2, Q. 22)

139. One out of every 20 to 40 samples from each supplier would be sent in for laboratory analysis. (Tr. 2/8/89, p. 177)

140. For each supplier, random samples would be analyzed at an off-site laboratory for the presence of toxic metals such as arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver, and of organic compounds such as base neutrals and halogenated solvents. Samples would not be analyzed for the presence of organochlorine pesticides, PCB's, chlorinated herbicides, organophosphorous pesticides, or cyanides. (Bio-Gen 1, p. 22; City 2, Q. 32)

141. Samples would be labeled and stored for a three month period. (Tr., 2/6/89, p. 91)

142. By the time the laboratory results of each sampling had been obtained, the material from which it came would have been burned. (City 2, Q. 24; Tr., 4/13/89, p. 13)

143. If multiple violations were found, the offending supplier's chips would no longer be accepted at the proposed facility. (Bio-Gen 1, pp. 22-24; Tr. 2/6/89, p. 235)

Wood Chip Storage

144. Wood fuel would be stored in enclosed concrete silos. To prevent spontaneous combustion, acidic and corrosive runoff, and wood decomposition from fungi, chips would be rotated on a first-in first-out basis, with a rotation period of less than 10 days. Chips would have a low bark content to slow the rate of heat evolution of the pile. Good housekeeping practices would be followed, including the prohibition of open flames or hot metal in the wood yard. (Bio-Gen 1, pp. 84-85)

145. The fuel handling equipment is designed to recirculate the wood fuel from the bottom of the silos to the top during emergency outages. The fuel conveyer system is designed to recirculate the fuel in the silos. The silos would contain approximately an eight day supply of wood chips. (Tr., 2/10/89, p. 218, p. 219; Tr. 5/17/89, p. 150; Bio-Gen 1; pp. 84-85)

Fire Fighting and Prevention

146. The proposed facility would be encircled by a hydrant system which would be connected to a 150,000 gallon water tank. (Bio-Gen 1, p. 79; Tr., 3/29/89, p. 71)

147. The water tank would hold a 30 to 40 minute water supply for fire fighting purposes, assuming four hoses pumping 1000 gallons per minute. (Tr. 3/31/89, p. 107)

148. Stand pipe hose stations would be installed in the boiler and turbine generator building, and in the fuel handling areas. Sprinklers would be installed in the plant switchyard and the cooling tower. A halon gas electrical fire protection system would be installed in the facility control room and the electrical room. The wood storage, handling, and unloading areas would be equipped with a hydrant system. The oil tank would be located in a separate area and would be fitted with a similar system. (Bio-Gen 1, p. 79)

149. The fire protection system would include an integrated fire monitoring panel with heat and smoke detectors in the main building, the ash storage building, the baghouse, and the wood fuel receiving/storage area. An emergency pump would supply water to the sprinkler systems. (Bio-Gen 2, Q. 73)

150. The fire protection system would meet all applicable fire codes. (City 2, Q. 87)

Air Pollution Regulations

151. Torrington is in attainment for sulfur dioxide, SO2, NOx, PM, lead, and one-hour CO; it is non-attainment for ozone, and unclassified for eight-hour CO. (Bio-Gen 1, p. 55; Tr., 3/29/89, p. 45)

152. DEP requires the application of Best Available Control Technology (BACT) for any source of air pollution emissions exceeding five tons per year. (Bio-Gen 1, Ex. BD, p. 4)

153. For this application, DEP considers as BACT a baghouse fabric filter with PM and lead emissions held to 0.01 lbs. per million (mm) British Thermal Unit (BTU); use of 0.1% sulfur, number one distillate oil as auxiliary fuel, with SO_2 emissions held to 0.1/mm BTU heat imput; selective noncatalytic reduction (SNCR) with emissions of NOx held to 0.2/mm BTU heat input; staged combustion with 0.29/mm BTU heat imput for CO and 0.08/mm BTU heat imput for volatile organic carbons (VOC). (Bio-Gen 1, Ex. BZ)

154. The Lowest Achievable Emission Rate (LAER) is the most stringent emission limitation achieved in practice by a source or category of source. LAER is proposed by Bio-Gen for the control of total suspended particulates, SO2, CO, and VOC. (CAP, Ex. 1, Q. 28)

