

COMMONWEALTH OF VIRGINIA
Department of Environmental Quality
Valley Regional Office

STATEMENT OF LEGAL AND FACTUAL BASIS

Frederick County Regional Landfill
Frederick County, Virginia
Permit No. VRO81312

Title V of the 1990 Clean Air Act Amendments required each state to develop a permit program to ensure that certain facilities have federal Air Pollution Operating Permits, called Title V Operating Permits. As required by 40 CFR Part 70 and 9 VAC 5 Chapter 80, Frederick County has applied for a renewal of the Title V Operating Permit for its landfill in Frederick County, Virginia. The Department has reviewed the application and has prepared a draft Title V Operating Permit.

Air Permit Writer:  Date: 9/30/14
Trevor H. Wallace, P.E.

Air Permit Manager:  Date: 9/30/14
Janardan R. Pandey, P.E.

FACILITY INFORMATION

Permittee

Frederick County
107 N. Kent Street
Winchester, Virginia 22601-5000

Facility

Frederick County Regional Landfill
280 Landfill Road
Frederick County, Virginia

Plant Identification Number: 51-069-0127

SOURCE DESCRIPTION

| NAICS Code | SIC Code | Manufacturing Description |
|------------|----------|---------------------------|
| 562212 | 4953 | Solid Waste Landfill |

| Air Permits | Permit Date(s) | Permitted Units/Processes |
|-------------------------------|---|--------------------------------------|
| Minor New Source Review (NSR) | 7/17/09, amended 9/6/12 (hereafter referenced as "NSR permit") | Municipal Solid Waste (MSW) Landfill |
| Title V | Effective: 9/30/09 Expiration: 9/29/14 | MSW Landfill |

The Frederick County Regional Landfill (facility or landfill) is a MSW management facility. The 544-acre landfill accepts household and commercial waste, construction demolition debris (CDD) and sludge. The landfill includes three sites with solid waste permits, as follows: an active landfill located south of Route 655 (Solid Waste Permit No. 529, Title V Permit Ref. EU-2), a closed landfill south of the active landfill and west of Opequon Creek (Solid Waste Permit No. 40, Title V Permit Ref. EU-1), and a CDD landfill located southwest of the closed landfill (Solid Waste Permit No. 591, Title V Permit Ref. EU-3). Sites EU-1, EU-2, and EU-3 are contiguous county-owned property, and thus, constitute a single stationary source for air permitting purposes. This source is located in an attainment area for all air pollutants and is a Prevention of Significant Deterioration (PSD) minor source. PSD criteria and permitting requirements are included in 9 VAC 5, Chapter 80, Article 8.

The landfill contains an active gas collection and control system (GCCS) in two of the three waste management units, EU-1 and EU-2. Landfill gas (LFG) is collected by the active GCCS, which includes gas collection wells, and header lines leading to the on-site pollution control devices, a LFG-fired utility flare (PCD-1), and the recently installed LFG fueled engine generator sets (PCD-2 and PCD-3). The facility is a Title V major source of volatile organic compounds (VOC). The facility's VOC and non-methane organic compound (NMOC) emissions are uncontrolled as there are no federally enforceable requirements for the facility to control emissions. In addition sites EU-1, EU-2, and EU-3 and the control devices PCD-1, PCD-2, and PCD-3, the other significant emission source at this facility is the landfill surfaces and roads (EU-4).

Site EU-1 is a 57-acre site that accepted approximately 1.5 million tons (1.4 million Mg) of waste from 1977 through 1993. It contains two discrete waste disposal areas: a 20-acre southern mound and a 37-acre northern mound. A portion of the southern mound has a geosynthetic cap. In 2008, the existing GCCS was expanded to include 32 new extraction wells to capture LFG from EU-1.

Site EU-2 contains an 89-acre landfill out of 171 acres of the total parcel; the area consists of four separate contiguous sections designated as Phases 1 through 4. Land filling operations commenced in Phase 1 during October 1993. Phase 1 Cell A is 5.8 acres and is closed and capped; Phase 1 Cells B, C and D total 18 acres, and all cells are closed. Phase 2A is 8.1 acres and is active; Phase 2B is 11 acres and is active; Phase 3 and 4 are 30 acres and 16.2 acres, respectively, and are to be completed in the future. In 2008, the existing active GCCS was expanded to include 17 new extraction wells, which incorporated LFG extraction in Phase 2, in addition to Phase 1. On September 21, 2010, DEQ approved a minor amendment to the facility's Solid Waste Permit 529. The total landfill design capacity included in the amended permit is 16,630,563 yd³ (12.71 million m³) with a waste volume of 14,135,978 yd³. Given a potential waste density of 0.8 ton/yd³, the final waste in-place would be 11.31 million tons. The increased design capacity was incorporated in the facility's NSR permit on July 17, 2009 and is the result of steepening the base side slopes and lower base grades for Phases 2B, 3, and 4. Prior to the change, the capacity was 11.79 million m³ (15.42 million yd³).

Site EU-3 is a 47-acre CDD active landfill, is located south of the closed EU-1 landfill, and has a total design capacity of 3.59 million m³. EU-3 began accepting CDD waste in 1998 and is not served by the GCCS.

COMPLIANCE STATUS

A full compliance evaluation (FCE) of the landfill was conducted on January 30, 2014. All reports and other data required by permit conditions or regulations, which are submitted to DEQ, are evaluated for compliance. Based on these compliance evaluations, the facility is not in violation of any state or federal applicable requirements at this time.

TITLE V PERMIT CONSIDERATIONS

The DEQ received a Form 805 air permit application from Frederick County on August 23, 2011, followed by a revised application received by DEQ on June 28, 2012. The applications requested the Title V permit be modified to incorporate changes made to the landfill's NSR permit, which included the addition of the two LFG fueled engine generator sets (GE Jenbacher Model JGC 320 GS-L.L., 1,059 kW each, PCD-2 and PCD-3). Following receipt of these applications, the landfill's NSR permit was modified on September 6, 2012 as a result of the EU-2 capacity expansion from 11.79 million m³ to 12.71 million m³.

The NSR permit and the pertinent NSR permit action engineering memos are included as Attachments A, B, and C. Specific changes and additions made to the NSR permit with each action are detailed in the respective memos. The Title V permit modification to incorporate these changes was tabled, given the modification timing relative to the permit renewal.

On March 26, 2014, DEQ received the Title V permit renewal Form 805 application from the landfill. In addition to the previously permitted emission units, the application includes the Jenbacher engine generator sets and three combustion ignition emergency engine generator sets, as follows:

- Kohler/John Deere, Model: 100ROZJ/6059TF003 (EU-5)
- Kohler/John Deere, Model: 100REOZJD/4045HF285 (EU-6)
- Marathon/John Deere, Model: 284PSL1742/4024HF285B (EU-7)

The Jenbacher engine generator sets (PCD-2 and PCD-3) and the John Deere emergency engine generator sets (EU-5, EU-6, and EU-7) are all subject to 40 CFR 63 Subpart ZZZZ - *National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*. The Jenbacher engine generator sets are also subject to 40 CFR 60 Subpart JJJJ - *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines* and the emergency generators sets EU-6 and EU-7 are subject to 40 CFR 60 Subpart IIII - *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines*. MACT, Subpart ZZZZ compliance for units PCD-2 and PCD-3 requires compliance with NSPS, Subpart JJJJ and MACT, Subpart ZZZZ compliance for units EU-6 and EU-7 requires compliance with NSPS, Subpart IIII. The applicable requirements from these rules are being incorporated into the Title V permit with this action.

