DOCKET NO. 152 - An application of the Connecticut Resources Recovery Authority and Resource Recovery Associates Limited Partnership for a Certificate of Environmental Compatibility and Public Need for the construction of a landfill gas electric generating facility at the Shelton landfill located on the southeasterly side of River Road (Conn. Route 110), in the City of Shelton, Connecticut.	:	Connecticut Siting Council November 12, 1992

FINDINGS OF FACT

1. On April 14, 1992, pursuant to sections 16-50g through 16-50z of the Connecticut General Statutes (CGS) and section 16-50j-1 et seq. of the Regulations of Connecticut State Agencies (RSA), the Connecticut Resources Recovery Authority (CRRA) and Resource Recovery Associates Limited Partnership (RRALP) submitted to the Connecticut Siting Council (Council) an application for a Certificate of Environmental Compatibility and Public Need (Certificate) for the construction, maintenance, and operation of a 1,750 kilowatt (kW) gross (1,630 kW net) landfill gas (LFG) electric generating facility (Facility) at the Shelton landfill in Shelton, Connecticut. (CRRA/RRALP, p. 13; Afternoon Transcript, p. 30)

2. Pursuant to CGS section 16-50l(b), CRRA and RRALP published notice of the application in The Evening Sentinel and The Bridgeport Post on April 10 and 11, 1992. (CRRA/RRALP 1, pp. 61-62)

3. Pursuant to CGS section 16-50m, the Council, after giving due notice thereof, held a public hearing for the proposed Facility on July 16, 1992, beginning at 2:30 p.m., and reconvening at 7:00 p.m., in the Shelton City Hall, Shelton, Connecticut. Prior to the hearing, the Council and its staff inspected the proposed Facility site. (Public Hearing Notice, May 8, 1992; Afternoon Transcript, July 16, 1992; Evening Transcript, July 16, 1992)

Need

4. In accordance with CGS section 16a-35k, the proposed Facility would be using an indigenous fuel in an effort to diversify Connecticut's fuel mix, thereby reducing the State's dependence on foreign oil. (CRRA/RRALP 1, pp. 13, 22-23)

5. Operation of the proposed Facility would displace approximately 24,840 barrels of oil per year over the life of the project and would provide enough electricity for approximately 2000 residences. (CRRA/RRALP 1, p. 26)

6. Electricity generated by the proposed Facility would be sold to the United Illuminating Company (UI). No modifications to UI's electric grid would be necessary. UI has forecasted that its year of need for additional generation capacity is 2006. The projected gas supply would allow the proposed Facility to operate until approximately 2018. (CRRA/RRALP 1, pp. 20, 23-24; CRRA/RRALP 2, EPA Ex. D, Tables 1-4; CRRA/RRALP 4, Q. 9, 10; CRRA/RRALP 11, Q. 33)

7. The Federal Energy Regulatory Commission has been notified of the proposed Facility's status as a qualifying small power production facility pursuant to Title 18, Code of Federal Regulations section 292.203(a). (CRRA/RRALP 1, Ex. N)

8. CRRA cannot issue bonds secured by the special capital reserve fund pursuant to CGS section 22a-272 because the revenues from the proposed Facility may not be able to do the following: pay the principal of and interest on the bonds issued to finance the proposed Facility; establish, increase, and maintain any reserves deemed by CRRA to be advisable to secure the payment of principal of the interest on such bonds; pay the cost of maintaining the proposed Facility in good repair and keeping it properly insured; and pay such other costs as may be required. (CRRA/RRALP 2, Electric Purchase Agreement (EPA), Ex. 3, p. 6)

9. CRRA member municipalities determined that rather than issuing taxable bonds for the proposed Facility and thereby assuming a risk in owning the Facility, they would contract out the construction, operation, and maintenance of the Facility. (Afternoon Transcript, pp. 43-45)

10. The CRRA has contracted RRALP to design, develop, and operate the proposed Facility. In May 1992, citing non-performance, RRALP replaced their original engineering contractor, Sweet-Edwards/EMCON, Inc., with the Inte-Fac Corporation. Inte-Fac Corporation would pay CRRA a royalty fee for use of the LFG as a fuel. (CRRA/RRALP 1, p. 13; Afternoon Transcript pp. 35, 51)

Proposed Site

11. The site of the proposed Facility is located on 0.2 acres on the southern side of the Shelton landfill within the landfill's boundaries. The Shelton landfill is an approximately 42-acre landfill located off of Connecticut Route 110 in Shelton, Connecticut. The proposed site is bordered by the landfill to the north, Connecticut Route 110 to the west, the Housatonic River to the east, and the Far Mill River and wetlands to the south. The proposed site is exempt from zoning classification pursuant to CGS section 22a-282. (CRRA/RRALP 1, pp. 21, 35-36, 49)

