16 September 2004

Mr. Claude Cote
Director, Regulatory Compliance
Rhode Island Resource Recovery Corporation
65 Shun Pike
Johnston, RI 02919

Dear Mr. Cote:

The Department of Environmental Management, Office of Air Resources has reviewed and approved your application for a minor source permit for the Phase V Landfill at your 65 Shun Pike, Johnston, RI location.

Enclosed is a minor source permit issued pursuant to our review of your application (Approval No. 1810).

If there are any questions concerning this permit, please contact me at 222-2808, extension 7011.

Sincerely,

Douglas L. McVay
Associate Supervising Engineer
Office of Air Resources

cc: Johnston Building Official
Michael North – GZA GeoEnvironmental, Inc.

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR RESOURCES

MINOR SOURCE PERMIT

Rhode Island Resource Recovery Corporation

APPROVAL No. 1810

Pursuant to the provisions of Air Pollution Control Regulation No. 9, this minor source permit is issued to:

Rhode Island Resource Recovery Corporation

For the following:

Construction of the Phase V landfill

Located at: *65 Shun Pike, Johnston*

This permit shall be effective from the date of its issuance and shall remain in effect until revoked by or surrendered to the Department. This permit does not relieve *Rhode Island Resource Recovery Corporation* **from compliance with applicable state and federal air pollution control rules and regulations. The design, construction and operation of the landfill shall be subject to the attached permit conditions and emission limitations.**

Stephen Majkut, Chief
Office of Air Resources

Date of issuance

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR RESOURCES

Permit Conditions and Emissions Limitations

Rhode Island Resource Recovery Corporation

Approval No. 1810

A. Emission Limitations

1. The owner/operator shall install and operate a landfill gas collection and control system that captures the gas generated within the Phase V landfill at a sufficient extraction rate to prevent methane concentration levels at the landfill surface, as measured in accordance with the Surface Emission Monitoring (SEM) Plan, from exceeding 500 ppm above background. Amendments to the SEM plan must be approved by the Office of Air Resources.

2. All the collected landfill gas shall be routed to:

   a. An open flare designed and operated in accordance with 40 CFR 60.18; or,

   b. A control system designed and operated to either reduce NMOC by at least 98% by weight or reduce the outlet NMOC concentration to less than 20 ppm by volume, dry basis as hexane at 3% oxygen; or,

   c. A treatment system that filters, de-waters and compresses the landfill gas for subsequent sale or use. The treatment system shall meet the requirements of 40 CFR 60.752(b)(2)(iii)(C).

B. Landfill Gas Collection Systems Design/Construction Requirements

1. The owner/operator shall install landfill gas collection systems in accordance with the Phase V Landfill Operational and Closure/Post Closure Landfill Gas Management Plan submitted to the RIDEM's Office of Waste Management in October 2003, found in Appendix N of the Phase V Permit Application, as may be amended by RIRRC and approved by the Office Of Air Resources. Routine, minor system improvements will not require prior approval, but shall be reported quarterly in the surface monitoring quarterly reports required by Condition E.4.

2. The landfill gas collection systems for the Phase V landfill shall consist of the following:

   a. A network of horizontal gas collection trenches prior to closure; and,

b. A network of vertical extraction wells that will be installed over the landfill surface as each area reaches its precapping final grade.

3. The landfill gas collection systems shall be designed to meet the following requirements:

   a. Handle the maximum expected gas flow rate from the entire Phase V landfill area that warrants control over the intended use period of the gas control or treatment system equipment;

   b. Minimize off-site migration of subsurface gas.

4. The owner/operator shall construct the landfill gas collection systems to meet the following requirements:

   a. The landfill gas extraction components shall be constructed of polyvinyl chloride (PVC), high density polyethylene (HDPE) pipe, fiberglass, stainless steel, or other nonporous corrosion resistant material.

   b. The landfill gas extraction components shall be of suitable dimensions to: convey projected amounts of gases; withstand installation, static, and settlement forces; and withstand planned overburden or traffic loads.

   c. The collection system must be capable of being extended as necessary to comply with emission and migration standards.

   d. All vertical wells and horizontal collectors shall be perforated to allow gas entry without head loss sufficient to impair performance across the intended extent of control. Perforations shall be situated to prevent excessive air infiltration.

   e. The landfill gas shall be conveyed to a control system through a collection system header pipe(s).

   f. The gas extraction blowers shall be sized to handle the maximum gas generation flow rate expected over the intended use period of the blowers.

   g. Vertical wells and horizontal collectors may be connected to the collection system header pipes below or above the landfill surface. The connector assembly shall include a positive closing throttle valve, any necessary seals and couplings, access couplings and at least one sampling port.

   h. The depth of any vertical collection well shall not result in or give cause to failure of the liner or leachate collection systems.

i. Holes and trenches constructed for piped wells and horizontal collectors shall be of sufficient cross-section so as to allow for their proper construction and completion including, for example, centering of pipes and placement of gravel, stone or other similar backfill materials that have the prior approval of the Office of Air Resources.

j. Vertical wells and horizontal collectors shall be designed so as not to allow intrusion of air into the cover, refuse into the collection system or landfill gas into the atmosphere.

