2010 LANDFILL GAS UTILIZATION EXCELLENCE AWARD

NOMINATION FORM

Program/Facility Nominated:
Greater New Bedford Landfill Gas Utilization Project

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Nomination submitted by (if different than information listed above):

Name: ___________________ Phone #: ___________________ Email: ___________________

If selected for an award, how would you like the name of the organization to read on the award (limit of 50 characters)?

Greater New Bedford Landfill Gas Utilization Project at the Crapo Hill Landfill, Dartmouth and New Bedford, Massachusetts

2010 Applications must be submitted to SWANA no later than Friday.

*** PLEASE NOTE THAT ENTRY REQUIREMENTS HAVE RECENTLY CHANGED ***

See the attached Entry & Eligibility Requirements sheet for further information

Application Checklist (Please make sure the following items are included in your submittal packet):

- Completed nomination form with signed release statement (this page), to be scanned and included in digital submission
- 1 copy of your award submittal on a CD-ROM OR via the SWANANET FTP site.
- Executive Summary of your nomination (NO more than 200 words)
- At least 2 pictures of your operation (may be included in nomination text)
- Check or credit card payment (made payable to SWANA) for nomination fee (in U.S. dollars)

Please mail all application packages to:

SWANA
ATTN: Technical Programs Department
1100 Wayne Avenue, Suite 700
Silver Spring, MD 20910

Release Statement: I certify that the information provided in this application is accurate and correct to the best of my knowledge. SWANA reserves the right to publish the enclosed information. Nominations become the property of SWANA. My signature gives SWANA the right to request a copy of this submittal.

Signature: ___________________ Date: March 31, 2010
GREATER NEW BEDFORD
LANDFILL GAS UTILIZATION PROJECT
AT THE CRAPO HILL LANDFILL
DARTMOUTH/NEW BEDFORD, MASSACHUSETTS

Prepared by:
CommonWealth
New Bedford Energy LLC

March 31, 2010
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EXECUTIVE SUMMARY

The Greater New Bedford Landfill Gas Utilization Project generates 3.3 megawatts of electricity from combustion of landfill gas in four Caterpillar 3516 engine-generator sets. The landfill gas is being collected and delivered to the engines from the Crapo Hill Landfill. The Project is located in the Town of Dartmouth, Massachusetts. The Landfill is owned and operated by the Greater New Bedford Regional Refuse Management District, a Massachusetts regional refuse district comprised of the Town of Dartmouth and the City of New Bedford.

CommonWealth New Bedford Energy, LLC obtained the development rights to the Project from the District in August 2003 and subsequently developed, constructed and commenced operation in October 2005 of the Project. CNBE purchases the landfill gas from the District. The District owns and operates the landfill gas collection system and a LFG flare that extracts landfill gas from the Landfill and delivers the LFG to the Project. The District aggressively expands the landfill gas collection system into new areas of waste, which areas are expected to continue to expand for 15 years. The Project is planned to grow with the Landfill. CNBE and the District work cooperatively to maximize and use the landfill gas resource beneficially.
1.0 DESIGN AND CONSTRUCTION

The Greater New Bedford Landfill Gas Utilization Project (the Project) generates approximately 3.3 megawatts (MW) of electricity from combustion of landfill gas (LFG) in four engines that drive electricity generators. The landfill gas is being collected and delivered to the engines through a comprehensive landfill gas collection system from the Crapo Hill Landfill, a municipal solid waste landfill (the Landfill). The Project is located in the Town of Dartmouth (Dartmouth), Massachusetts, proximate to Samuel Barnet Boulevard and the New Bedford Industrial Park in the City of New Bedford, Massachusetts, and to Quanapoag Road in the Town of Freetown, Massachusetts. The Landfill is owned and operated by the Greater New Bedford Regional Refuse Management District (the District), a Massachusetts regional refuse district comprised of Dartmouth and New Bedford.