CHANGES TO EXISTING TITLE V PERMIT

| | |
|---|--|
| Permit-wide | <p>The permit format and general condition language were updated to reflect current DEQ boilerplate.</p> <p>NSR permit date was changed from “06/17/05 Permit, as amended 03/26/07” to “07/17/09 Permit, as amended 9/6/12”.</p> <p>"Director, Valley Region" revised to "DEQ".</p> <p>Permit condition cross references were updated.</p> |
| Permit Cover | Updated formatting and permit dates. |
| Emission Units | Site EU-2 capacity was updated to reflect the expansion. Sites EU-1, EU-2, and EU-3 capacity units were changed to metric units to match the NSR permit and other occurrences in the TV permit. Added emission units PCD-2, PCD-3, EU-5, EU-6, and EU-7. |
| Landfill Requirements – (Emission Units: EU-1, EU-2, and EU-3) | |
| 1. Limitations | The design capacity of site EU-2 was revised to reflect the expansion to 12.71 million m ³ . |
| 7. Monitoring and Recordkeeping | Updated C _{NMOC} concentration to 82 ppm hexane to reflect the most recent Tier 2 testing results. |
| 8. Monitoring and Recordkeeping | Revised to require annual calculated mass emission rate of NMOC from the landfill. |
| 9. Testing | Updated to reflect current NSR language. Additional language from the NSPS, Subpart WWW was added to allow flexibility in the Tier 2 testing. The NSPS language allows facilities with active or passive gas collection systems the option to sample from the combined header pipe rather than from individual wells. |
| 10. Testing | Updated to reflect current NSR language. Additional language regarding test protocol submittal was added. |
| 13. Reporting | Condition 13 was updated to include language from the omitted Condition 14 (III.D.3). Condition 14 reiterated the reporting allowance included in Condition 13. |

| Jenbacher Generator Stationary Reciprocating Internal Combustion Engines (RICE) – Emission Units: PCD-2 and PCD-3 | |
|---|--|
| 22. Limitations 23. Limitations 24. Limitations 25. Limitations 26. Limitations 27. Limitations 28. Limitations 29. Limitations 30. Limitations | <p>Added to incorporate Conditions 3, 4, 9, 10, 11, 13, 14, 18, and 19 of the NSR permit, which include requirements for the Jenbacher engines.</p> <p>NSR permit Condition 10 was updated to include details for determining the LFG lower heating value. NSR permit Condition 18 was updated to include the corresponding mass (g/HP-hr) emission limits included in NSPS, Subpart JJJJ.</p> |
| 31. Limitations | Added requirement to operate and maintain the Jenbacher engines in such ways that will achieve the NSPS (Subpart JJJJ) emission standards. |
| 32. Limitations 33. Limitations | Added to require the Jenbacher engines be operated in compliance with NSPS, Subpart JJJJ and MACT, Subpart ZZZZ. |
| 34. Limitations | Added to require that the Jenbacher engines meet the requirements of MACT Subpart ZZZZ by meeting the requirements of NSPS Subpart JJJJ. |
| 35. Limitations | Added to require NSPS based performance testing for a non-certified engine. The Jenbacher engines are non-certified. |
| 36. Monitoring and Recordkeeping | Added to incorporate Condition 12 of the NSR permit, which requires continuously measuring the LFG consumed by the Jenbacher engines. |
| 37. Monitoring and Recordkeeping | Added to include recordkeeping requirements for the Jenbacher engines included in the NSR permit Condition 29 and NSPS, Subpart JJJJ. |
| 38. Testing 39. Testing | Added to incorporate Conditions 26 and 27 of the NSR permit regarding visible emissions testing and LFG heat content test reporting. |
| 40. Testing | Added to require the Jenbacher engines be performance tested every three years or 8,760 hours of operation. |
| 41. Testing | Added to require that performance testing for the Jenbacher engines follow NSPS, Subpart JJJJ procedures. |
| 42. Testing | Added to require any additional testing of the Jenbacher engines follow procedures approved by DEQ. |
| 43. Reporting | Incorporates notification requirements from NSPS, Subpart JJJJ applicable to non-certified engines. |

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| Emergency Generator Stationary RICE Constructed Before June 12, 2006 – Emission Unit: EU-5 | |
| 44. Limitations 45. Limitations 46. Limitations 47. Limitations 48. Limitations 49. Limitations 50. Monitoring 51. Monitoring 52. Monitoring 53. Monitoring 54. Recordkeeping 55. Testing 56. Reporting | <p>The landfill operates an emergency generator stationary RICE constructed prior to June 12, 2006 (EU-5) that is subject to MACT, Subpart ZZZZ - <i>National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines</i>. These are the applicable MACT requirements for emergency engine EU-5.</p> |
| Emergency Generator Stationary RICE Constructed After June 12, 2006 – Emission Units: EU-6 and EU-7 | |
| 57. Limitations 58. Limitations 59. Limitations 60. Limitations 61. Limitations 62. Limitations 63. Limitations 64. Monitoring 65. Recordkeeping 66. Recordkeeping 67. Reporting | <p>The landfill operates two emergency generator stationary RICE constructed after June 12, 2006 that are subject to MACT, Subpart ZZZZ, which references NSPS , Subpart IIII - <i>Standards of Performance for Stationary Compression Ignition Internal Combustion Engines</i>. These are the applicable NSPS requirements for emergency engines EU-6 and EU-7.</p> |
| Facility Wide Conditions | |
| 73. Monitoring and Recordkeeping | Updated to reflect current NSR permit language. |
| 76. Insignificant Emission Units | Revised to reflect requested change in equipment reference from EU to IS and updated to include IS-6 (Petroleum Liquid Storage Tanks) as an insignificant emission unit. |
| General Conditions | |
| 88. Annual Compliance Certification | Updated to reflect current agency boilerplate. |
| Omissions | |
| The previous permit Condition III.D.3 included redundant testing language, and thus, was omitted. | |

EMISSIONS INVENTORY

The 2013 Emission Statement and associated report are included as Attachment D. Facility total emissions are as follows”

| VOC | NO _x | SO ₂ | CO | PM-10 | PM-2.5 | HAP | TRS | NMOC |
|--------------|-----------------|-----------------|-------|-------|--------|------|------|------|
| <i>(tpy)</i> | | | | | | | | |
| 1.25 | 15.08 | 1.44 | 64.68 | 14.5 | 6.53 | 0.06 | 0.85 | 3.2 |