k. A four foot thick bentonite, clay or other impervious seal shall be installed at the outer end of the perforated portion of the collection pipe in each collection trench to prevent gas leakage. Surface emission monitoring shall be conducted quarterly at the pipe/landfill surface boundary where the collection pipe exits the landfill. If a leak is detected in two consecutive quarters, a bentonite, clay or other impervious seal shall be installed at the outer end of where the solid trench connectors meets the side slope of Phase V.

l. Any gravel, stone or other similar backfill materials that have the prior approval of the Office of Air Resources used around pipe perforations should be of a dimension so as not to penetrate or block perforations.

m. A sampling port and a thermometer or other temperature measuring device, or an access port for temperature measurements shall be installed at each trench header and each vertical wellhead.

n. Beginning with the second lift of solid waste, horizontal gas collection trenches shall be constructed with the maximum horizontal distance between any two horizontal gas collection trenches no more than 120 feet apart on center or some alternative distance approved by the Office of Air Resources based on the results of radius of influence tests.

o. Horizontal gas collection trenches shall be placed in alternating lifts of solid waste with the maximum vertical distance between any two horizontal gas collection trenches no more than 35 feet apart on center or some alternative distance approved by the Office of Air Resources based on the results of radius of influence tests.

p. All gas collection pipes are to be fitted with end caps or blind flanges at the upslope (upgradient) end of each horizontal gas collection trench to prevent gas leakage.

q. The siting of vertical wells and horizontal collectors shall be of sufficient density throughout all gas producing areas.

r. The vertical wells and horizontal collectors within the interior and along the perimeter areas shall be certified, by a professional engineer, to achieve uniform control of surface gas emissions. The following issues shall be addressed in the design: depths of refuse, refuse gas generation rates and flow characteristics, cover properties, gas system expandability, leachate and condensate management, accessibility, compatibility with filling operations, integration with closure end use, air intrusion control, corrosion resistance, fill settlement, and resistance to the refuse decomposition heat.

s. The siting of vertical wells and horizontal collectors shall be of sufficient density to address landfill gas migration issues and augmentation of the collection system through the use of active or passive systems at the landfill perimeter or exterior.

t. The placement of vertical wells and horizontal collectors shall control all gas producing areas, except as provided below:

(1) Any segregated area of nondegradable material may be excluded from collection if documented as provided in Condition E.3.e. The documentation shall provide the nature, date of deposition, location and amount of nondegradable material deposited in the area and shall be provided to the Office of Air Resources and/or EPA upon request.

(2) Any nonproductive area of the landfill may be excluded from control, provided that the total of all excluded areas can be shown to contribute less than 1 percent of the total amount of NMOC emissions from the landfill. The amount, location, and age of the material shall be documented and provided to the Office of Air Resources upon request. A separate NMOC emissions estimate shall be made for each section proposed for exclusion, and the sum of all such sections shall be compared to the NMOC emissions estimate for the entire landfill. Emissions from each section shall be computed using the following equation:

$$Q_i = 2\ k\ L_o\ M_i\ (e^{-kt})\ (C_{NMOC})\ (3.6 \times 10^{-9})$$

Where,

Q_i	=	*NMOC emission rate from the ith section, megagrams per year*
k	=	*methane generation rate constant, year^{-1}*
L_o	=	*methane generation potential, cubic meters per megagram solid waste*
M_i	=	*mass of the degradable solid waste in the ith section, megagram*

t	=	*age of the solid waste in the ith section, years*
C_{NMOC}	=	*concentration of nonmethane organic compounds, parts per million by volume*
3.6×10^{-9}	=	*conversion factor*

The values for k, and C_{NMOC} determined in field testing shall be used, if field testing has been performed in determining the NMOC emission rate or the radii of influence (the distance from the well center to a point in the landfill where the pressure gradient applied by the blower or compressor approaches zero). If field testing has not been performed, the default values for k, L_o and C_{NMOC} provided in 40 CFR 60.754(a)(1) or the alternative values from 40 CFR 60.754(a)(5) shall be used.

5. The owner/operator shall begin installing a horizontal gas collection trench within 30 calendar days of reaching a height of 30 feet of waste above the trench one vertical layer below where the new trench (to be installed) would be placed. Each new horizontal gas collection trench installation shall be completed as soon as possible, but no longer than 45 calendar days from when construction/installation started for that trench.

6. Within 140 calendar days of completed horizontal gas collection trench installation, the owner/operator shall ensure that the trench is covered with at least 15 feet of waste and that the trench is made operational, except for the trench in the topmost layer of waste after the landfill reaches design elevation.

C. Landfill Gas Collection System Operating Requirements

1. Each vertical wellhead and trench header shall be operated with a landfill gas temperature less than 55°C (131°F).

2. The nitrogen level in each vertical wellhead and trench header shall be less than 20 percent or the oxygen level in each vertical wellhead and trench header shall be less than 5 percent.

3. The owner/operator may establish a higher operating temperature, nitrogen, or oxygen value at a particular well or trench. A higher operating value demonstration shall show supporting data that the elevated parameter does not cause fires or significantly inhibit anaerobic decomposition by killing methanogens.