The right to develop the Project was awarded to CommonWealth Resource Management Corporation (CRMC) by the District via a public procurement process in August 2003. To implement the Project, CRMC created a single-purpose subsidiary, CommonWealth New Bedford Energy, LLC (CNBE), which is wholly owned by CRMC. CNBE subsequently developed, constructed and commenced operation in October 2005 of the Project. CNBE has the rights to all the landfill gas collected from the Landfill. CNBE purchases the landfill gas from the District. The District owns and operates the landfill gas management system (consisting of a LFG collection system and a LFG flare) that extracts landfill gas from the Landfill and delivers the LFG to the Project (see figure below).

The landfill gas collection system consists of a network of vertical and horizontal wells, laterals and header pipes to extract the LFG that is being generated under the surface of the Landfill. The LFG extracted from the Landfill is composed of approximately 50 percent methane and has a heating value of approximately 500 BTUs per cubic foot. Before the Project was developed, two vacuum blowers pulled LFG under pressure from
the Landfill through the wells and pipes and through the main header to the flare station, where the LFG was destroyed by combustion.

Since the Project commenced operation, LFG is diverted for use as fuel in four reciprocating internal combustion engine-generator sets that are specially designed for combustion of LFG. Combustion of the LFG fuel in the engines creates mechanical shaft power that turns appropriately-matched electrical generators to generate up to 3.3 MW of electricity. The planned capacity and initial design of the Project is based on the use of four Caterpillar model 3516 engine-generator sets nominally rated at 825 kW (gross) per set. Internal combustion engine technology from Caterpillar and its competitors are widely available and have a long record of successful use in LFG applications over many decades and under a wide range of operating conditions.

The engines, generators and ancillary equipment are housed in a facility (the Facility) located at the Landfill on property leased from the District. The Facility is owned by CNBE (see figure below). CNBE procured an engineering and construction contractor to design and construct the Facility pursuant to an engineering, procurement and construction (EPC) contract, and a contract operator to operate the Facility pursuant to an operations and maintenance (O&M) services agreement. Electricity generated at the Facility is delivered to the regional power grid via an interconnection with the local electric distribution company, NStar Electric (NStar).
The Facility is located on a 0.9-acre site adjacent to the Landfill access road and north of the Landfill mound and outside of the limits of waste. The site is located adjacent to the District’s leachate pump station, where the condensate discharge from the Facility is accepted into the Landfill’s leachate management system. The site is located adjacent to existing underground electrical and telephone duct banks that allowed easy installation of cables to export electricity to the NStar electric distribution system and to the telephone company for communication service lines. Physically, the site consists of flat upland area that is situated with substantial buffer area owned by the District between the Facility and the nearest residences. The nearest residence to the site is 900 feet to the west through densely forested land that is owned by the District and intended to remain as a buffer area. The nearest industrial land use to the site is approximately 2,250 feet to the southeast at the New Bedford Business Park.

The site was prepared by clearing of trees, grubbing of stumps, rocks and stones. The soils under the footprint of the building were compacted prior to pouring of cement footings and foundation. To provide a safe environment for personnel, and to protect equipment, an extensive grounding system was installed under and around the footprint of the building. The grounding system consists of a matrix of soft drawn, 4/0 AWG copper ground wires installed at a depth of at least 18 inches below finished grade, ground rods, and leads to the building, generator frame/enclosures, generator switchgear, generator step-up transformer, utility interconnection equipment, station fence, station gates, and other points. To minimize the risk of methane buildup in the Facility from the potential of landfill gas migration through the ground, an underground vent system was installed beneath the foundation of the Facility. To minimize dust and vegetative growth, a filter fabric and crushed stone were installed around the building and over the site.

The Facility was located within the site to facilitate vehicle access in and around the Facility and ancillary equipment for ease of construction, operation and maintenance. The Facility access ways were configured to facilitate the removal of engines during major overhauls and other major equipment as needed.