EMISSION UNITS

| Emission Unit ID | Stack ID | Emission Unit Description | Size/Rated Capacity* | Pollution Control Device Description (PCD) | PCD ID | Pollutant Controlled | Applicable Permit Date |
|---------------------------------------|----------|---|------------------------------|--|--------|----------------------|-------------------------------|
| Landfills | | | | | | | |
| EU-1 | F-1 | Closed MSW Landfill Solid Waste Permit No. 40 | 1.4 million megagrams | - | - | - | - |
| EU-2 | F-2 | Active MSW Landfill Solid Waste Permit No. 529 | 12.71 million m ³ | - | - | - | 7/17/09 Amended: 9/6/12 |
| EU-3 | F-3 | CDD Landfill Solid Waste Permit No. 591 | 3.59 million m ³ | - | - | - | 7/17/09 Amended: 9/6/12 |
| Landfill Surface and Roads | | | | | | | |
| EU-4 | F-4 | Landfill Surface and Roads | - | - | - | - | - |
| Fuel Burning Equipment - Flare | | | | | | | |
| PCD-1 | S-1 | 8-inch Utility Flare | 40.9 MMBtu/hr | - | - | NMOC and VOC | 7/17/09 Amended: 9/6/12 |

| Emission Unit ID | Stack ID | Emission Unit Description | Size/Rated Capacity* | Pollution Control Device Description (PCD) | PCD ID | Pollutant Controlled | Applicable Permit Date |
|--|----------|--|------------------------|--|--------|----------------------|-------------------------|
| Fuel Burning Equipment - Generators | | | | | | | |
| PCD-2 | S-2 | General Electric Jenbacher Internal Combustion Genset Model JGC 320 GS-L.L | 9.8 MMBtu/hr, 1.059 MW | - | - | NMOC and VOC | 7/17/09 Amended: 9/6/12 |
| PCD-3 | S-3 | General Electric Jenbacher Internal Combustion Genset Model JGC 320 GS-L.L | 9.8 MMBtu/hr, 1.059 MW | - | - | NMOC and VOC | 7/17/09 Amended: 9/6/12 |
| EU-5 | S-5 | Kohler/John Deere CI Emergency Generator Model: 100ROZJ/6059TF003 | 0.9 MMBtu/hr 100 KW | - | - | - | - |
| EU-6 | S-6 | Kohler/John Deere CI Emergency Generator Model: 100REOZJD/4045HF285 | 0.9 MMBtu/hr 86 KW | - | - | - | - |
| EU-7 | S-7 | Marathon/John Deere CI Emergency Generator Model: 284PSL1742/4024HF285B | 0.5 MMBtu/hr 60 KW | - | - | - | - |

*The size/rated capacity is provided for informational purposes only, and is not an applicable requirement.

EMISSION UNIT APPLICABLE REQUIREMENTS – LANDFILLS: EU1, EU-2 and EU-3

Limitations

The landfill is subject to 40 CFR 60 Subpart WWW - *New Source Performance Standards (NSPS) for Municipal Solid Waste Landfills* because it has a permitted design capacity greater than 2.5 million cubic meters and 2.5 million megagrams, and because the landfill was modified after May 30, 1991. Therefore, the landfill is also subject to 40 CFR 60 Subpart A, the General Provisions of Part 60 (NSPS). All applicable limitations from NSPS, Subparts A and WWW are included in the permit.

Since the non methane organic compounds (NMOC) emission rate is less than 50 Mg/yr, limitations and requirements related to a collection and control system have not been incorporated into the permit. However, a condition requiring the facility to submit a collection and control design plan and to install a collection and control system in compliance with 40 CFR §60.752(b)(2) if the NMOC emission is equal to or greater than 50 Mg/yr is included in the permit.

Per the minor NSR permit (Attachment A), the Title V permit includes the following limitations and requirements for EU-1, EU-2 and EU-3:

- A change in the design capacity may require a permit to modify and operate the landfill;
- The permittee shall install a LFG collection and control system that captures the gas generated within the landfill within 30 months after the first annual NMOC emission rate report, in which the NMOC emission rate equals or exceeds 50 megagrams per year, unless Tier 2 or Tier 3 sampling demonstrates that the NMOC emission rate is less than 50 megagrams per year;
- Except where the permit is more restrictive than the applicable requirement, the landfill shall be operated in accordance with 40 CFR 60, Subpart WWW;
- If the NMOC emissions rate reported in the annual report is equal to or exceeds 50 megagrams per year, the permittee shall submit a gas control and collection design plan or within 180 days of the emissions rate report, demonstrate using a Tier 2 testing site specific methane generation constant, that NMOC emissions do not equal or exceed 50 megagrams per year;
- If the NMOC emission rate based on a site-specific NMOC concentration is equal to or exceeds 50 megagrams per year, the permittee shall submit a gas control and collection design plan, or within 1 year of the emissions rate report, demonstrate using a Tier 3 testing site specific methane generation constant, that NMOC emissions do not equal or exceed 50 megagrams per year; and
- A deadline for submission of the collection and control design plans.

Monitoring and Recordkeeping

The minor NSR permit monitoring and recordkeeping requirements for EU-1, EU-2, and EU-3 in are included in the Title V permit. The permittee must maintain records including the design capacity of the landfill, the current amount of solid waste in place, and the year-by-year waste acceptance rate. Also, the permit requires the calculation of the NMOC emission rate using the procedures described in NSPS, Subpart WWW. These monitoring and recordkeeping requirements meet the Part 70 requirements.

Per NSPS, Subpart WWW and the minor NSR permit, the Title V permit requires actual emissions from the operation of the landfill to be calculated using either Equation 1 or 2, below. Equation 1 shall be used if the actual year-to-year solid waste acceptance rate is known, and Equation 2 shall be used if the actual year-to-year solid waste acceptance rate is unknown.

$$\text{Equation 1: } M_{NMOC} = \sum_{i=1}^n 2kL_oM_i(e^{-kt_i})(C_{NMOC})(3.6 \times 10^{-9})$$

M_{NMOC} = total NMOC emission rate from the landfill, 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 solid waste in the i^{th} section, megagrams
 t_i = age of the i^{th} section, years
 C_{NMOC} = concentration of NMOC, parts per million by volume as hexane
 3.6×10^{-9} = conversion factor

The mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value for M_i if documentation of the nature and amount of such wastes is maintained.

$$\text{Equation 2: } M_{NMOC} = 2L_oR(e^{-kc} - e^{-kt})(C_{NMOC})(3.6 \times 10^{-9})$$

M_{NMOC} = mass emission rate of NMOC from the landfill, megagrams per year
 L_o = methane generation potential, cubic meters per megagram solid waste
 R = average annual acceptance rate, megagrams per year
 k = methane generation rate constant, year⁻¹
 t = age of the landfill, years
 C_{NMOC} = concentration of NMOC, parts per million by volume as hexane
 c = time since closure, years (for an active landfill $c = 0$ and $e^{-kc} = 1$)
 3.6×10^{-9} = conversion factor

The mass of nondegradable solid waste may be subtracted from the average annual acceptance rate when calculating a value for R , if documentation of the nature and amount of such wastes is maintained.

Reporting Requirements

The NSPS Subpart WWW contains requirements for reporting annual and/or five-year estimates of the NMOC emissions depending upon the estimation of the NMOC emission rate. These requirements are included in the permit. Since the NMOC emission rate is less than 50 Mg/yr, reporting requirements related to the LFG collection and control system are not incorporated into the permit.

Per the minor NSR permit (Attachment A), the Title V permit includes the following reporting requirements for EU-1, EU-2 and EU-3:

- Submission of an annual NMOC report;
- The facility shall apply for a solid waste amendment if the facility is required to install a gas control and collection system; and
- The facility shall submit a closure report within 30 days of the date that the facility stops accepting landfill waste.