155. According to new DEP regulations, the proposed project would be subject to a Prevention of Significant Deterioration (PSD) review. PSD regulations apply to the construction of major stationary sources located in areas designated as attainment or unclassifiable for one criteria pollutant. (Bio-Gen 1, Ex. BE, p. 22)

156. A major stationary source is any facility which would have the potential to emit 100 tons per year or more of any individual air pollutant. Bio-Gen would emit more that 100 tons per year of NOx and CO, and therefore PSD regulations would apply for this project. (Bio-Gen 1, Ex. BE, p. 22)

157. The DEP has determined that this facility would be subject to PSD review for NOx, CO, and lead. (Bio-Gen 1, Ex. BZ)

Air Modeling

158. The Industrial Source Complex Short-Term (ISCST) model and Point-Multiple-Point Connecticut (PTMTPA-CONN) model are air pollution models required by the DEP to assess air quality impacts. The PTMTPA model is most applicable to more complex terrain, such as that surrounding the proposed site. (Tr., 4/13/89, pp. 140-142)

159. Using the PTMTPA model, the highest air emissions impacts were predicted for the high terrain within 1500 feet of the proposed plant. This modeling shows CO levels would drop below significant levels within 2970 feet of the proposed site. Short-term SO2 and particulate matter impacts would fall below significance within 6930 feet. (Bio-Gen 1, Ex. BC)

160. Refined single-source air quality modeling using the PTMTPA-CONN model has predicted that the proposed plant would not violate National Ambient Air Quality Standards for SO2, PM, NOx, or CO. Hydrocarbons (HC) were not modeled. (Bio-Gen 1, Ex. BC)

161. The DEP has completed its review of Bio-Gen's single source modeling and has found it acceptable. The next step in the air permitting process is refined multi-source modeling, which Bio-Gen has submitted to DEP. (Tr., 5/18/89, p. 194)

Maximum Facility Emissions

162. Based on 8760 hours per year of operation at 100 percent of boiler nameplate capacity assuming 25 percent auxiliary fuel firing of number one fuel oil, the estimated annual worst case air emission rates of criteria pollutants after control, in tons per year, would be: NOx, 168.24 t.p.y.; SO2 15.23 t.p.y.; total suspended particulates (tsp), 18.51 t.p.y.; CO, 243.94 t.p.y.; HC, 67.29 t.p.y.; lead, 2.15 t.p.y.; and sulfuric acid, 0.3 t.p.y. The annual emission of carbon dioxide would be 200,000 t.p.y. (Bio-Gen 1, Ex. BM, Ex. BZ; Bio-gen response to Farmington River Watershed Association, Q.50.)

163. The allowable emissions, potential emissions, and actual emissions for SO2, NOx, CO, and volatile organic carbons (VOC) would all be the same in tons per year. Allowable emissions of tsp would be 18.51 t.p.y. (Bio-Gen Ex. BE Table A-3, A-4, A-5,; Bio-Gen Ex. BM; Bio-Gen Ex. BZ)

NOx Emissions

164. Bio-Gen has agreed to limit NOx emissions to 0.2 lbs/mm BTU of NOx and install selective non-catalytic reduction (SNCR) technology as required by the DEP. The use of SNCR to control NOx emissions is considered LAER. Under federal regulations, boilers are allowed 0.6 lbs/mm BTU of NOx emissions. (CAP 1, Q. 28; Tr., 2/20/89, pp. 213-215)

165. Bio-Gen intends to use a urea injection system for SNCR designed by Fueltech. This system would not require the storage of ammonia on-site, and has lower maintenance costs than the Exxon Thermal De-NOx system. The Fueltech system would cost $60,000 per year. (Tr., 3/29/89, p. 61; Tr., 3/30/89, p. 139; Tr., 5/18/89, p. 156, p. 164)

Sulfur Dioxide Emissions

166. Generally, the sulfur content of wood is very low, and emissions of SO_2 from wood-fired boilers are much less than those from fossil fuel plants. (Bio-Gen 1, p. 53; Tr., 2/9/89, p. 68)