The Facility was designed to facilitate ease of operation and maintenance and possible expansion. Some of these design elements include:

- Facility engine room airflows from the outside through four 10-foot by 10-foot horizontally mounted filters; one for each engine-generator. The flow of air is directed horizontally across each generator, and then upward through the roof through four fans and vents to optimize the cooling of the engine-generator.
- Ample space provided between and around each engine-generator set to allow the operators with easy access to the equipment for maintenance.
- Five large access ways into the engine room that provide multiple paths for engine-generator sets and other equipment to be removed and returned to Facility when required for major maintenance.
- Quick connect, flexible hoses installed for each engine to supply new oil, coolant and compressed air, and to remove waste oil.
• Variable frequency drives (VFDs) on all large Facility motors to minimize in-plant power, and to optimize control over important operating parameters.
• Lighting that includes halogen overhead lighting and side window ambient lighting to provide the operators with a combination of natural and artificial light that allows easy visibility of equipment.
• Infrastructure installed for the installation of a fifth engine-generator when sufficient landfill gas is available to support the incremental capacity. The infrastructure includes space for a fifth engine-generator unit and its associated switchgear and radiator, underground conduits between the place for a fifth unit and the control room, and LFG processing equipment sized for the full capacity of five engine-generators.
• Supervisory control and data acquisition (SCADA) system that integrates all continuously measured and controlled data from the Facility. Three months of data is stored on the system. Trending of data provides an important analytical tool for diagnostics, troubleshooting, preventative maintenance, and maintenance scheduling.

The Facility was sized to match the quantity of the landfill gas available and predicted. CNBE chose this sizing approach based on the modern design of the landfill and aggressive development and expansion of the landfill gas collection system by the District.
2.0 ENVIRONMENTAL CONTROLS

The Facility serves as a control to extract and combust landfill gas and recover energy in the form of electric power for delivery to the local utility’s electric grid. CNBE sized the Facility to utilize the entire quantity of collected landfill gas being generated by the Landfill. The District owns and operates the landfill gas collection system and delivers landfill gas for sale to CNBE. The District aggressively expands the landfill gas collection system into new areas of waste to insure adequate gas flows using innovative designs not employed at any other landfill.

The District voluntarily installed an initial active landfill gas extraction system consisting of lateral and vertical landfill gas extraction wells, header pipes connecting the wells and a flare to combust the landfill gas in order to prevent odor issues and to provide a means for productive use of the landfill gas in the future. Two vacuum blowers were installed to pull the landfill gas to an open flare capable of combusting 2,000 scfm of landfill gas. This initial system was completed and became operation during 2000.

After the initial system was installed, the LFG collection system was subsequently expanded aggressively in anticipation of the development of an electric generating facility. The gas extraction system is currently comprised of 41 vertical gas extraction wells and over 20 interconnected horizontal collection wells installed at approximately every thirty feet of landfill elevation.

The District’s practice is to aggressively expand the landfill gas collection as follows:

- Install vertical gas extraction wells at intervals of 100 to 200 feet as areas approach their final grades. Each vertical well is connected to the landfill gas collection system and commences operation within 60 days of its installation.

- Install horizontal wells in active operating landfill areas at waste thickness intervals of 25 to 40 vertical feet. The horizontal distance between the horizontal wells averages 100 feet.

- Connect the leachate cleanout risers to the landfill gas collection system to enable landfill gas to be extracted from the leachate collection system.

The expansion of the landfill gas collection system has maximized the efficiency of collection and recovery of landfill gas generated within the waste mass and minimized the emission of gas to the environment.

The District has implemented significant design innovations to the landfill gas collection system that have increased performance to collect landfill gas and control leachate. The design innovations have been critical in overcoming potential gas supply constraints, as the Facility was sized to match a high recovery and collection rate of landfill gas generated from the Landfill.
These innovations include the following:

- The horizontal wells are installed in rows, with each row connected to form an integrated grid or matrix. Each end of the row of horizontal wells is connected to landfill collection system that provides vacuum and hence extraction from both ends. This innovation extends the life of the horizontal wells operations and performance by creating multiple paths to the horizontal wells. For instance, if a section of a horizontal well becomes blocked from settlement or water, only that section of the horizontal well becomes ineffective; the remainder of the well can be drawn on from another direction.

- The horizontal wells are pitched from high to low from the center to the sides of the Landfill, thereby directing the flow of any collected condensate and leachate to either side of the landfill. The horizontal wells incorporate unique well-head and moisture traps that separate and drain leachate and condensate from the landfill gas and direct the leachate and condensate directly to the leachate and condensate disposal system. This innovation minimizes water blockages in the horizontal wells that typically become problematic. Furthermore, this innovation provides additional drainage points throughout the landfill mass that reduces the likelihood of pooling of leachate in the mass of the Landfill.