Compliance Assurance Monitoring (CAM)

Per 40 CFR §64.2(b)(1), emission limitations or standards proposed after November 15, 1990 pursuant to section 111 or 112 are exempt from CAM. All applicable monitoring requirements from NSPS, Subpart WWW are included in the permit. Since NSPS, Subpart WWW was promulgated on March 1996 under the authority of Section 111 of NSPS, this standard is exempt from CAM requirements and no additional monitoring is incorporated into the Title V permit.

Testing

Per the minor NSR permit (Attachment A), the Title V permit includes the following testing requirements for EU-1, EU-2 and EU-3:

- Tier 2 testing of the site-specific NMOC concentration shall be performed using the procedures described in 40 CFR §60.754(a)(3). This testing procedure requires the installation of at least two sample probes per hectare of landfill surface that has retained waste for at least two years;
- Tier 3 site-specific methane rate generation constant shall be determined as indicated in Method 2E of 40 CFR §60.754(a)(4); and
- Other methods may be used to determine the NMOC concentration of a site specific methane rate generation constant.

Streamlined Requirements

The following NSPS, Subpart WWW requirements were previously met and are not included in the Title V permit:

- *40 CFR §60.7 (a) (1) - Requirements of the Notification of the Date Construction is Commenced* - Per 40 CFR §60.757(a)(1), the initial design capacity report submitted on September 24, 1996 fulfilled this requirement.
- *40 CFR §60.757 (a) - Initial Design Capacity Submittal Requirement* - On September 24, 1996, the facility submitted the initial design capacity report.
- *40 CFR §60.757 (b) - Initial Nonmethane Organic Compounds (NMOC) Emission Rate Report Requirement* - On July 25, 1997, the facility submitted an NMOC emission rate report. Per the report, the 1997 NMOC emission estimate for the landfill was 294 Mg/yr. Since the NMOC emission rate exceeded 50 Mg/yr, the facility was required to determine a site-specific NMOC concentration and recalculate the NMOC emissions estimate using Tier 2 procedures or submit a collection and control system design plan prepared by a professional engineer within one year of the report and comply with 40 CFR §60.752 (b) (2). The facility notified DEQ that Tier 2 sampling would be done and revised NMOC emissions estimate would be submitted within 180 days.
- *40 CFR §60.757 (c)(1) - Nonmethane Organic Compounds (NMOC) Emission Rate Report Requirement under Tier 2 sampling* - On August 22, 1997, the facility determined the site-specific NMOC concentration and recalculated the NMOC emissions rate. The revised Tier 2 NMOC emission rate report was submitted on October 15, 1997. Per the report, the 1997 NMOC emission estimate for the landfill was 17 Mg/yr. Since the NMOC emission rate is under 50 Mg/yr, the facility is not required to submit a collection and control system design plan at this time. The most recent Tier 2 testing conducted by the facility indicated the LFG NMOC emission rate to be 9 Mg/yr, based on a NMOC concentration of 82 ppmv (as hexane).

EMISSION UNIT APPLICABLE REQUIREMENTS – Utility Flare: PCD-1

Requirements for the flare (PCD-1) are unchanged from the previous permit.

Limitations

Per the minor NSR permit (Attachment A), the Title V permit includes the following limitations and requirements for the flare:

- The flare shall be constructed to allow for emissions testing;
- The approved fuel for the flare is LFG. Propane gas may be used as a source of ignition for the pilot light;
- The flare is fuel throughput limited to 716 million cubic feet of LFG, calculated as the sum of each consecutive 12 month period;
- Proper operation and maintenance of the flare;
- Hourly and annual emissions limits on the flare; and
- No visible emissions except for a brief period not to exceed five minutes during any two consecutive hours.

Monitoring and Recordkeeping

The minor NSR permit monitoring and recordkeeping requirements for the flare are included in the Title V permit. The Title V permit includes the following monitoring and recordkeeping requirements for the flare:

- Monthly and annual LFG throughput; and
- Maintenance plan, maintenance records, and operator training;

The hourly and annual emission limits established for the flare are based on the capacity of the flare. Therefore, if the flare is operated at capacity, or below, there should not be a violation of the hourly and annual emission rates. The calculations that were used to determine the flare's criteria pollutant emission limits are listed as Equations 3 – 6 in Attachment E. As long as the flare is operated properly, it can be assumed that the emission limitations will not be violated.

Maintaining records demonstrating that the operators have been properly trained along with maintaining operating procedures will ensure compliance with the emission limitations and satisfy the periodic monitoring requirements.

There is no monitoring for the visible emission limit. Compliance with the visible emission limit was demonstrated by initial testing performed on May 16, 2003. This test showed that the opacity was zero percent. As long as the flare is operated properly, it can be assumed that the opacity limitations will not be violated. Maintaining records demonstrating that the operators have been properly trained along with maintaining operating procedures will ensure compliance with the opacity limitation and satisfy the periodic monitoring requirements.

CAM

CAM does not apply to the flare. This unit does not use a pollution control device to achieve compliance with the emission limitations.

Testing

The permit does not require source emission tests of the flare. The DEQ and the EPA have authority to require testing not included in this permit if necessary to determine compliance with an emission limit or standard.

Reporting

No specific reporting has been included in the Title V permit for the flare.

Streamlined Requirements

There are no streamlined requirements for the flare.

**EMISSION UNIT APPLICABLE REQUIREMENTS – Jenbacher Generator Stationary RICE:
PCD-2 and PCD-3**

The landfill provided a letter from General Electric (GE), dated March 28, 2012, indicating that the Jenbacher engines (PCD-2 and PCD-3) are classified as “non-certified” according to NSPS, Subpart JJJJ. A copy of the letter is included as Attachment F of the SOB

Requirements for the Jenbacher engines (PCD-2 and PCD-3) were added to the Title V permit at this renewal.

Limitations

Per the minor NSR permit (Attachment A), the Title V permit includes the following limitations and requirements for the Jenbacher engines:

- The approved fuel for the Jenbacher engines is LFG;
- The LFG shall meet a minimum heat content of 365 Btu/scft LHV, as determined by a DEQ-approved method;
- Limited annual LFG throughput to the Jenbacher engines;
- The Jenbacher engines shall be equipped with a device to continuously measure the LFG consumed;
- Hourly, annual, performance based, and visible emissions limits on the Jenbacher engines;
- The permittee shall conduct annual testing of the on-site generated LFG to be burned in the Jenbacher engines to demonstrate compliance with the fuel specifications;
- The permittee shall performance test the Jenbacher engines every 8,760 operating hours or every three years, whichever occurs first; and
- Performance tests shall conform to the procedures included in NSPS, Subpart JJJJ.

Monitoring and Recordkeeping

The minor NSR permit monitoring and recordkeeping requirements for the Jenbacher engines are included in the Title V permit.

The Title V permit includes the following monitoring and recordkeeping requirements for the Jenbacher engines:

- LFG consumption monitoring device records and annual LFG throughput;
- Manufacturer’s approved maintenance procedures;
- LFG heat content test results;
- Results of all visible emissions evaluations;
- Maintenance plan, maintenance records, and operator training;
- Records showing compliance with emission limitations; and

- All notifications required by NSPS, Subpart JJJJ.

These monitoring and recordkeeping requirements fulfill periodic monitoring needs for the Jenbacher engines and render the associated operating and emission limitations enforceable as a practical matter.

CAM

The Jenbacher engines are subject to emission limitations or standards proposed after November 15, 1990, pursuant to section 111 or 112 of the Clean Air Act; and therefore, are exempt from CAM under 40 CFR 64.2(b)(1)(i).