4. The owner/operator shall, at all times, make every effort to prevent excess moisture from entering the waste and trenches/wells.

5. Each vertical wellhead and trench header in the gas collection system shall be operated with negative pressure except in the following conditions:

a. A fire or increased well/trench temperature. The owner/operator shall record instances when positive pressure occurs in efforts to avoid a fire. These records shall be submitted with the annual reports as provided in Condition E.5.

b. A decommissioned well or trench. A well or trench may experience a static pressure after shut down to accommodate for declining flows.

c. Use of a geomembrane or synthetic cover. The owner/operator shall develop acceptable pressure limits in the design plan.

d. Doing so would cause dangerous oxygen infiltration conditions.

e. Other conditions that would make it imprudent or dangerous to operate under negative pressure. The owner/operator shall keep a record of the occurrence of these conditions and submit these records with the annual reports as provided in Condition E.5.

6. The owner/operator shall maintain all of the landfill gas collection equipment in accordance with good air pollution control and engineering practices.

7. In the event the collection or control system is inoperable, the gas extraction blowers shall be shut down and all valves in the collection system contributing to the venting of the gas to the atmosphere shall be closed within one hour.

8. The Phase V landfill gas collection system may be capped or removed provided that all the following conditions are met:

a. The Phase V landfill shall be a closed landfill. Closed landfill means a landfill in which solid waste is no longer being placed, and in which no additional solid wastes will be placed without first filing a notification of modification as prescribed under 40 CFR 60.7(a)(4). Once a notification of modification has been filed, and additional solid waste is placed in the landfill, the landfill is no longer closed. A closure report shall be submitted to the Office of Air Resources as provided in Condition E.6;

b. The Phase V landfill gas collection system shall have been in operation a minimum of 15 years; and

c. Following the procedures specified in Condition F.6, the calculated NMOC emission rate from Phases I-V combined shall be less than 50 megagrams per year on three successive test dates. The test dates shall be no less than 90 days apart, and no more than 180 days apart.

D. Monitoring Requirements

1. Wellhead/Trench Header Monitoring

a. The owner/operator shall measure gauge pressure in the gas collection header at each individual well and trench monthly to demonstrate whether the gas collection system flow rate is sufficient. If a positive pressure exists, action shall be initiated to correct the exceedance within 5 calendar days, except for the five conditions allowed under Condition C.5. If negative pressure cannot be achieved without excess air infiltration within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial measurement of positive pressure. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance may be submitted to the Office of Air Resources for approval.

b. The owner/operator is not required to expand the system as required in Condition D.1.a during the first 180 days after gas collection system startup.

c. Landfill gas temperature, and nitrogen or oxygen concentration in each vertical wellhead and trench header shall be monitored monthly to determine whether excess air infiltration into the landfill is occurring.

d. The nitrogen level in each vertical wellhead and trench header shall be determined using Method 3C.

e. The oxygen level in each vertical wellhead and trench header shall be determined by an oxygen meter using Method 3A or 3C except that:

(1) The span shall be set so that the regulatory limit is between 20 and 50 percent of the span;

(2) A data recorder is not required;

(3) Only two calibration gases are required, a zero and span, and ambient air may be used as the span;

(4) A calibration error check is not required;

(5) The allowable sample bias, zero drift, and calibration drift are ± 10 percent.

f. If an exceedance of the landfill gas temperature, the nitrogen level or the oxygen level is found in one of the vertical wellheads and/or trench headers,

action shall be initiated to correct the exceedance within 5 calendar days. If correction of the exceedance cannot be achieved within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial exceedance. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance may be submitted to the Office of Air Resources for approval.

g. The owner/operator shall conduct a visual inspection (through the sample port) of each Phase V horizontal gas collection trench every nine months. Each visual inspection shall include trench-by-trench flow monitoring with a heated wire anemometer. If the anemometer shows a significant reduction in flow from what would be expected, then a full inspection of the trench shall be performed within 20 days of discovering the lower-than-expected landfill gas flow and corrective action shall be commenced. If the problem cannot be corrected within 45 days, the owner/operator shall notify the Office of Air Resources of the problem and propose a schedule for correcting the problem, unless the owner/operator can demonstrate that the Phase V landfill can comply with emission limitation in Condition A.1 without corrective action. The owner/operator shall maintain records of visual inspections and heated wire anemometer flow readings, including any follow-up full trench inspections and corrective actions taken.