167. Low sulfur (0.1 percent) number one fuel oil (kerosene) is proposed as the BACT for SO_2 and sulfuric acid emissions. Existing Connecticut facilities are allowed to burn one per cent sulfur oil, while new facilities cannot exceed .5 percent. (Bio-Gen 1, Ex. BE. p. 49; Tr., 3/30/89, p. 118)

168. To store the kerosene, a 25,000 gallon storage tank would be placed underground on the proposed site. This would be a fiberglass-reinforced plastic tank. It would be double-walled or within a containment enclosure, fitted with a leak detection system and spill prevention equipment. It would conform with all Connecticut and EPA petroleum tank standards. (Bio-Gen 2, Q. 1; Tr., 3/30/89, p. 161)

Particulate Emissions

169. The Connecticut standard for particulate emissions while burning oil as a fuel is 0.014 lbs/mm BTU. The proposed facility's particulate matter emission level of 0.01 lbs/mm BTU would be the most stringent particulate emission limit required of any wood-fired boiler or resource recovery facility in the State. Bio-Gen would agree to shut down the proposed facility any time the particulate matter emission rate exceeded a level of 0.02 lbs/mm BTU. (Tr., 3/29/89, p. 41; Tr., 5/14/89, p. 214; Bio-Gen 1, Ex. BH, Ex. BM)

170. Large particulates would be removed by a mechanical dust collector and re-injected into the boiler. Fine particles would be captured in the fabric filter baghouse prior to the discharge of the flue gas to the stack. (Bio-Gen 1, p. 57)

171. Fabric filters have a greater control efficiency for smaller sized particles, including trace metals, compared to electrostatic precipitators. The disadvantages of fabric filters include a high pressure drop, susceptibility to fires, fabric clogging, and corrosion. (Bio-Gen 1, Ex. I, pp. 42-43)

172. Fabric filters have high removal efficiencies for particle sizes less than one micron. These efficiencies range from 99.0 to 99.9 percent. (Bio-Gen 1, Ex. BE, p. 28)

173. The flue gas temperature within the fabric filter baghouse would be approximately 300^{o}F. The expected life of the bags would be 18 to 24 months. (Tr., 2/10/89, pp. 212-213)

174. If the temperature of the flue gases exceeded 550^{0}F, the fabric filter could burn. For this reason, some facilities have a system to bypass the fabric filters during temperature excursions. The proposed facility would not have a bypass system, which would eliminate the possible release of unfiltered emissions. (Tr., 4/11/89, pp. 120-123; Tr., 5/17/89, pp. 94-96; Tr., 2/9/89, pp. 25-26)

175. An acid gas removal system ahead of the baghouse system in the flue gas stream would reduce the risk of burning the fabric filters. Such a system would also make the baghouse more efficient in the removal of heavy metals. (Tr. 4/13/89, pp. 37-38; Tr. 5/17/89, pp. 61-62)

CO and VOC Emissions

176. CO and VOC are products of incomplete combustion. A furnace designed to provide conditions favoring good combustion is BACT for CO and VOC emissions. (Bio-Gen, Ex. I, p. 52; Tr., 4/13/89, pp. 27-28)

177. The more efficient the combustion process, the less CO and VOC's produced. Bio-Gen intends to operate the furnace as efficiently as possible, with a sufficiently long residence time combined with good fuel mixing, evenly distributed combustion air, and carefully staged combustion. (Bio-Gen 1, Ex. BE; Tr., 3/29/89, p. 49)

Hydrocarbons

178. Connecticut is in non-attainment for hydrocarbons, the precursors of ozone. Bio-Gen would emit HC at 0.08 lbs/mm BTU. Hydrocarbons would be controlled by using an efficient boiler design to improve the combustion of unburned VOC's (Bio-Gen 1, p. 57; Tr., 3/29/89, p. 44)

Lead

179. Lead could be present in the fuel stream from lead-based paints found in the demolition debris. A fabric filter is the BACT for non-volatile metals. The DEP has approved baghouse control as BACT for lead for this project. The proposed facility would have a lead control efficiency of a range of 95.0 to 98.7 percent. (Bio-Gen 1, Ex. BE, p. 51, Ex. BL; Ex. BZ; Tr., 4/13/89, pp. 78-79)