12. The 42-acre Shelton landfill was formerly used for sand and gravel excavation through the 1940s, and was subsequently filled with municipal solid waste (MSW) through 1988. Since 1988 the landfill has only accepted ash from the Bridgeport resource recovery facility. (CRRA/RRALP, p. 21)

13. There are current plans for horizontal expansion of the Shelton landfill for increased ash disposal capacity; however, this expansion would not affect the proposed Facility site. (CRRA/RRALP 4, Q. 5; CRRA/RRALP 10-Oliva, p. 7)

14. The following are the closest land uses to the proposed Facility site:

Land Use	Distance in miles
Residential	0.3
Industrial	0.5
Commercial	0.2
Public recreation	0.5
Public building (Firehouse)	3.0

(CRRA/RRALP 4, Q. 4)

Equipment

15. Equipment at the proposed Facility site would be located within an approximately 85-foot by 45-foot gravel-covered area. The engines, generators, switchgear building, gas compressor, and gas coolers would be located beneath a single story metal roof structure. The remaining equipment, including the radiators, exhaust stacks, 13.8 kV/4160V transformer, and electrical relay equipment would remain outside of, but adjacent to the south side of the metal roof structure. (CRRA/RRALP 1, p. 17; CRRA/RRALP 9, attachment 1; CRRA/RRALP 10-Anderson, p. 7; Afternoon Transcript, p. 23)

16. The exhaust stacks for the proposed Facility would have a maximum height of approximately 47.5 feet above ground level. (CRRA/RRALP 11, Q. 29; Afternoon Transcript, p. 22)

17. The 13.8kV/4160V transformer for the proposed Facility would have approximately 350 gallons of non-PCB containing mineral oil. No spill containment for the transformer was proposed. (CRRA/RRALP 1, p. 17; CRRA/RRALP 4, Q. 16; CRRA/RRALP 9, attachment 9)

18. The proposed Facility was initially planned to operate with three Caterpillar 3516 internal combustion engines each rated at 720 kW. Sweet-Edwards/EMCON, Inc., modified the Facility plan and proposed to use two Kongsberg KG 2-3 recuperated radial gas turbines each

rated at 1290 kW. A reevaluation of the Facility, following CRRA and RRALP's removal of Sweet-Edwards/EMCON,Inc. in favor of the Inte-Fac Corporation, determined that the best available engine technology for the Facility would be two Waukesha GL series external combustion/lean burn engines, each rated at 875 kW. (CRRA/RRALP 1, pp. 14, 17; CRRA/RRALP 2, Petition to DPUC, pp. 15, 17; CRRA/RRALP 2, EPA, Ex. A, p. 1; CRRA/RRALP 3; Afternoon Transcript, p. 30)

19. The proposed switch to lean burn external combustion engines for the proposed Facility was made by CRRA and RRALP after consultation with UI concerning the utility buy back schedule, the amount of gas available for use, and an environmental and cost comparison of the following technologies:

	Lean-burn external combustion	Axial flow turbine	Radial flow turbine	Existing Landfill gas flare
Cost of equipment (dollars per kW)	335	675-1000	675-1000	250,000 for 1500 cfm
Thermal efficiency (percent)	43	20-25 not recuperated	28-32 recuperated	98
Emissions				
NOx	1.5g/bhp	2.5g/bhp	2.5g/bhp	7g/bhp
CO	125ppm	116-197ppm	24-50ppm	250-300ppm
Particulates	less than 1 lb/hr	less than 1 lb/hr	less than 1 lb/hr	less than 1 lb/hr
Available equipment size (kW)	474-1539	3300	1300-3500	full range
Noise emissions (dBA at 50 feet)				
actual	95	100	95	80
attenuated	70	73	75	80
Parasitic Load (kW)	186	447	447	18

(CRRA/RRALP 6, Q. 21, Attachment 5; Evening Transcript, p. 7)

20. Each engine housing at the proposed Facility would be supplied with a halon fire suppression system and a gas leak detection system. Public safety officials of the City of Shelton would be invited to comment on the safety features of the Facility prior to construction. These public safety officials currently have keys to the gate at the landfill. (CRRA/RRALP 1, p. 29; Afternoon Transcript, p. 76)

21. The proposed Facility could be designed to house an aero-derived (axial-flow) turbine for research and development purposes. If an aero-derived turbine were operated at the Facility, contingency plans for switch over to the lean burn external combustion engines would have to be made in the event of turbine failure or shutdown. (Afternoon Transcript, pp. 58-61)

22. Maintenance for the proposed Facility would be scheduled during weekends and off-peak hours. UI would receive a two week notice of scheduled maintenance. In the event of an emergency shutdown or system failure, a remote telemetry system would direct dial or beep plant operators so that the gas flow could be manually switched from the engines to the existing LFG flare. (CRRA/RRALP 1, p. 20; CRRA/RRALP 2, EPA, p. 19; CRRA/RRALP 4, Q. 18; Afternoon Transcript, p. 25)