2. Surface Emission Monitoring

a. To determine if the methane concentration is less than 500 parts per million above background as required under Condition A.1, the owner/operator shall conduct quarterly surface emissions monitoring in accordance with the Phase V Landfill Surface Emission Monitoring Plan, found in Appendix Q of the Phase V Permit Application submitted to RIDEM's Office of Waste Management in October 2003, as may be amended by RIRRC and approved by the Office of Air Resources.

b. The owner/operator shall monitor surface concentration of methane along the entire perimeter of the collection area and along a pattern that traverses the landfill at 30 meter intervals of each collection area and where visual observations indicate elevated concentrations of landfill gas such as distressed vegetation and cracks or seeps in the cover. The methane surface monitoring is not required until after the installation of the collection system. The owner/operator may establish an alternative traversing pattern that ensures equivalent coverage. Areas with steep slopes or other dangerous areas may be excluded from the surface monitoring requirement in accordance with the approved SEM Plan.

c. The background concentration shall be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least 30 meters from the perimeter wells.

d. Surface emission monitoring shall be performed in accordance with section 4.3.1 of 40 CFR 60 Appendix A, Method 21, except that the probe inlet shall be placed within 5 to 10 centimeters of the ground. Monitoring shall be performed during typical meteorological conditions.

e. Any reading of 500 parts per million or more above background at any location shall be recorded as a monitored exceedance and the actions specified below shall be taken. As long as the specified actions are taken, the exceedance is not a violation of Condition A.1.

(1) The location of each monitored exceedance shall be marked and the location recorded.

(2) Cover maintenance or adjustments to the vacuum of the adjacent wells or trenches to increase the gas collection in the vicinity of each exceedance shall be made and the location shall be re-monitored within 10 calendar days of detecting the exceedance.

(3) If the re-monitoring of the location shows a second exceedance, additional corrective action shall be taken and the location shall be monitored again within 10 days of the second exceedance. If the re-monitoring shows a third exceedance for the same location, the action specified in paragraph (5) shall be taken, and no further monitoring of that location is required until the action specified in paragraph (5) has been taken.

(4) Any location that initially showed an exceedance but has a methane concentration less than 500 ppm methane above background at the 10-day re-monitoring specified in paragraph (2) or (3) shall be re-monitored 1 month from the initial exceedance. If the 1-month remonitoring shows a concentration less than 500 parts per million above background, no further monitoring of that location is required until the next quarterly monitoring period. If the 1-month remonitoring shows an exceedance, the actions specified in paragraph (3) or (5) shall be taken.

(5) For any location where monitored methane concentration equals or exceeds 500 parts per million above background three times within a quarterly period, a new well, trench or other collection device shall be installed within 120 calendar days of the initial exceedance. An alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a

corresponding timeline for installation may be submitted to the Office of Air Resources for approval.

f. If corrective actions are taken as specified in Conditions D.1.a, D.1.f, and D.2.e, the monitored exceedance is not a violation of the operational requirements of this permit.

g. Surface methane concentration shall be monitored using an organic vapor analyzer, flame ionization detector, or other portable monitor. The owner/operator shall comply with the following instrumentation specifications and procedures for surface emissions monitoring devices provided in 40 CFR 60, Appendix A, Method 21:

(1) The portable analyzer shall meet the instrument specifications provided in section 3, except that ``methane'' shall replace all references to VOC.

(2) The calibration gas shall be methane, diluted to a nominal concentration of 500 parts per million in air.

(3) To meet the performance evaluation requirements in section 3.1.3, the instrument evaluation procedures of section 4.4 of Method 21 shall be used.

(4) The calibration procedures provided in section 4.2 of Method 21 shall be followed immediately before commencing a surface monitoring survey.

h. Any closed landfill that has no monitored exceedances of the 500 ppm limitation in three consecutive quarterly monitoring periods may skip to annual monitoring. Any methane reading of 500 ppm or more above background detected during the annual monitoring returns the frequency for that landfill to quarterly monitoring.

3. VOC Content of the Landfill Gas

a. The owner/operator shall conduct an annual test to determine the VOC content of the Phase V landfill gas. The first test shall be conducted within 12 to 18 months from the initial placement of waste in the Phase V landfill. Subsequent testing shall be conducted annually thereafter.

b. The owner/operator shall submit to EPA, for approval, a test protocol (including sampling, analysis and QA/QC procedures) at least 40 days in advance of the test.

c. The test date shall be scheduled such that EPA and/or Office of Air Resources personnel can observe the test.

d. The results of the test shall be submitted (in ppm VOC as hexane) to EPA and the Office of Air Resources for approval, no later than 45 days after the test is completed.

e. After the test results have been approved by EPA and the Office of Air Resources, the results shall be effective until the next set of test results have been approved by EPA and the Office of Air Resources.

4. Landfill Gas Flow

a. The owner/operator shall monitor and record, at least once every hour using a data logging device (such as a strip chart recorder), the landfill gas flow from each landfill gas collection system to the conduit leading to each individual control device controlling landfill gas. The landfill gas flow from Phase I, Phase II/III, Phase IV and Phase V shall be monitored and recorded separately.

b. If the data logging device malfunctions or is inoperable, the owner/operator shall manually record the landfill gas flow from the each landfill gas collection system to the conduit leading to each individual control device controlling landfill gas twice per day Monday through Friday with no two readings within 6 hours of each other, and once per day on Saturdays. The landfill gas flow from Phase I, Phase II/III, Phase IV and Phase V shall be manually recorded separately.

c. If landfill gas flow is being recorded manually and any adjustments are made to any of the landfill gas collection systems on a Sunday or a holiday, the owner/operator shall monitor and record the landfill gas flow from the landfill gas collection system to the conduit leading to each individual control device controlling landfill gas, directly before and after the change is made.

d. The flow meter used for manual readings shall be calibrated at least once every thirteen months in accordance with the manufacturer's specifications.

e. The flow meter used for manual readings shall be checked for accuracy every month by comparing its readings with that of an annubar. Within 45 days of finding that the flow meter is inaccurate by 10% or more, the flow meter shall be completely recalibrated.