Dioxin

180. Uncontaminated wood is naturally low in chlorine content, an element generally considered necessary for the formation of dioxins. (Bio-Gen 1, pp. 53-54; Tr., 2/8/89, p. 40; Tr., 3/29/89, pp. 190-191; Tr., 5/17/89, p. 58)

181. Dioxin formation has not been found to occur at a wood burning facility analyzed in California. This facility burned 70 percent whole tree wood chips and 30 percent urban wood waste during the the test period. Urban wood waste consists of demolition debris and bulky wood waste. (Tr., 3/29/89, p. 191, pp. 194, to 196; Bio-Gen Ex. BD, p. 5))

182 Connecticut state regulations call for a temperature during combustion of 1800^0F with a one second residence time for dioxin destruction. (Tr. 2/9/89, p. 125)

Continuous Emissions Monitoring

183. NOx concentrations, CO levels, and gas opacity would be measured in the flue gas by continuous emission monitors in the exhaust stack. (Bio-Gen 1, p. 86)

184. These monitors would continuously verify whether pollutant levels were being exceeded and if the boiler was achieving efficient combustion. These monitors would be linked via telephone with the DEP. If the emission parameters were exceeded, the facility could be required to shut down pursuant to their DEP air permit to operate. (Bio-Gen 1, p. 86; Tr., 3/29/89, p. 154, p. 174)

185. Bio-Gen does not plan to establish ambient air monitoring stations in the Torrington area. (Bio-Gen 2, Q. 77)

Air Emissions Impacts

186. The proposed site is located within a valley, and limited atmospheric dispersion conditions associated with temperature inversions and light winds are expected to occur. Temperature inversions occur when warmer air overlies cooler air, and little or no vertical mixing of air occurs. (Bio-Gen 1, Ex. BA; Bio-Gen 3, Q. 92)

187. The Torrington area is subject to temperature inversions. According to modeling conducted of the area, the number of days in which at least one hour of inversions occurs ranges from 316 to 339 days annually. The average length of these inversions is approximately six hours. (Tr., 3/29/89, pp. 142-144)

188. Valley-induced inversions are often so shallow that a thermally buoyant plume from a tall stack will pierce the top of the inversion layer, thereby causing little impact at ground level. (Bio-Gen 3, Q. 92)

189. The base of the proposed stack has an elevation of 744 feet AMSL, (National Geodetic Vertical Datum of 1929) The hills surrounding the Torrington area have elevations of 1300 to 1400 feet AMSL. Under temperature inversions, there might be instances when the plume would not rise above the valley, but could get above the inversion layer which would affect high terrain areas. (Tr., 3/29/89, pp. 167-169; Bio-Gen 1, Ex. AG)

190. If air pollution during a temperature inversion reached significant levels, the DEP could direct the proposed facility to begin an emergency episode procedure by limiting the quantity of fuel burned, or to shut the facility down. (Tr., 3/29/89, p. 173)

191. Depending on atmospheric conditions and wood fuel moisture, a vapor plume could be visible from the stack. (Tr., 5/18/89, p. 215)

192. No smoke emissions from the stack would be visible. (Tr., 5/18/89, p. 214)

193. Odors from wood burning are the result of the incomplete combustion of volatile organics and the insufficient capture of fine particulates. There would be no detectable odor from the exhaust stack. (Bio-Gen 2, Q. 66; Tr., 5/18/89, p. 214)

Fugitive Emissions

194. Principal sources of fugitive particulate matter are vehicular traffic, fuel handling, and the handling of boiler ash. (Bio-Gen 1, Ex. I, p. 60)

195. Methods to control fugitive emissions would include paving of roadways, establishing of vegetative groundcovers, partially enclosing the fuel storage area, the enclosing of fuel conveyors, fully enclosing ash conveyors, and wetting ash prior to transport. (Bio-Gen 1, Ex. I, p. 60)

196. After the storage of high moisture chips for a period longer than 60 days, extensive wood chip decomposition could be a cause of odor. The wood chip handling system would be designed to allow the wood to be cycled from bottom of the silos during long outages. (Bio-Gen 2, Q. 30)