Testing

Periodic performance testing is required for the Jenbacher engines to ensure compliance with the emission limits dictated by NSPS, Subpart JJJJ. Testing is required every three years or 8,760 operating hours. Initial performance testing was conducted on July 17, 2012.

Annual testing of the LFG heat content is also required to ensure compliance with minimum lower heating value required by the Title V permit. The first annual test was conducted in December 2010.

Visible emissions testing of the Jenbacher engines may be required upon DEQ request.

Reporting

The Jenbacher engines performance testing and LFG heat content results must be submitted to DEQ within 60 days after the test has been completed.

Streamlined Requirements

40 CFR 60.4245 (c) - Initial Notification requirements from NSPS, Subpart JJJJ applicable to non-certified engines were not included in the renewal permit. Based on the timing of this Title V permit renewal and the fact that the appropriate timeframe for submitting the Initial Notification has passed the Initial Notification requirements were not included in the permit. Initial notification was received on June 11, 2010.

40 CFR 60.4243 (b)(2)(ii) - Initial performance testing was performed on July 17, 2012, thus the permit does not require initial performance testing, but does require periodic performance testing every three years or 8,760 operating hours, whichever occurs first.

There are no other streamlined requirements for the Jenbacher engines.

**EMISSION UNIT APPLICABLE REQUIREMENTS – Emergency Generator Stationary RICE
Constructed Before June 12, 2006: EU-5**

Requirements for the emergency generator stationary RICE constructed before June 12, 2006 (EU-5) were added to the Title V permit at this renewal.

Limitations

The emergency engine EU-5 is subject to the requirements of the MACT, 40 CFR 63 Subpart ZZZZ. Emergency engine EU-5 is diesel-fired with a power rating less than 500 HP. Per the application, this engine was manufactured in 1999.

Per the MACT, Subpart ZZZZ, the Title V permit includes the following limitations and requirements for the EU-5 emergency engine:

- The engine must be operated in accordance with MACT, Subpart ZZZZ, except where the Title V permit is more restrictive;
- The permit includes operating hour restrictions for maintenance and non-emergency operating needs;
- The engine shall meet the applicable work practice standards specified in 40 CFR 63, Subpart ZZZZ (NESHAP for Stationary RICE).
- During periods of startup, the permittee must minimize the time spent at idle and minimize the engine's startup time to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply, in accordance with Table 2c of the MACT, Subpart ZZZZ.
- An oil analysis program may be implemented to extend the specified oil change requirements; and
- Diesel fuel requirements if the engine is contractually obligated to participate in a demand response program.

Monitoring and Recordkeeping

The Title V permit includes the following monitoring and recordkeeping requirements for the EU-5 emergency engine:

- The permittee must install a non-resettable hour meter on the engine in accordance with 40 CFR 63.6625(f). The hour meter shall be provided with adequate access for inspection;
- The permittee shall operate and maintain the emergency engine according to the manufacturer's emission-related written instructions or develop their own maintenance plan;
- The permittee shall demonstrate compliance with the required work practice standards;
- Certification from the fuel supplier is required with each shipment of diesel fuel if the emergency engine participates in a demand response program; and
- The permittee must keep records of all maintenance conducted on the emergency engine, hours of operation recorded on the hour meter, and all fuel certifications.

The requirement for installation of a non-resettable hour meter, establishes the means for determining

compliance with the operating hour limitations. The required maintenance and operating plans assure compliance with MACT requirements to maintain and operate the engine in accordance with the manufacturer's written instructions. The maintenance plan provides a means of ensuring the engines meet the required maintenance and work practice standards. The fuel certification requirements establish a means of demonstrating compliance with the diesel fuel limitations for demand load response operation.

The recordkeeping requirements demonstrate compliance with the limitations in the permit. The facility is required to maintain records of the hours of operation to ensure that each engine continues to meet the definition of emergency-use, as found in the Virginia Regulations and the MACT. The facility is also required to keep records of maintenance conducted on the emergency engine to demonstrate that the engine is operated and maintained in accordance with the maintenance plan. Fuel certification records demonstrate continuous compliance with the diesel fuel limitations, if applicable.

CAM

Emergency engine EU-5 is subject to emission limitations or standards proposed after November 15, 1990, pursuant to section 111 or 112 of the Clean Air Act, and are therefore exempt from CAM under 40 CFR 64.2(b)(1)(i).

Testing

The permit does not require testing emergency engine EU-5. The DEQ and EPA have authority to require testing not included in this permit, if necessary, to determine compliance with an emission limit or standard.

The permit specifies that if testing is conducted in addition to the general monitoring required, the permittee shall use the appropriate method(s) in accordance with procedures approved by the DEQ.

Reporting

The permittee must report any failure to perform scheduled management practices.

Streamlined Requirements

There are no streamlined requirements for the emergency engine EU-5.

**EMISSION UNIT APPLICABLE REQUIREMENTS – Emergency Generators Stationary RICE
Constructed after June 12, 2006: EU-6 and EU-7**

Requirements for the emergency generator stationary RICE constructed after June 12, 2006 (EU-6 and EU-7) were added to the Title V permit at this renewal.

Limitations

The emergency engines EU-6 and EU-7 are subject to the requirements of the MACT, 40 CFR 63 Subpart ZZZZ, which references NSPS, Subpart IIII. These engines are diesel-fired with power rating less than 500 HP. Per the application, engine EU-6 was manufactured in 2009 and engine EU-7 was manufactured in 2010.

Per the NSPS, Subpart IIII, the Title V permit includes the following limitations and requirements for the EU-6 and EU-7 emergency engines:

- The engines must be operated in accordance with MACT, Subpart ZZZZ and NSPS, Subpart IIII, except where the Title V permit is more restrictive;
- NMHC + NO_x, CO, and PM emissions are limited based on the applicable standards included in 40 CFR 89.112.
- The permit includes operating hour restrictions for maintenance, emergency demand response, and non-emergency operating needs;
- The engines shall use diesel fuel with a sulfur content of no greater than 15 parts per million; and
- The permittee must maintain and operate the engines according to the manufacturer's written instructions or procedures developed by the permittee that are approved by the manufacturer;

Monitoring and Recordkeeping

The Title V permit includes the following monitoring and recordkeeping requirements for the EU-6 and EU-7 emergency engines:

- The permittee must install non-resettable hour meters on the emergency engines and log the operating hours and associated operating purpose;
- Certification from the fuel supplier is required with each shipment of diesel fuel;
- The permittee shall keep records of maintenance and operation demonstrating compliance with the manufacturer's written maintenance and operating instructions or procedures developed by the permittee that are approved by the manufacturer; and
- The permittee shall keep engine manufacture data indicating compliance with the emission limits.

The requirement for installation of non-resettable hour meters establishes the means for determining compliance with the operating hour limitations. The facility is required to keep records of the hours of operation of the emergency engines to ensure the operating hour limitations are met. The fuel certification requirements establish a means of demonstrating compliance with the diesel fuel limitations.

The recordkeeping requirements demonstrate compliance with the limitations in the permit. The facility is required to maintain records of the hours of operation to ensure that each engine continues to meet the definition of emergency-use. Recording maintenance and operation activities will demonstrate that the engine is operated and maintained according to the manufacturer's written maintenance and operating instructions or procedures developed by the permittee that are approved by the manufacturer. Fuel certification records demonstrate continuous compliance with the diesel fuel limitations.