Gas Production

23. Fuel for the proposed Facility would be generated from decaying MSW buried in the Shelton landfill. LFG contains over 50 percent methane, over 40 percent carbon dioxide, and other gases, including water vapor and malodorous volatile organic compounds (VOC). The heating value of the LFG is approximately 500 British thermal units per cubic foot which is approximately one half of the heating value of pipeline quality gas. (CRRA/RRALP 1, pp. 13-14)

24. Condensate collected from the LFG as it is drawn from the landfill to the proposed Facility would be collected in an above ground 10,000 gallon dual containment tank. The estimated volume of condensate collected weekly would be 5,000 gallons. The condensate would be removed on a weekly basis and taken to the Shelton sewage treatment plant. (CRRA/RRALP 4, Q. 14; Afternoon Transcript, p. 68)

25. The Shelton landfill currently has a central and perimeter well system each served by a flare for controlling methane migration. Methane is twenty-five times more active a greenhouse gas than carbon dioxide in the atmosphere. Combustion of the methane and VOC's in LFG is considered the best available control technology to improve air quality. The existing collection system at the Shelton landfill allows LFG, including methane and malodorous VOC's, to percolate through the landfill cap. Eight additional gas collection wells would be added to the existing central gas collection system in order to improve gas collection capability. The low (three to five percent) methane content of the gas from the existing perimeter wells cannot be used in the proposed Facility; therefore, the flare that serves these wells would continue to be used. (CRRA/RRALP 4, Q. 6, 7, 8; Afternoon Transcript, p. 24; Docket No. 111 Findings of Fact, No. 59-60)

26. LFG cannot be stored due to VOC's contained in the gas that become corrosive and explosive under pressure. (CRRA/RRALP 4, Q. 11)

27. When LFG production falls below 500,000 cubic feet per day, one of the engines at the proposed Facility would be removed. The estimated date for removal of the first engine is 2003. The remaining engine would operate until the end of the Electric Purchase Agreement in 2006. If UI were to continue buying electricity from the Facility and if no secondary fuel were used, the remaining engine could operate until daily gas production fell below 150,000 cubic feet per day (approximately in the year 2018). (CRRA/RRALP 4, Q. 9, 10)

Construction

28. No clearing would be necessary at the proposed Facility site. During construction of the proposed Facility, existing material laydown and storage areas adjacent to the site would be utilized. (CRRA/RRALP 10-Oliva, p. 5; Afternoon Transcript, pp. 21-22)

29. During construction of the proposed Facility, an existing concrete slab and block wall at the site would be retained if possible and covered with topsoil. The area would be graded and covered with gravel. (CRRA/RRALP 10-Oliva, p. 5; Afternoon Transcript, p. 2, 3)

30. Water would be used to control dust during construction of the proposed Facility. A street sweeper currently makes weekly patrols along the access roads around the landfill. (CRRA/RRALP 4, Q. 20)

31. Existing groundwater at the proposed Facility site has a GC classification and flows in an easterly direction toward the Housatonic River. The Facility would be designed as a zero effluent discharge facility. (CRRA/RRALP 1, pp. 37, 53)

32. Tidal wetlands are located within 30 to 35 feet south of the proposed Facility's footprint. (CRRA/RRALP 1, Ex. G; CRRA/RRALP 9, Attachment 1)

33. No State or federally listed or proposed to be listed threatened, endangered, or species of special concern, plant or animal would be affected by construction of the proposed Facility. (CRRA/RRALP 1, Ex. H & I)

34. No known historic, architectural, or archeological resources would be affected by construction of the proposed Facility. (CRRA/RRALP 1, p. 36)

35. The following are the estimated noise levels from the proposed Facility to the nearest residential, commercial, and industrial noise receptor zones:

Location	Calculated Noise Levels	DEP Noise Standard
Residential	40.12 dBA	61 dBA Day 51 dBA Night
Commercial	44.08 dBA	66 dBA
Industrial	36.10 dBA	70 dBA

(CRRA/RRALP 11, Q. 34)

36. CRRA and RRALP would have to receive from the Connecticut Department of Environmental Protection (DEP) an air quality permit to construct, an air quality certificate to operate, and a solid waste permit modification. (CRRA/RRALP 1, Ex. M)

37. Following all regulatory approvals, the construction of the proposed Facility would take approximately 30 weeks. (CRRA/RRALP 1, Ex. E)

38. The estimated cost breakdown for equipment and labor for construction of the proposed Facility is as follows:

Power generation engine/generator room	$ 850,000
Power generation switch gear room	189,575
Structural/building	193,855
Gas processing	225,000
Utilities tie-in	150,000
Contingency	160,000
Miscellaneous, including engineering, loan interest, lease fee, legal, and overhead	731,570
Total	$2,500,000

(CRRA/RRALP 1, p. 32; CRRA/RRALP 4, Q. 3)

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