197. There would be no major emitters of odor at the proposed facility. (Bio-Gen 1, p. 70)

Ash

198. The proposed facility would produce ash at a rate of 7.5 tons per day or 2738 tons per year. (City 2, Q. 75)

199. The primary constituents of wood ash are compounds of potassium, phosphorous, and calcium. The ash would also contain silicon dioxide, aluminum oxide, calcium oxide, potassium oxide, and ferric oxide. (City, 2, Q. 78)

200. Ash may also contain dioxins, furans, or heavy metals if the wood or the ash has been mixed with other products that produce these compounds when burned. The presence of toxic and hazardous materials in wood ash can be prevented by controlling the materials being burned. (Bio-Gen 1, Ex. T, p. 78)

201. Bio-Gen has a 25-year contract in place with the Cannavo Construction Company to dispose of all of the proposed facility's ash. The contractor plans to use the ash as a supplement for land spreading and for asphalt batching. (Bio-Gen 1, p. 62)

202. Fly ash would be collected at the baghouse fabric filter, while bottom ash would be collected from the boiler. (Tr., 4/13/89, p. 97)

203. Both bottom and fly ash would be conditioned with water to reduce dust during handling. Bottom ash would fall into a water pit with a chain conveyor. Fly ash would be sprayed with water as it traveled to an ash dumpster. Both types of ash would be conveyed to water tight covered dumpsters for temporary on-site storage. The dumpsters would be removed from the site once a day. (Bio-Gen 2, Q. 54)

204. No water discharge would be associated with the ash quench. About four gallons per minute would be taken from the cooling tower blowdown and directed to the ash system where the water would either be removed with the ash or evaporate. (Bio-Gen 1, p. 60)

205. The ash would undergo periodic extraction procedure (EP) toxicity analysis, whether its ultimate destination were landfilling, concrete use, land spreading, or as a compost additive. (City 2, Q. 77)

206. Bio-Gen expects DEP would require EP toxicity testing of every dumpster of ash during initial operations at the proposed facility. (Tr., 3/30/89, p. 178)

207. Uncontaminated wood ash can serve as a soil enhancer by adding lime and potassium to the soil and by increasing the pH and fertility of the soil. (Bio-Gen, Ex. T, p. 78)

208. Uncontaminated wood ash can be disposed of in any Connecticut landfill licensed by the DEP with a stipulation that the ash be covered. (Bio-Gen 1, Ex. T, p. 79)

209. If asbestos is present in the fuel stream, it would be trapped by the fabric filter baghouse, and collected with the flyash. (City 13, p. 27; Tr., 2/8/89, p. 197)

Traffic Impacts

210. Trucks would deliver wood chips to the proposed facility 22 times a day. One truck per day would remove ash from the facility. This would result in 46 one-way trips by trucks to or from the facility daily. (Bio-Gen 1, p. 65, p. 70; Bio-Gen 1, Ex. S, p. 1)

211. The applicant proposes to allow the delivery of wood chips from 6:00 A.M. to 9:00 P.M. Monday through Saturday, but would agree to a 7:00 A.M. to 7:00 P.M. delivery schedule. (Bio-Gen 2, Q. 38; Tr, 3/31/89, p. 75)

212. The trucks delivering fuel would be covered tractor trailers carrying 90 cubic yards of wood chips. The ash would be removed by trucks carrying 30-cubic yard enclosed dumpsters. (Tr., 2/8/89, p. 173, p. 176; Bio-Gen 2, Q. 63)

213. The trucks entering and leaving the proposed site would have sliding doors, thereby eliminating potential banging of tailgates. (Tr., 2/7/89, p. 58)

214. Up to seven trucks could be staged on-site at one time. (Tr., 3/30/89, p. 155; Bio-Gen 1, Ex. BH)

215. During arrival, sampling, unloading and turning around, each truck would be on-site approximately 15 minutes. If a truck delivery were not accepted and had to be reloaded, a 15 to 30 minute delay would occur. (Tr., 2/6/89, p. 83)