CAM

Emergency engines EU-6 and EU-7 are subject to emission limitations or standards proposed after November 15, 1990, pursuant to section 111 or 112 of the Clean Air Act, and are therefore exempt from CAM under 40 CFR 64.2(b)(1)(i).

Testing

The permit does not require testing emergency engines EU-6 and EU-7, which are manufacturer certified engines. The DEQ and EPA have authority to require testing not included in this permit, if necessary, to determine compliance with an emission limit or standard.

Reporting

If emergency engine EU-6 (>100HP) participates in a demand load response program for more than 15 hours per year, the permittee must submit an annual report as outlined in the permit.

Streamlined Requirements

There are no streamlined requirements for emergency engines EU-6 and EU-7.

EMISSION UNIT APPLICABLE REQUIREMENTS – Facility-Wide Conditions

Limitations

Per the minor NSR permit (Attachment A), the Title V permit includes the following limitations for the landfill surfaces and roads:

- Visible emissions shall not exceed the Rule 5-1 opacity requirements;
- Fugitive dust shall be controlled through work practices; and
- The landfill is required to have a dust control plan.

Monitoring and Recordkeeping

In lieu of conducting periodic evaluations using EPA Method 9 to demonstrate compliance with the facility wide visible emission limit, the permittee shall perform a daily visual survey of the trafficable roads at the site and landfill activities for sources of excessive emissions. The reason for not requiring EPA Method 9 is that there is no stack in the landfill to perform the test. The presence of excessive emissions shall require further investigation as to the cause of the emissions and timely corrective action shall be required. All observations and corrective actions taken shall be logged and recorded. These records shall be available on site for inspection by the DEQ and shall be current for the most recent five years.

There is reasonable assurance that violations of the visible emission standards should not occur if the permittee complies with the permit condition to mitigate fugitive dust, implements the operating procedures included in the dust control plan, performs a daily visible emission survey and conducts timely corrective actions as needed.

These monitoring requirements for the landfill surfaces and roads are per the minor NSR permit (Attachment A).

CAM

CAM does not apply to the landfill surface and roads because the landfill surface and roads do not use a control device to achieve compliance with the emission limitations.

Testing

The permit does not require emission tests for the landfill surface and roads. DEQ and EPA have authority to require testing not included in this permit, if necessary, to determine compliance with an emission limit or standard.

Reporting

The minor NSR permit requires the submission of an annual emission report for fee calculation. This condition is not specifically enumerated in the Title V permit because the permit General Conditions requires the submission of a report by which emissions fees are assessed.

Streamlined Requirements

There are no streamlined requirements for the landfill surface and roads.

INSIGNIFICANT EMISSION UNITS

The insignificant emission units are presumed to be in compliance with all requirements of the Clean Air Act as may apply. Based on this presumption, no monitoring, recordkeeping or reporting shall be required for these emission units in accordance with 9 VAC 5-80-110.

Insignificant emission units include the following:

| Emission Unit No. | Emission Unit Description | Citation | Pollutants Emitted (9 VAC 5-80-720 B) | Rated Capacity (9 VAC 5-80-720 C) |
|-------------------|--------------------------------------|------------------|--|--------------------------------------|
| IS-1 | Leachate Lagoon | 9 VAC 5-80-720 B | VOC | - |
| IS-2 | Compost Chipper | 9 VAC 5-80-720 B | NO _x , CO, SO ₂ , PM-10 and VOC | - |
| IS-3 | Tire Chipper | 9 VAC 5-80-720 B | NO _x , CO, SO ₂ , PM-10 and VOC | - |
| IS-4 | Gasoline and Diesel Storage Tanks | 9 VAC 5-80-720 B | VOC | - |
| IS-5 | Landfill Gas Fueled Heater | 9 VAC 5-80-720 B | NO _x , CO, SO ₂ , PM-10 and VOC | - |
| IS-6 | Petroleum Liquid Storage Tanks | 9 VAC 5-80-720 C | VOC | - |

¹The citation criteria for insignificant activities are as follows:
 9 VAC 5-80-720 A - Listed Insignificant Activity, Not Included in Permit Application
 9 VAC 5-80-720 B - Insignificant due to emission levels
 9 VAC 5-80-720 C - Insignificant due to size or production rate

Emission calculations for the insignificant units are included in Attachment G. The compost and tire chipper units are driven by non-road engines.

GENERAL CONDITIONS

The permit contains general conditions required by 40 CFR Part 70 and 9 VAC 5-80-110 that apply to all Federal operating permit sources. These include requirements for submitting semi-annual monitoring reports and an annual compliance certification report. The permit also requires notification of deviations from permit requirements or any excess emissions, including those caused by upsets, within four daytime business hours after discovery.

STATE ONLY APPLICABLE REQUIREMENTS

The permittee did not identify any state-only requirements in their application and all requirements in their minor NSR permits are federally enforceable. Therefore, no state-only requirements have been included in the permit.

FUTURE APPLICABLE REQUIREMENTS

On June 30, 2014, the EPA administrator signed an Advanced Notice of Proposed Rulemaking (ANPRM), and EPA is submitting the ANPRM for publication in the Federal Register. The purpose of the ANPRM is to request public input on methods to reduce emissions from existing MSW landfills. The EPA intends to consider the information received in response to the ANPRM in evaluating whether changes to NSPS, Subpart WWWW requirements for existing sources are warranted. Future changes to NSPS, Subpart WWWW could be applicable to this source.

INAPPLICABLE PERMIT REQUIREMENTS

The provisions of 40 CFR Part 98 – Mandatory Greenhouse Gas Reporting require owners and operators of municipal solid waste landfills that generate methane (CH₄) in amounts equivalent to 25,000 metric tons CO₂e or more per year, to report greenhouse gas (GHG) emissions, annually. The definition of “applicable requirement” in 40 CFR 70.2 and 71.2 does not include requirements such as those included in Part 98, promulgated under Clean Air Act (CAA) section 114(a)(1) and 208. Therefore, the requirements of 40 CFR Part 98 are not applicable under the Title V permitting program.

As a result of several EPA actions regarding GHG under the CAA, emissions of GHG must be addressed for a Title V permit renewed after January 1, 2011. The current state minor NSR permit for the facility contains no GHG-specific applicable requirements and there have been no modifications at the facility requiring a PSD permit. Therefore, there are no applicable requirements for the facility specific to GHG.

40 CFR 63 Subpart AAAA, National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills, is not an applicable requirement for the Frederick County Regional Landfill. This is because this facility is not (1) a major source of HAP; (2) collocated with a major source of HAP; (3) an area source with a design capacity greater than or equal to 2.5 million m³ and 2.5 million Mg with estimated uncontrolled NMOC emissions equal to greater than 50 Mg/yr; or (4) an active area source landfill with a design capacity greater than or equal to 2.5 million m³ and 2.5 million Mg that operates an anaerobic bioreactor. The most recent Tier 2 testing conducted by the facility indicated the LFG NMOC emission rate to be 9 Mg/yr, based on a NMOC concentration of 82 ppmv (as hexane).

CAM, 40 CFR 64, is not applicable to the landfill, the Jenbacher engine generator sets (PCD-2 and PCD-3), or the emergency engine generators (EU-5, EU-6, and EU-7). The landfill and all of the engines are subject to NSPS requirements, that were promulgated after November 15, 1990, and thus these sources are exempt from CAM applicability.