- In a newly constructed waste cell that recently commenced operation, the operators designed, fabricated and installed a vertical conduit that is directly connected to the leachate collection system and will be extended vertically with the waste mass disposed around it (herein “the Pease-Peckham Conduit”). The Pease-Peckham Conduit provides a path to extract landfill gas from the leachate system and to the landfill gas collection system, and a path to drain leachate and condensate from the waste mass and landfill gas collection system directly to the leachate collection system. The Pease-Peckham Conduit consists of a steel conduit four feet in diameter and ten feet in height. The Pease-Peckham Conduit is placed vertically on a pad of crushed stone directly above the leachate collection header line. Within the Pease-Peckham Conduit, an eight-inch diameter perforated plastic pipe is welded to the leachate header line and held in place vertically by drainage material (e.g., crushed stone) between the outside of the perforated plastic pipe and the inside of the Pease-Peckham Conduit. The top of the Pease-Peckham Conduit is sealed with a steel cover and gasket. The top of cover contains a metal fitting that is used as a passive vent or active gas collection connector (see figures below).
The Pease-Peckham Conduit is extended upward as the waste mass is deposited around it, leaving a four-foot diameter leachate drainage and landfill gas conduit in place that allows for connections with the landfill gas collection system. The Pease-Peckham Conduit allows for continual dewatering of the waste mass through a path that is directly connected to the leachate collection system, and for collection of landfill gas from the leachate system and waste mass.

The innovations have increased the effectiveness to collect landfill gas from the Landfill, and drain leachate and condensate contained within the waste mass.

CNBE sized the Facility to match and utilize all the landfill gas collected from the Landfill, and hence, since the commencement of operation of the Facility, all the landfill gas collected from the Landfill has been used at the Facility with the exception of small
quantities that are diverted to the flare when an engine is not operating due to maintenance or unscheduled outage. The environmental benefits of the sizing of the Facility by CNBE and the aggressive expansion of the landfill gas collection system and the implementation of innovative designs by the District include maximizing the beneficial use of the landfill gas resource and minimizing uncontrolled emissions of landfill gas to the atmosphere.
3.0 REGULATORY COMPLIANCE

The Project is one component of the larger integrated solid waste management system owned and operated by the District. The Project’s contribution to the integrated solid waste management system includes control and beneficial use of landfill gas, and significant financial contribution to the District thereby effectively lowering costs to the member communities. CNBE also supports the District’s community efforts by providing tours of the Facility to students enrolled in area secondary schools, high schools and colleges.

CNBE was required to obtain four environmental approvals under Massachusetts State rules and regulations to construct and operate the Facility. These approvals include:

- Certificate of the Secretary of Environmental Affairs that the Massachusetts Environmental Policy Act and Section 11.06 of the MEPA regulations for evaluation of environmental impacts of significant projects and activities have been satisfied.
- An air emissions license and plan approval (Air Permit) from the Massachusetts Department of Environmental Protection (the MDEP), which is a requirement prior to construction of any combustion facility of the proposed size under 310 CMR 7.02 of the MDEP regulations.
- An Air Quality Operating Permit from the MDEP, which is a requirement to operate a combustion facility of the proposed size under 310 CMR 7.0: Appendix C of the MDEP regulations.
- A modification to the solid waste management facility operating permit for the Landfill (the Solid Waste Permit) from the MDEP, which is a requirement prior to implementation of any change in the method for management of LFG under 310 CMR 19.100 of the MDEP regulations.

Subsequent to construction and commencement of operation of the Facility, an air emissions compliance test was performed. The test demonstrated that the Facility was in compliance with the applicable permit conditions, including air emission limits of carbon monoxide, nitrogen dioxides, and non-methane organic compounds. In addition, the MDEP performed an inspection to determine compliance with the balance of licensing requirements. CNBE is in compliance with all permit conditions and requirements.
The Facility operates 24 hours per day, 365 days per year. CNBE has contracted with one of the most experienced contract operators in the landfill gas industry, New England Energy Services Corp. (NEESCO). NEESCO operates or has operated more than 30 other landfill gas-to-electricity facilities in addition to the Facility and has a strong track record with safe and successful facility operations and maintenance. NEESCO staffs the Facility with one full time operator and supports the operator as needed with additional personnel and service providers.