216. The proposed route for trucks going to the proposed site would be to leave Route 8 at Interchange 45, turn right onto Route 800 in a northerly direction, and then turn right into the facility. Trucks leaving the proposed site would turn right onto Route 800, and proceed north to the Route 8 entrance ramp at Interchange 46. Interchange 45 is 1.4 miles south of the proposed site, and Interchange 46 is 2.5 miles to the north of the proposed site. (Bio-Gen 1, Ex. S; Tr., 2/8/89, p. 100)

217. Daily traffic on Route 800 in the vicinity of Interchange 45 off of Route 8 is 6100 vehicles. Peak traffic occurs between 3:00 P.M. and 6:00 P.M. Existing overall truck traffic comprises an average of 7.5 percent of the total traffic flow on Route 800. (Bio-Gen 1, Ex. S, revised Ex. M, p. 7)

218. One truck making a delivery and a return trip during a 30 minute period would increase the overall 30 minute traffic flow north of Interchange 45 by a range from a low of 0.6 percent to a high of 1.7 percent between the hours of 7:00 A.M. and 5:00 P.M. This additional truck traffic would correspond to an increase of 6 percent in truck traffic during the period of 12:00 P.M. to 12:30 P.M., the smallest increase, and an increase in truck traffic of 33 percent during the period of 10:00 A.M. to 10:30 A.M., the greatest increase. (Bio-Gen 1, Exhibit S)

219. Total traffic at the proposed facility would be comprised of 23 trucks per day, and 15 personal vehicles for plant employees, resulting in a total of 38 vehicles per day. (Bio-Gen 1, p. 70)

220. The intersection of the proposed facility's access road and Route 800 might be a potential traffic hazard. The section of Route 800 to the north of the proposed site, known as Sink Hole Bridge, has been the site of numerous accidents, including fatalities. (Bio-Gen 1, Ex. S; Tr., 2/6/89, p. 144)

221. The entrance to the proposed facility would be across from the intersection of Old Winsted Road and Route 800. Route 800 to the south of the proposed entrance has a downhill gradient, curving to the northwest, and trucks would be slowing down to make a right turn into the proposed facility. (Bio-Gen 1, Ex. S)

222. The applicant might post a "Truck Crossing" warning sign south of the proposed facility entrance to slow on-coming traffic. (Bio-Gen 1, Ex. S)

Noise Impacts

223. The major sources of noise at the proposed facility would be the wood hog and conveyor, the truck dumper, induced draft fan, compressors, and cooling towers. (Bio-Gen 1, p. 64, Revised Ex. M, p. 1)

224. The proposed site is within a Class C noise zone (industrial). The maximum permissible sound level at the boundary of a Class C receptor is 70 dBA. (Bio-Gen 1, Revised Ex. M. p.1)

225. The proposed site is surrounded by Class A noise zones (residential) to the north, west, and south-southwest, and abuts an undeveloped parcel of land to the east zoned C industrial. According to state regulations, noise impacts on adjacent Class A receptors must be below 51 dBA at night and below 61 dBA during the day. (Bio-Gen 1, Revised Ex. M, p. 1)

226. Ambient noise levels in the vicinity of the Sons of Jacob Cemetary adjacent to the proposed site were found to vary from 49 dBA to 57 dBA during the day, and from 42 dBA to 47 dBA during the night. (Tr., 3/31/89, p. 185; Tr., 4/11/89; pp. 90-91)

227. The area of the proposed site currently meets all State noise standards, and therefore the proposed facility would be limited to a 51 dBA level at the Class A receptors at night. (Bio-Gen 1, Revised Ex. M, p. 18)

228. Noise levels between 40 dBA and 60 dBA are described as "moderate", and those from 60 dBA to 80 dBA as "loud". (Bio-Gen 1, Revised Ex. M, Figure 1)

229. Mobile noise sources at an industrial facility, such as trucks and automobiles, are excluded from compliance with State noise regulations. (Bio-Gen 1, Revised Ex. M, pp. 4-5; Tr., 4/11/89, p. 88)

230. Bio-Gen intends to comply with all applicable State noise regulations and to retrofit equipment with additional sound control equipment if needed. (Bio-Gen 1, Revised Ex. M, p. 5)