The permittee did not identify any inapplicable requirements in the application.

CONFIDENTIAL INFORMATION

The permittee did not submit a request for confidentiality. All portions of the Title V application are available for public review.

PUBLIC PARTICIPATION

The public participation requirements of 9 VAC 5-80-270 apply to Title V permit renewals. A public notice regarding the draft permit was placed in the *Winchester Star* on August 15, 2014 and comments were accepted for 30 days.

EPA was sent a copy of the draft permit and notified of the public notice on August 12, 2014. West Virginia, Maryland, and Pennsylvania are the states potentially affected by this action. As such, a copy of the public notice was e-mailed to the WVDEP, MDE, and PDEP on August 14, 2014. All persons on the Title V mailing list were also mailed a copy of the public notice on August 15, 2014.

No comments were received from the public, EPA, or states potentially affected by this action.

ATTACHMENTS

- Attachment A – Minor NSR Permit dated July 17, 2009, as amended September 6, 2012
- Attachment B – Memo for Minor NSR Permit dated July 17, 2009, as amended September 6, 2012
(memo attachments not included)
- Attachment C – Memo for Minor NSR Permit dated July 17, 2009
- Attachment D – 2013 Emission Statement
- Attachment E – Utility Flare Calculation Equations
- Attachment F – GE Letter dated March 28, 2012 regarding Jenbacher Engines
- Attachment G – Insignificant Unit Emission Calculations

ATTACHMENT A

Minor NSR Permit dated July 17, 2009, as amended September 6, 2012



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY VALLEY REGIONAL OFFICE

4411 Early Road, P.O. Box 3000, Harrisonburg, Virginia 22801
(540) 574-7800 Fax (540) 574-7878
www.deq.virginia.gov

Douglas W. Domenech
Secretary of Natural Resources

David K. Paylor
Director

Amy Thatcher Owens
Regional Director

September 6, 2012

Mr. John R. Riley, Jr.
County Administrator
Frederick County
107 N. Kent Street
Winchester, Virginia 22601
Email: jriley@co.frederick.va.us

Location: Frederick County
Registration No.: 81312
Plant ID No.: 51-069-0127

Dear Mr. Riley:

Attached is a significant amendment to your new source review permit dated July 17, 2009 to install and operate two landfill gas-fueled generators at the Frederick County Regional Landfill, a municipal solid waste (MSW) landfill, in accordance with the provisions of the Virginia Regulations for the Control and Abatement of Air Pollution. This permit has been amended to reflect the proposed design capacity increase of the active MSW, Solid Waste Permit No. 529. This permit replaces your permit dated July 17, 2009.

The permit contains legally enforceable conditions. Failure to comply may result in a Notice of Violation and civil penalty. Please read all permit conditions carefully.

The Department of Environmental Quality (DEQ) deemed the application complete on June 28, 2012, and has determined that the application meets the requirements of 9 VAC 5-80-1290 A for a significant amendment to a new source review permit.

This permit approval to **modify** and operate shall not relieve Frederick County of the responsibility to comply with all other local, state, and federal permit regulations.

The Board's Regulations, as contained in Title 9 of the Virginia Administrative Code 5-170-200, provide that you may request a formal hearing from this case decision by filing a petition with the Board within 30 days after this case decision notice was mailed or delivered to you. 9 VAC 5-170-200 provides that you may request direct consideration of the decision by the Board if the Director of the DEQ made the decision. Please consult the relevant regulations for additional requirements for such requests.

As provided by Rule 2A:2 of the Supreme Court of Virginia, you have 30 days from the date you actually received this permit or the date on which it was mailed to you, whichever occurred first, within which to initiate an appeal of this decision by filing a Notice of Appeal with:

David K. Paylor, Director
Department of Environmental Quality
P.O. Box 1105
Richmond, Virginia 23218

If this permit was delivered to you by mail, three days are added to the thirty-day period in which to file an appeal. Please refer to Part Two A of the Rules of the Supreme Court of Virginia, at <http://www.courts.state.va.us/courts/scv/rules.html>, for information on the required content of the Notice of Appeal and for additional requirements governing appeals from decisions of administrative agencies.

Please be aware that the two GE Jenbacher generators appear to be subject to 40 CFR 63, Maximum Achievable Control Technology, (MACT) Subpart ZZZZ and 40 CFR 60, New Source Performance Standard (NSPS), Subpart JJJJ, and thus, are subject to owner/operator requirements of the MACT and NSPS. In summary, the units are required to comply with certain federal emission standards and operating limitations over their useful life. The DEQ advises you to review the MACT and NSPS to ensure compliance with applicable emission and operational limitations. As the owner/operator, you are also responsible for monitoring, notification, reporting and recordkeeping requirements of the MACT and NSPS. Notifications shall be sent to EPA, Region III.

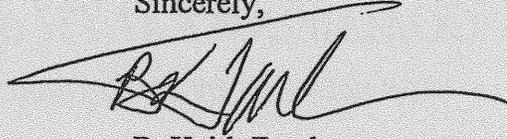
Mr. John R. Riley, Jr.

September 6, 2012

Page 3

If you have any questions concerning this permit, please contact Trevor Wallace at 540-574-7807 or trevor.wallace@deq.virginia.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "B. Keith Fowler", with a long horizontal flourish extending to the right.

B. Keith Fowler
Deputy Regional Director

Attachments: Permit
NSPS, Subpart WWW (via electronic attachment)
NSPS, Subpart JJJJ (via electronic attachment)
MACT, Subpart ZZZZ (via electronic attachment)

c: Director, OAPP (via email)
File DEQ-VRO
Barry Brandon, Air Compliance Inspector (via email)



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

STATIONARY SOURCE PERMIT TO MODIFY AND OPERATE

**This permit includes designated equipment subject to
New Source Performance Standards (NSPS) for Municipal Solid Waste Landfills.**

This permit replaces your permit dated July 17, 2009.

In compliance with the Federal Clean Air Act and the Commonwealth of Virginia
Regulations for the Control and Abatement of Air Pollution,

Frederick County Regional Landfill
107 N. Kent Street
Winchester, Virginia 22601
Registration No.: 81312
Plant ID No.: 51-069-0127

is authorized to modify and operate

a municipal solid waste landfill

located at

280 Landfill Road
Winchester, Virginia

in accordance with the Conditions of this permit.

Approved on

July 17, 2009

Amended on

9/6/12

A handwritten signature in black ink, appearing to read "BKW", written over a horizontal line.

Deputy Regional Director, Valley Region

Permit consists of 16 pages.
Permit Conditions 1 to 44.
Source Testing Report Format

INTRODUCTION

This permit approval is based on the permit applications:

| Application Signature Date | Application Amendment Date | Application Additional Information Received Date |
|-----------------------------------|-------------------------------------|---|
| November 20, 2002 | -- | February 19, 2003 |
| September 29, 2004 | December 10, 2004 April 12, 2005 | -- |
| March 8, 2007 | -- | -- |
| February 23, 2009 | April 20, 2009 | April 14, 2009 |
| June 24, 2012 | -- | -- |

Any changes in the permit application specifications or any existing facilities which alter the impact of the facility on air quality may require a permit. Failure to obtain such a permit prior to construction may result in enforcement action. In addition, this facility may be subject to additional applicable requirements not listed in this permit.