Financial management includes CNBE preparing an operating plan and budget for subsequent three-year periods. The operating plan provides the following information with respect to the Project on a monthly basis for the three-year periods.

(i) Projected levels of operation on a monthly basis;
(ii) Projected revenues and expenses on a monthly basis;
(iii) An overhaul, maintenance and repair schedule;
(iv) The amount and timing of expected capital expenditures;
(v) Cash flow projections and working capital needs; and
(vi) Reconciliation of actual expenses versus those projected in the prior Operating Plan and Budget.

As part of the financial management, CNBE sets aside a capital reserve each month to fund the scheduled overhauls. The reserve is based on projected costs and frequency of performance of top-end overhauls, in-frame overhauls and major out-of-frame overhauls over the projected life of the Facility.

The Facility has the capability to expand by adding a fifth engine-generator set. The Facility is already permitted for the expansion. Furthermore, CNBE made provisions for the installation of the fifth engine-generator in the design of the Facility.

For CNBE, the safety of operations and maintenance of staff and the Facility is of primary importance. CNBE has taken great care to ensure that the Facility has been designed and is being operated and maintained in accordance with safety standards and procedures that go beyond the requirements of the industry.

CNBE has implemented a safety plan that consists of a set of safety plans, programs and procedures, maintenance safety plans and emergency plans. Safety features incorporated into the Facility’s design include the following:

- Gas lines leading to the Facility are buried underground for protection.
- The main gas shut-off valve is located approximately 50 feet away from the building outside wall in order to allow the gas supply to be shut off without entering or approaching the building.
• All gas processing equipment is located outside of the building. In the unlikely event of a leak, the gas would disperse and dissipate without being concentrated in an enclosed or confined space.

• An emergency “E-Stop” button is located on the outside south wall of the building to allow the engines to be shut down without entering the building.

• The building incorporates four horizontal vents underneath the foundation to provide a path to vent to the atmosphere any gas that might migrate on to the Facility site.

• The engines are placed in a separate room to limit access to authorized personnel.

• The door and wall between the engine room and the control room are acoustically insulated to keep the noise level in the control room below 65 dBA. This allows staff to operate the Facility from the control room without the need for hearing protection.

• All high-voltage (13,200 volts) and medium-voltage (4160 volts) electrical cables are run through underground conduits and terminated in appropriate enclosed cabinets in order to avoid incidental contact. Cabinets containing electrical equipment are secured and are labeled with appropriate signage to warn of potential hazards.

• The Facility incorporates neutral ground resistors and an extensive ground grid for grounding and protection of all major electrical equipment.

• The Facility SCADA system is programmed to shut down the engines in the event of imminent hazard to personnel, to the Facility, or to equipment operation, and to provide alarms in the event of conditions requiring operator attention. The SCADA system can be accessed by the operator remotely via an Internet connection in order to diagnose the alarm condition and to respond appropriately.

• The Facility’s electrical interconnection can be shut down remotely by NStar through a recloser and a 900 MHz wireless communication system in the event of unacceptable conditions on the electricity distribution grid.

• The Facility is equipped with a hoist and a hydraulic man lift to facilitate lifting of heavy engine components and other equipment during maintenance activities.

• The Facility is equipped with smoke detectors to warn of fire, methane detectors to warn of the presence of methane in the building and CO detection and temperature measurement devices to monitor operating conditions.
• The Facility is equipped with handheld fire extinguishers in the engine room and the control room. In addition, a fire panel has been installed with capability to provide direct communication of alarm conditions to the Dartmouth Fire Department.

• The Facility is equipped with a First Aid kit to respond to medical requirements.

• No smoking is allowed in or around the Facility.

All operators complete 10-hour OSHA training sessions for general industry safety and health practices.
5.0 UTILIZATION OF EQUIPMENT/SYSTEMS AND TECHNOLOGIES

Description of Equipment, Systems and Technologies

The Facility, as shown below, consists of a pre-fabricated metal building and ancillary pad-mounted equipment. The building has an enclosed area of 4,560 square feet (sf) divided into two rooms: a 3,120-sf engine room (65 feet by 48 feet), and a 1,430-sf control room (30 feet by 48 feet).