231. The operation of an air-cooled condenser involves the movement of air through cells. Most of the sound from this equipment is generated at the inlet of its fans, which are underneath the structure, about 15 feet off of the ground. The sound emissions from the condenser would be generated toward the ground. The retaining wall adjacent to the condenser would be lined with an acoustically absorbent covering. Noise from the condenser, with six fans operating, would measure 93 dBA at a distance of three feet. A conventional cooling tower would measure 95 dBA at three feet. (Bio-Gen 1, Revised Ex. M, pp. 9-10; Tr., 3/30/89, pp. 165-166)

232. The induced draft fan and duct work would be enclosed with acoustic insulation. Inlet silencers would also be installed. The induced draft fan noise would be 60 dBA at three feet. (Bio-Gen 1, p. 65, Revised Ex. M, pp. 10-11)

232. The hammermill, also referred to as a woodhog, would be enclosed in a structure acoustically equivalent to a six-inch thick concrete wall. Noise from the hammermill would measure 75 dBA at a distance of three feet. (Bio-Gen 1, Revised Ex. M, pp. 10-11, Exhibit T, p. 41)

234. A potential source of a prominent discrete tone would be from the induced draft fan on the exhaust stack. This tone could originate at the fan outlet and emanate through the top of the stack thereby traveling a greater distance than ground level noise. This tonal noise could be controlled through the use of a resonant silencer installed at the fan outlet. (Bio-Gen 1, Revised Ex. M, pp. 11-12; DEP Comments, 1/25/89, p. 7)

235. After the completion of construction, acoustic measurements would be made from areas around the proposed site. If violations were found, the necessary adjustments would be made. The proposed facility would not be allowed to operate if it were found in violation of State noise regulations. (Bio-Gen 1, p. 70; City 2, Q. 64; Tr., 4/11/89, pp. 94-95; DEP Comments, 1/25/89, p. 7)

Security

236. The proposed site would be surrounded by security fencing. (Bio-Gen 1, BH; Bio-Gen 2, Q. 60)

237. The proposed site would be lit with high-pressure sodium lights with a non-glare cutoff fixture. These lights would be placed on poles 20 to 25 feet in height, and would be directed downward only. Lighting around the plant would be largely restricted to the proposed site itself within a 0.1-foot candle limitation established at the perimeter of the proposed site. (Bio-Gen 1, Ex. AH; Tr., 2/8/89, pp. 113-114)

Visibility

238. The proposed facility would be visible from nearby portions of Route 800 and Route 8 and from the Paugnut State Forest. The 180-foot stack would be visible for approximately one mile north of the proposed site along Route 800. There would be limited visibility of the stack for approximately one-half mile to the south along Route 800. The top portion of the stack might be visible from the Country Living condominiums located approximately one mile south of the proposed site. (Bio-Gen 1, p. 37; Bio-Gen 3, Q. 82; Tr., 4/13/89, p. 131)

Facility Start-Up

239. Bio-Gen would conduct emissions tests of the proposed facility during start-up. The boiler would initially be fired with fuel comprised of 100 percent whole tree chips and bulky wood wastes. After a determination that this fuel met DEP requirements, demolition wood would be selectively introduced into the fuel stream in these proportions: 75 percent tree chips and bulky wood waste, and 25 percent demolition wood waste; 50 percent tree chips and bulky wood waste and 50 percent demolition wood; 25 percent tree chips and bulky wood waste, and 75 percent demolition wood waste; and finally, 100 percent demolition wood. (Bio-Gen 1, Ex. BK)

240. At each step in the wood fuel testing process, tests would be conducted on particulate matter, metals, and organics to determine whether there were a significant difference in the various wood fuel mixtures. The final test protocol would have to be approved by the DEP prior to the commencement of any testing. (Tr., 3/29/89, p. 186; Bio-Gen 1, Ex. BK)

Cogeneration

241. Bio-Gen has found no significant energy user nearby the proposed site to use low grade heat from the steam cycle. (Bio-Gen 2, Q. 35)

Rare and Endangered Species

242. There are no known existing populations of Connecticut species of special concern or federal endangered or threatened species ocurring at the proposed site. (Bio-Gen 1, Ex. J; Tr. 3/29/89, p. 219)