5. The owner/operator shall monitor and record the methane content and oxygen content of the landfill gas twice per week at every conduit leading to each individual control device controlling landfill gas from Phase V.

6. The owner/operator shall monitor the total quantity of waste (in tons) that is deposited into Phase V, using a scale calibrated in accordance with the standards traceable to National Institute of Standards and Technology (NIST) and Handbook 44.

7. The owner/operator shall implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis.

8. Vertical Well Soundings

   a. The owner/operator shall sound each vertical gas collection well in Phase V, once per year or more frequently if flooding or pinching is discovered during the sounding, consistent with the Well Sounding, Inspection and Response Plan, as approved by the Office of Air Resources.

   b. If any well is found to contain water occupying more than 20% of the length of slotted pipe of the well or if any well is found to be pinched or broken, the owner/operator shall commence corrective action within 5 calendar days of discovering the problem.

   c. The owner/operator shall devise a schedule for implementing all required corrective action, which shall include completion of the corrective action as soon as possible.

   d. Within 10 days of discovering a failure as defined in the Well Sounding, Inspection and Response Plan, the owner/operator shall notify the Office of Air Resources of the corrective action plan and schedule for its implementation.

   e. After discovery of flooded or pinched wells, the owner/operator shall sound on a semi-annual basis, until three consecutive soundings reveal that the problem has been corrected. At such time, the owner/operator shall resume sounding the relevant well(s) on an annual basis.

E. Recordkeeping and Reporting

1. The owner/operator shall keep for at least 5 years, up-to-date, readily accessible, on-site records of:

   a. The current amount of solid waste in-place in Phase V;

b. The year-by-year waste acceptance rate for Phase V.

c. All collection system exceedances of the operational standards in Condition C.1, C.2 and C.5 and the emission limitation in Condition A.1, the reading in the subsequent month, whether or not the second reading is an exceedance, and the location of each exceedance.

2. The owner/operator shall maintain the following monthly records:

a. waste acceptance (in tons) into Phase V;

b. average monthly volume of landfill gas collected and controlled in standard cubic feet per minute (scfm) from Phases I, II and III, IV and V individually, for each control device individually and for the total from all control devices, in accordance with Condition D.4;

c. average monthly scfm of landfill gas generated from Phases I, II and III, IV and V individually in accordance with Condition G.5;

d. average monthly methane and oxygen content of the landfill gas from Phase V, in accordance with Condition D.5;

e. total VOC emissions (in pounds) from Phases I, II and III, IV and V individually, including all VOCs in any and all uncollected landfill gas and the portion of any and all VOCs not destroyed in the collected landfill gas, using the equations contained in Condition G.4;

f. for each and every consecutive twelve month period, totals of VOC emissions (in tons) from Phases I, II and III, IV and V combined;

3. The owner/operator shall keep up to-date, readily accessible records, for the life of the landfill gas collection system for Phase V, of the following:

a. A plot map showing each planned trench and well in the system and providing a unique identification location label for each collector.

b. The installation date and location of all trenches and wells.

c. The maximum expected gas generation flow rate from the landfill as calculated in 40 CFR 60.755(a)(1). The owner/operator may use another method to determine the maximum gas generation flow rate, if the method has been approved by the Office of Air Resources**.**

d. The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in 40 CFR 60.759(a)(1).

e. Documentation of the nature, date of deposition, amount, and location of nondegradable waste excluded from collection as provided in Condition B.4.t.(1).

4. The owner/operator shall submit to the Office of Air Resources, within 45 days of the end of each calendar quarter, a surface monitoring quarterly report for Phase V that includes the following information:

   a. A map of the Phase V landfill showing where excess methane emissions were detected;

   b. The methane quality at each gas collection system blower for each day surface monitoring was conducted.

   c. A list of all excess methane emissions detected, including the magnitude, location, date first detected and date and magnitude of any subsequent re-monitoring conducted;

   d. An explanation of any and all corrective actions taken to address excess methane emissions;

   e. A description of any and all corrective action planned, including a schedule for completion; and

   f. A certification, from a responsible corporate official, to the best of that official's knowledge and belief, after exercising due diligence, that the approved surface monitoring plan for Phase V was followed, with exceptions noted and the reasons therefore.

   g. A description of any routine, minor system improvements that were made to the landfill gas collection systems.

5. The owner/operator shall submit to the Office of Air Resources annual reports of the following recorded information for the landfill gas collection system. The initial annual report shall be submitted within 180 days of installation and start-up of the collection and control system, and shall include the initial performance test report required under 40 CFR 60.8.

   a. Value and length of time for exceedance of applicable parameters monitored under Condition D.1.

   b. Description and duration of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow.

c. Description and duration of all periods when the control device was not operating for a period exceeding 1 hour and length of time the control device was not operating.

d. All periods when the collection system was not operating in excess of 5 days.

e. The location of each exceedance of the 500 parts per million methane concentration as provided in Condition D.2 and the concentration recorded at each location for which an exceedance was recorded in the previous month.

f. The date of installation and the location of each well or collection system expansion added pursuant to Condition D.1.a, D.1.f or D.2.e (5).