The Facility

The engine room, as shown below, holds four 3516 engine-generator sets mounted on special foundations. The engine room also holds two 2000-gallon tanks: one for clean lubricating oil, and one for waste oil.

Engine Room
The control room holds the electrical switchgear cabinets, the motor control center (MCC), and a desk for operating staff. The electrical switchgear incorporates a programmatic logic controller (PLC) to control engine and electrical system operations. The MCC incorporates variable frequency drives (VFDs) to control start-up and operation of large drive motors for the Facility’s large fans. The operation of the PLC and the VFD controls are integrated into the Facility’s Supervisory Control and Data Acquisition (SCADA) system that resides in the personal computer located on a desk in the control room. The control room also includes additional furnishings, storage shelves, a storage room, and a bathroom equipped with a sink and shower.

Both rooms are actively ventilated. The engine room is ventilated by four roof-top ventilation fans that draw air into the building through full-wall louvers on the south wall. The control room has its own air conditioning system mounted on a pad outside the north wall.

Ancillary pad-mounted equipment includes the landfill gas management equipment (vacuum blowers, gas cooler and coalescing filter) installed on a pad outside the south wall of the control room, and various electrical equipment (transformers, metering equipment, etc.), installed in individual protective enclosures and mounted on individual concrete pads on the north side of the control room. Radiators that cool the engines via two cooling water loops are located outside the north wall of the engine room. Space was left around the radiators to facilitate the installation of heat exchangers for beneficial use of waste heat from the engines in the future in the event a feasible opportunity to do so can be developed.

The Facility is surrounded by its own steel perimeter fence with a lockable gate to prevent unauthorized entry. The Facility is located along the Landfill perimeter road on the northwest side of the Landfill mound. The Landfill perimeter road is accessible via the main access road to the Landfill off Samuel Barnet Boulevard in New Bedford, which leads to a scale house that is staffed during operating hours. The main access road is secured by a gate at the front entrance, which is locked during off-hours. The District also has a security guard on the Landfill premises 24 hours per day, 7 days per week, to respond to unauthorized entry and to circumstances or events requiring prompt response.

**Facility Performance**

Key measures of performance include availability of Facility operation, capacity factor, efficiency of engine-generator sets, and air emissions. Since October 2005, the Facility’s annual availability has ranged from 95 percent to 97 percent; annual capacity factor has ranged from 86 percent to 91 percent; gross annual output from 24,810 MWhr to 26,438 MWhr per year; and annual efficiency of the engines to convert energy contained in landfill gas to electric power has ranged from 30 percent to 32 percent. The Facility operates in a lean-burn mode (e.g., high excess oxygen in the range of 7- to 9-percent oxygen content in the exhaust gas) to maintain nitrogen oxide emissions below the stringent permit limit of 0.6 grams of nitrogen oxides per brake-horse power hour. The high annual availability of the engine-generator sets is attributed to a thorough scheduled
and preventative maintenance program, well stocked inventory of key spare parts, and monitoring of metrics that are used to predict major maintenance items.

Maintenance

CNBE has contracted with New England Energy Services Corp. (NEESCO) to operate and maintain the Facility. NEESCO’s responsibilities include performance of routine maintenance and repairs, as well as performance of top-end and bottom-end major overhauls. The plan for performing routine maintenance and repairs provided herein is based on information provided by NEESCO and on actual experience with Facility operations to date.

NEESCO performs the routine maintenance tasks including oil and filter changes, replacement and maintenance of engine parts, landfill gas processing equipment and balance of plant equipment and systems. NEESCO also performs overhauls of the major equipment including engine, generators, blowers and motors. The minor overhauls on each engine are performed approximately once per year, which involve servicing the engine cylinder head assemblies, along with inspection, servicing, rebuilding and/or replacement of transformers, turbochargers, pre-lube and water pumps, aftercooler cores, waste gates, starter motors, and related parts and components. The major overhauls of each engine are performed approximately once every four years of operation and include the scope of a minor overhaul plus replacement of camshaft and connecting rod bearings, cylinder liners, gaskets and seal, piston rings, main and gear train bushings, and wiring harnesses; rebuilding of vibration dampers; and servicing or rebuilding of camshafts, connecting rods, crank shafts, fuel metering valves, oil coolers, pistons and throttle valves. Inspections and overhauls on generators, motors and blowers are also performed on an as needed basis.