243. No critical habitats were found on the proposed site, and no animal or plant species of special concern were observed on the proposed site. (Bio-Gen 1, Ex. D, p. 7)

Historical

244. The Connecticut Historical Commission has determined the proposed facility would have no effect on historic, architectural, or archaeological resources listed on or eligible for the National Register of Historic Places. (Bio-Gen 1, Ex. J)

Permits

245. Bio-Gen filed an application for an air permit to construct with the DEP in August 1, 1988, and submitted revised air permit applications in November 1988, and March 1989. (Bio-Gen 1, Ex. I, Ex. BE)

246. Bio-Gen has yet to receive a determination for stack obstruction marking and lighting from the FAA. (Bio-Gen 1, p. 76)

247. Bio-Gen must file an amendment with FERC to replace the permit FERC issued to Bio-Gen in 1987 for a 10 MW facility. (Bio-Gen 1, p. 76)

248. Bio-Gen has not yet obtained a Solid Waste Permit or submitted a Spill Prevention, Control, and Countermeasure Plan. (Bio-Gen 1, p. 76)

249. Bio-Gen would have to obtain a Water Diversion Permit only if groundwater withdrawals at the proposed site were greater than 50,000 gallons per day. (DEP Comments, 1/25/89)

250. Bio-Gen would submit a National Pollution Discharge Elimination System permit for runoff before construction. (Bio-Gen 1, p. 76)

251. If applicable, Bio-Gen would obtain a publicly-owned treatment works (POTW) discharge permit. (Bio-Gen 1, p. 76)

Procedural

252. Bio-Gen filed its application with both the Torrington Planning and Zoning Commission and with the Torrington Inland Wetlands Commission pursuant to Section 16-50x(d) of the CGS on December 5, 1988, and supplemental correspondence on December 16, 1988. (Breetz letter of 1/27/89, Appeal From Orders)

253. By letter of December 28, 1988, the Torrington Acting City Planner informed the applicant that, based on amendments to the Torrington Zoning Regulations, it will be necessary for the applicant to apply to the Torrington Zoning Board of Appeals for a variance before a zoning permit and a building permit can be issued. The Acting City Planner cited the Torrington zoning regulations amended on April 27, 1988, as follows: "Section 215.1(B) any manufacturing or industrial use processing raw materials and/or assembling parts into finished products is permitted except those expressly prohibited in Section 220, and except junk yards, which are permitted only as "special exceptions." "Section 220 - Prohibited uses was amended to include the following: any use not specified in these regulations as a permitted use, special exception use, or accessory use are prohibited uses." (Acting City Planner letter of December 28, 1988)

254. On December 30, 1988, the Director of Public Works and Acting City Planner for the City of Torrington, and the Torrington Planning and Zoning Commission issued an order directing Bio-Gen to submit additional material and information, and stated to the applicant that, based on amendments to the Torrington Zoning Regulations approved on April 27, 1988, "a facility of this type is not a permitted use within the City of Torrington". The Acting City Planner also stated "The City of Torrington reserves the right to further review such submissions... and to render additional orders when all necessary information is submitted." (Acting City Planner letter of December 28, 1988; Appeal dated January 27, 1989)

255. On January 27, 1989, Bio-Gen filed an appeal from the Orders of the Planning and Zoning Commission of December 30, 1988, with the Siting Council. (Record)

256. By letter dated February 6, 1989, the Torrington Planning and Zoning Commission denied Bio-Gen's application for site plan approval. (Record; Appeal of March 8, 1989)

257. On March 8, 1989, Bio-Gen filed a second appeal from the Orders of the Torrington Planning and Zoning Commission dated February 6, 1989. (Record)

Project Costs

258. Proposed project costs are estimated as follows in millions of 1989 dollars:

	Conventional Cooling	Wet Surface Condenser	Dry Condenser
Construction Costs	19.311	19.248	20.103
Construction Interest	1.900	1.900	1.900
Soft Costs (financing legal fees, etc.)	2.175	2.175	2.175
Start-Up	1.250	1.250	1.250
Reserves	1.000	1.000	1.000
Land	.475	.475	.475
Total	$26.111	$26.048	$26.903

(Bio-Gen 1, p. 75, Revised Ex. K)

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