6. The owner/operator shall submit a closure report to the Office of Air Resources within 30 days of waste acceptance cessation. The Office of Air Resources may request additional information as may be necessary to verify that permanent closure has taken place in accordance with the requirements of 40 CFR 258.60. If a closure report has been submitted to the Office of Air Resources, no additional wastes may be placed into the landfill without filing a notification of modification as described under 40 CFR 60.7(a)(4).

7. The owner/operator shall submit an equipment removal report to the Office of Air Resources 30 days prior to removal or cessation of operation of any control device.

   a. The equipment removal report shall contain all of the following items:

      (1) A copy of the closure report submitted in accordance with Condition E.6;

      (2) A copy of the initial performance test report demonstrating that the 15 year minimum control period has expired; and

      (3) Dated copies of three successive NMOC emission rate reports demonstrating that the landfill is no longer producing 50 megagrams or greater of NMOC per year.

   b. The Office of Air Resources may request such additional information as may be necessary to verify that all of the conditions for removal in Condition C.8 have been met.

8. The owner/operator shall, upon determining that significant additions to the landfill gas collection system are necessary, beyond the specific wells and trenches described in the Phase V Landfill Operational and Closure/Post Closure Landfill Gas

Management Plan, such as new collection wells or collection trenches, notify the Office of Air Resources of such intended additions prior to beginning construction.

9. The owner/operator shall, on a monthly basis, no later than 10 days after the first of each month, determine the total VOC emissions from Phases I-V for the previous 12 months.

10. The owner/operator shall notify the Office of Air Resources in writing within 15 days, whenever total VOC emissions from Phases I-V exceed 99.45 tons in any 12-month period.

11. The owner/operator shall notify the Office of Air Resources in writing of the date of initial placement of waste in the Phase V landfill no later than fifteen days after such date.

12. The owner/operator shall notify the Office of Air Resources in writing of the date that landfill gas is first collected from Phase V no later than fifteen days after such date.

13. The owner/operator shall notify the Office of Air Resources of any anticipated noncompliance with the terms of this permit or any other applicable air pollution control rules and regulations.

14. The owner/operator shall notify the Office of Air Resources, in writing, of any noncompliance with the terms of this permit within 30 calendar days of becoming aware of such occurrence and supply the Office of Air Resources with the following information:

    a. The name and location of the facility;

    b. The subject source(s) that caused the noncompliance with the permit term;

    c. The time and date of first observation of the incident of noncompliance;

    b. The cause and expected duration of the incident of noncompliance;

    e. The estimated rate of emissions (expressed in lbs/hr or lbs/day) during the incident and the operating data and calculations used in estimating the emission rate.

    f. The proposed corrective actions and schedule to correct the conditions causing the incidence of noncompliance.

15. The owner/operator shall notify the Office of Air Resources in writing, of any planned physical or operational change to any emission unit covered under this approval that would:

    a. Change the representation of the facility in the application in a manner that would materially change the emission characteristics of the facility.

    b. Alter the applicability of any state or federal air pollution rules or regulations.

    c. Result in the violation of any terms or conditions of this permit.

    d. Qualify as a modification under APC Regulation No. 9.

    Such notification shall include:

    - Information describing the nature of the change.
    - Information describing the effect of the change on the emission of any air contaminant.
    - The scheduled completion date of the planned change.

    Any such change shall be consistent with the appropriate regulation and have the prior approval of the Director.

16. All records required in this permit shall be maintained for a minimum of five years after the date of each record and shall be made available to representatives of the Office of Air Resources or EPA upon request.

F. Other Permit Conditions

1. The emission unit shall be designed, constructed and operated in accordance with the representations in the permit application as prepared by GZA GeoEnvironmental, Inc., dated September 2002, to the extent that such representations are consistent with the requirements of this permit and applicable federal and state laws and materially affect the emission characteristics of the emission unit or the state and federal air pollution control regulations applicable to the emission unit.

2. Employees of the Office of Air Resources and its authorized representatives shall be allowed to enter the facility at all times for the purpose of inspecting any air pollution source, investigating any condition it believes may be causing air pollution or examining any records required to be maintained by the Office of Air Resources.

3. At all times, including periods of startup, shutdown and malfunction, the owner/operator shall, to the extent practicable, maintain and operate the facility in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Office of Air Resources which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures and inspection of the source.

4. If the owner/operator seeks to demonstrate compliance with Condition B.3.b through the use of a passive collection system, he/she shall provide information satisfactory to the Office of Air Resources demonstrating that off-site migration is being controlled.

5. The provisions of this permit apply at all times, except during periods of start-up, shutdown, or malfunction, provided that the duration of start-up, shutdown, or malfunction shall not exceed 5 days for collection systems and shall not exceed 1 hour for treatment or control devices.