The operator of the Facility, NEESCO, is responsible for ensuring that the on-site operator is properly trained and supervised. All operators complete 10-hour OSHA training sessions for general industry safety and health practices. Further training and supervision is provided by NEESCO’s corporate safety officer and other NEESCO senior staff.
6.0 PUBLIC ACCEPTANCE, APPEARANCE AND AESTHETICS

CNBE maintains an aesthetically clean and functional site and Facility. During construction of the Facility, CNBE installed a filter fabric overlain with crushed stone over much of the site to minimize vegetative growth on the site. CNBE has recently installed a green fabric netting along its fence line to minimize windblown dust and debris to the site. CNBE worked with the District to select the dark green color scheme for the Facility to blend into the evergreen forested surrounding as well as the green vegetative covered areas of the Landfill. Within the Facility, CNBE keeps the equipment and all work areas clean and in order.

CNBE supports the District public outreach program by providing tours of the Facility as part of larger tours of the Landfill. CNBE provides approximately 20 Facility tours each year to groups of students in secondary school, high school and colleges in the area.
7.0 INNOVATION AND CREATIVITY

The innovations and creativity of the Project include the environmental controls, and delineation of roles and responsibilities, and the involvement of the Massachusetts Technology Collaborative.

As previously described, CNBE sized the Facility to control and utilize all the landfill gas collected from the Landfill, and hence, since the commencement of operation of the Facility, all the landfill gas collected from the Landfill has been used at the Facility with the exception of small quantities that are diverted to the flare when an engine is not operating due to maintenance or unscheduled outage. The environmental benefits of the sizing of the Facility by CNBE and the aggressive expansion of the landfill gas collection system and the implementation of innovative designs by the District include maximizing the beneficial use of the landfill gas resource and minimizing uncontrolled emissions of landfill gas to the atmosphere.

A unique aspect of the Project is that CNBE utilizes the landfill gas but relies on the District to manage the physical expansion and operation of the landfill gas collection system. Therefore, CNBE does not have direct control over the fuel supply to its Facility. Owners of landfill gas utilization projects, which are independent of the landfill owner, typically insist on control over the landfill gas collection system as a threshold issue for financing the project. The District’s track record of aggressive expansion of the landfill gas collection system, the implementation in innovations, and good operating and maintenance practices enabled CNBE to accept the District in its role to control the landfill gas collection system expansion and operation. CNBE and the District work cooperatively in this relationship to maximize and use the landfill gas resource beneficially because the objectives and incentives are aligned.

Another unique aspect of the Project includes the participation of the Massachusetts Technology Collaborative as follows:

- A portion of the pre-construction project development activities were funded in part by a loan to the CNBE from the Massachusetts Technology Collaborative through the Predevelopment Financing Initiative of the Renewable Energy Trust Clean Energy Program. The activities include preliminary design and engineering, acquisition of environmental permits, completion of interconnection studies, acquisition of key project contracts and acquisition of financing. All activities were concluded successfully. The loan was repaid when the project achieved construction financing in March 2005.

- To support financing of the project, CNBE entered into a unique put-back option agreement with the MTC to sell the renewable energy certificate (RECs) that the Facility is eligible to generate under the Massachusetts system for implementing a renewable portfolio standard. First, CNBE entered into a long-term agreement to sell the energy output and a portion of the RECs to a competitive supplier that is active in the Massachusetts retail electricity markets. Then, CNBE entered into
an agreement with the MTC such that if CNBE is unable to find a buyer for the portion of the RECs not under long-term agreement, then CNBE has the option each year to sell such RECs for a specified price to the MTC. The MTC’s purchase obligations under the option agreement are secured by cash-equivalent investments held in escrow. This agreement with the MTC allowed CNBE to obtain credit for the value of RECs under this agreement in its financing of the project.