6. For purposes of determining when the landfill gas collection system can be capped and removed as provided in Condition C.8., the owner/operator shall calculate the NMOC emission rate using the following equation:

$$M_{NMOC} = 1.89 \times 10^{-3} Q_{LFG} C_{NMOC}$$

Where,

M_{NMOC}	=	*mass emission rate of NMOC, megagrams per year*
Q_{LFG}	=	*flow rate of landfill gas, cubic meters per minute*
C_{NMOC}	=	*NMOC concentration, parts per million by volume as hexane*

a. The flow rate of landfill gas, Q_{LFG}, shall be determined by measuring the total landfill gas flow rate at the common header pipe that leads to the control device using a gas flow measuring device calibrated according to the provisions of section 4 of Method 2E of 40 CFR 60 Appendix A.

b. The average NMOC concentration, C_{NMOC}, shall be determined by collecting and analyzing landfill gas sampled from the common header pipe before the gas moving or condensate removal equipment using the procedures in Method 25C or Method 18 of 40 CFR 60 Appendix A. If using Method 18 of Appendix A, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42). The sample location on the common header pipe shall be before any condensate removal or other gas refining units. The landfill owner/operator shall divide the NMOC concentration

from Method 25C of Appendix A by six to convert from C_{NMOC} as carbon to C_{NMOC} as hexane.

c. The owner/operator may use another method to determine landfill gas flow rate and NMOC concentration if the method has been approved by the Office of Air Resources.

7. The permittee is subject to the requirements of 40 CFR 60.1-19, Subpart A, "General Provisions" and 40 CFR 60, Subpart WWW, “Standards of Performance for Municipal Solid Waste Landfills”. Compliance with all applicable provisions therein is required, unless otherwise stated in this permit.

8. The permittee is subject to selected requirements of 40 CFR 63.1-15, Subpart A, "General Provisions" [as indicated in Table 1 to Subpart AAAA of 40 CFR 63] and to the requirements of 40 CFR 63, Subpart AAAA, “National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills”. Compliance with all applicable provisions therein is required, unless otherwise stated in this permit.

G. Offset Requirements

1. Within 60 days of discovering that the total VOC emissions from Phases I – V equal or exceeds 99.45 tons for any consecutive twelve month period, the owner/operator shall do one of the following:

a. purchase and retire VOC discrete emission reduction credits (DERs) in the ratio of 1.2 tons of VOC credits for every ton of VOCs emitted from Phases I-V in excess of 74.45 tons. This requirement to purchase VOC DERs begins with the first occurrence of VOC emissions equal to or in excess of 99.45 tons for any consecutive twelve month period, and shall continue to apply, regardless of whether actual VOC emissions in a subsequent consecutive twelve month period exceed or fall below 99.45 tons, through the consecutive twelve month period ending December 31st of the calendar year four years after the calendar year in which the final cap on Phase V is completed. Any and all VOC DERs, required pursuant to this paragraph, shall be obtained no later than March 31st of the calendar year following the calendar year for which the VOC emission reduction credits are required to be purchased.

b. purchase VOC emission reduction credits (ERCs) in the ratio of 1.2 tons of VOC credits for every ton of VOCs emitted from Phases I-V in excess of 74.45 tons. This requirement to hold VOC ERCs begins with the first occurrence of VOC emissions equal to or in excess of 99.45 tons for any consecutive twelve month period, and shall continue to apply, regardless of whether actual VOC emissions in a subsequent consecutive twelve month period exceed or fall below 99.45 tons, through the consecutive

twelve month period ending December 31st of the calendar year four years after the calendar year in which the final cap on Phase V is completed. Any and all VOC ERCs, required pursuant to this paragraph, shall be obtained no later than March 31st of the calendar year following the calendar year for which the VOC emission reduction credits are required to be purchased. On March 31st 5 years after the calendar year in which the final cap on Phase V is completed, the owner/operator may sell the difference between the total ERCs originally purchased to comply with this paragraph and 1.2 times difference between 75.45 tons and the actual VOC emissions from Phase I-V combined in the year four calendar years after the Phase V cap was completed.

c. If the owner/operator cannot comply with Conditions G.1.a or G.1.b because the combined total of VOC DERs available for purchase in the six New England states and VOC ERCs available for purchase in the six New England states is less than the total number of VOC emissions required to be offset, the owner/operator shall provide a written demonstration to EPA and the Office of Air Resources of such unavailability. If and when EPA and the Office of Air Resources have approved the written demonstration of the unavailability of VOC DERS and VOC ERCs, the owner/operator shall then purchase ozone season NO_x DERs or NO_x ERCs for each ton of VOC DERs or VOC ERCs that the owner/operator demonstrates is unavailable for purchase. If EPA and/or the Office of Air Resources determines that the written demonstration of the unavailability of VOC DERS and VOC ERCs is not adequate, the owner/operator shall comply with the requirements of Conditions G.1.a or G.1.b. EPA and/or the Office of Air Resources shall not approve the purchase of ozone season NO_x DERs to replace VOC DERs if there are sufficient VOC ERCs available for purchase. EPA and/or the Office of Air Resources shall not approve the purchase of NO_x ERCs to replace VOC ERCs if there are sufficient VOC DERs available for purchase.

2. The first consecutive twelve month period for calculating total VOC emissions from Phases I-V shall begin on the first day of the month following the month in which landfill gas is first collected from Phase V.

3. VOCs emitted during periods of start-up, shutdown and malfunction shall be included in any calculations of actual VOC emissions and shall not be grounds for an exemption or affirmative defense to comply with the offset requirements of this section.

4. The following two equations shall be used to calculate monthly VOC emissions from the landfill:

Equation (1) *Uncoll = actual scfm LFG generated – actual scfm LFG collected and controlled*

Equation (2) $MoVOC = \{(uncoll) + \sum [(1-eff_i) \times (coll_i)\} \times (ppmv\ VOC) \times C \times days$

Where:

$MoVOC$	=	*lbs of VOC emitted during the month in question;*
$uncoll$	=	*average monthly uncollected landfill gas (LFG) in standard cubic feet per minute (scfm);*
i	=	*the number of control devices controlling landfill gas;*
eff_i	=	*the efficiency of the i^{th} control device; eff = 0.98 unless the owner/operator has EPA approved test results from an engine or a flare showing that the VOC destruction efficiency is higher;*
$coll_i$	=	*average monthly collected landfill gas (scfm) controlled by the i^{th} control device;*
$ppm\ VOC$	=	*VOC content of the landfill gas in ppm (by volume) of VOCs = 663 ppmv as hexane or another value as determined by collecting and analyzing landfill gas following Conditions D.3.b through e;*
C	=	*0.000327 = a unit conversion factor (from cubic feet of VOC per minute to pounds of VOC per day) at 60°F;*
$days$	=	*the number of calendar days in the calendar month in question.*

5. The monthly quantity of landfill gas generated shall be determined as follows:

   a. The 2000 RIRRC base-case landfill gas generation model shall be run no later than January 15th of each calendar year beginning in 2005, using the actual waste acceptance figures for each Phase of the landfill through the end of the previous calendar year. For each month, the "method (a) monthly quantity landfill gas generated" shall be equal to the modeled scfm landfill gas generated for that calendar year as shown by the model run conducted for that calendar year.

   b. If the owner/operator, EPA or the Office of Air Resources determines that the RIRRC 2000 base-case landfill gas generation model requires modification or updating, the party making this determination shall notify the other two parties by certified mail. Within 45 days of receipt of such notification, the owner/operator shall submit proposed changes to the model to EPA and the Office of Air Resources for approval and shall thereafter use the revised model for purposes of calculating the "method (a) monthly quantity landfill gas generated".

c. In addition to paragraph a, above, the owner/operator shall use the monthly average landfill gas collected from each Phase (measured per Condition D.4 and recorded per Condition E.2) to calculate "method (b) monthly quantity landfill gas generated" using the following equation:

$$G = C/E$$

Where:

G	=	*method (b) monthly quantity landfill gas generated (scfm)*
C	=	*monthly average collected landfill gas (scfm)*
E	=	*collection efficiency from Appendix A*

d. Within 20 days of the end of each calendar month, the owner/operator shall certify to the Office of Air Resources that there were no malfunctions, unusual occurrences, or other circumstances at the landfill during the relevant calendar month which would be cause for questioning whether the assumed collection efficiencies in Appendix A were actually achieved. The owner/operator shall average the resulting scfm from the "method (a) monthly quantity landfill gas generated" and the "method (b) monthly quantity landfill gas generated". If the Office of Air Resources accepts the certification, then the method (a) and method (b) average shall be the actual scfm landfill gas generated for that Phase for that month for the purposes of equation (1). If the owner/operator cannot make such certification, or if the Office of Air Resources objects to the certification because they believe that the assumed collection efficiencies were not achieved due to malfunctions, unusual circumstances or other circumstances, then the method (a) monthly landfill gas generated calculation alone shall be the actual scfm landfill gas generated from each Phase for that month for the purpose of equation (1).

Appendix A

Landfill Gas Collection System Efficiencies

Year	Phase I	Phase II/III	Phase IV	Phase V
2004	93%	91%	80%	-
2005	94%	93%	83%	80%
2006	94%	94%	85%	80%
2007	95%	95%	87%	80%
2008	95%	95%	90%	80%
2009	95%	95%	92%	83%
2010	95%	95%	94%	85%
2011	95%	95%	94%	85%
2012	95%	95%	95%	85%
2013	95%	95%	95%	87%
2014	95%	95%	95%	90%
2015	95%	95%	95%	92%
2016	95%	95%	95%	94%
2017	95%	95%	95%	94%
2018	95%	95%	95%	95%
2019 and thereafter	95%	95%	95%	95%

Notes:

1. If the entire Phase II/III cap installation is completed by December 31, 2005 then the collection efficiency for 2006 will be 95% instead of 94%.

2. Collection efficiencies above 85% assume partial capping of the landfill surface area in the previous calendar year. A 1% increase in collection efficiency is added for each 10% of the landfill surface area capped in the previous calendar year. For example, this table assumes that during 2006 20% of the Phase IV final cap is completed. Therefore the 2007 collection efficiency is 85% + 2% = 87%.