Words or terms used in this permit shall have meanings as provided in 9 VAC 5-10-20 of the State Air Pollution Control Board Regulations for the Control and Abatement of Air Pollution. The regulatory reference or authority for each condition is listed in parentheses () after each condition.

Annual requirements to fulfill legal obligations to maintain current stationary source emissions data will necessitate a prompt response by the permittee to requests by the DEQ or the Board for information to include, as appropriate: process and production data; changes in control equipment; and operating schedules. Such requests for information from the DEQ will either be in writing or by personal contact.

The availability of information submitted to the DEQ or the Board will be governed by applicable provisions of the Freedom of Information Act, §§ 2.2-3700 through 2.2-3714 of the Code of Virginia, § 10.1-1314 (addressing information provided to the Board) of the Code of Virginia, and 9 VAC 5-170-60 of the State Air Pollution Control Board Regulations. Information provided to federal officials is subject to appropriate federal law and regulations governing confidentiality of such information.

PROCESS REQUIREMENTS

1. **Equipment** – Equipment at this facility consists of the following:

| Equipment to be Modified | | | |
|---------------------------------|---|-------------------|---------------------|
| Unit No. | Equipment Description | Rated Cap. | Federal Req. |
| EU-2 | Active Municipal Solid Waste Landfill, Solid Waste Permit No. 529 | -- | NSPS, Subpart WWW |

| Equipment Permitted Prior to the Date of this Permit | | | |
|---|---|-------------------|---------------------|
| Unit No. | Equipment Description | Rated Cap. | Federal Req. |
| EU-1 | Closed Municipal Solid Waste Landfill, Solid Waste Permit No. 40 | -- | NSPS, Subpart WWW |
| EU-3 | Construction and Demolition Debris (CDD) Landfill, Solid Waste Permit No. 591 | -- | NSPS, Subpart WWW |
| PCD-1 | Landfill gas (LFG) 8-inch utility flare, Manufacturer: Specialties | 1,362 scfm | -- |
| PCD-2 | GE Jenbacher electric generators, Model JGC 320 GS-L.L | 1,059 kW | -- |
| PCD-3 | GE Jenbacher electric generators, Model JGC 320 GS-L.L | 1,059 kW | -- |

Specifications included in the permit under this Condition are for informational purposes only and do not form enforceable terms or conditions of the permit.
 (9 VAC 5-80-1180 D 3)

2. **Design Capacity** - The design capacities of the landfills are as follows:

- Closed MSW Landfill, Solid Waste Permit No. 40 (EU-1) – 1.4 million megagrams
- Active MSW Landfill, Solid Waste Permit No. 529 (EU-2) – 12.71 million m³
- CDD Landfill, Solid Waste Permit No. 591 (EU-3) – 3.59 million m³

A change in the design capacity may require a permit to modify and operate.
 (9 VAC 5-80-1180)

3. **Emissions Testing** - The generators (PCD-2 and PCD-3) and utility flare (PCD-1) shall be constructed so as to allow for emissions testing upon reasonable notice at any time, using appropriate methods. Sampling ports shall be provided when requested and safe sampling platforms and access shall be provided.
 (9 VAC 5-50-30 F and 9 VAC 5-80-1180)

4. **Maintenance and Operation** – The permittee must maintain and operate the two generator (PCD-2 and PCD-3) engines according to the manufacturer’s written instructions or

procedures developed by the permittee that are approved by the manufacturer, over the entire life of the engine. The two 1,059 kW engines must be installed and configured according to the manufacturer's specifications, and the permittee may only change those settings that are approved by the manufacturer. The permittee must also maintain documentation indicating that the engines meet the requirements of Condition 18.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)

5. **LFG Collection and Control System: Design and Operational Standards** – The permittee shall install a LFG collection and control system that captures the gas generated within the landfill as required by 40 CFR § 60.752 (b) (2) (ii) (A) or (B) and 40 CFR § 60.752 (b) (2) (iii) within 30 months after the first annual non methane organic compounds (NMOC) emission rate report, required in Condition 30, in which the NMOC emission rate equals or exceeds 50 megagrams per year, unless Tier 2 or Tier 3 sampling demonstrates that the NMOC emission rate is less than 50 megagrams per year.
(9 VAC 5-50-410 and 40 CFR § 60.752 (b))

6. **Fugitive Dust and Fugitive Emission Controls** - Unless otherwise specified, fugitive dust emission controls shall include the following or equivalent as a minimum:
- a. Dust from grading, cell construction, waste compaction, application of daily cover, wood waste chipping operations, storage piles and traffic areas shall be controlled by wet suppression or equivalent (as approved by the DEQ) control measures.
 - b. All material being stockpiled shall be kept moist to control dust during storage and handling, or covered to minimize emissions.
 - c. Dust from haul roads shall be controlled by wet suppression and prompt removal of dried sediment resulting from soil erosion and dirt spilled or tracked onto paved surfaces within the landfill.
 - d. Reasonable precautions shall be taken to prevent deposition of dirt on public roads and subsequent dust emissions. Dirt spilled or tracked onto paved surfaces shall be promptly removed to prevent particulate matter from becoming airborne.

(9 VAC 5-80-1180 and 9 VAC 5-50-90)

7. **Dust Control Plan** - In order to minimize the duration and frequency of excess emissions, the permittee shall implement the DEQ-approved Dust Control Plan which outlines the preventive measures to be implemented for dust control at the landfill. The plan shall include the following minimum requirements as approved by DEQ:
- a. Identification of the personnel responsible for overseeing dust control,
 - b. Description and the frequency of measures to be taken to prevent excess emissions from grading, cell construction, waste compaction and daily cover application,

- c. Description and the frequency of measures to be taken to prevent excess emissions from storage piles and stockpiling operations, and
- d. Description and the frequency of measures to be taken to prevent dust from haul roads and other unpaved surfaces, and description and the frequency of measures to be taken to prevent deposition of dirt on paved surfaces within the landfills and access roads entering the landfill.

(9 VAC 5-80-1180)

8. **Emissions Calculations** - The permittee shall use either of the following equations (Equation 1 or Equation 2) to calculate the annual NMOC emission rate. The default values to be used in both equations are 0.05 per year for k, 170 cubic meters per megagram for L_O, and 4000 parts per million by volume as hexane for C_{NMOC}. If obtained, the site-specific value for C_{NMOC}, as determined by using the procedure specified in Condition 23, and/or the site-specific value for k, as determined by using the procedure specified in Condition 24, shall be used in lieu of the default value for C_{NMOC} and/or k in calculating the NMOC emission rate.

- a. Equation 1 shall be used if the actual year-to-year solid waste acceptance rate is known:

$$M_{NMOC} = \sum_{i=1}^n 2kL_o M_i (e^{-kt_i})(C_{NMOC})(3.6 \times 10^{-9})$$

.....Equation 1

- M_{NMOC} = Total NMOC emission rate from the landfill, 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 solid waste in the ith section, megagrams
- t_i = age of the ith section, years
- C_{NMOC} = concentration of NMOC, parts per million by volume as hexane
- 3.6x10⁻⁹= conversion factor

The mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value for M_i if documentation of the nature and amount of such wastes is maintained.

- b. Equation 2 shall be used if the actual year-to-year solid waste acceptance rate is unknown:

$$M_{NMOC} = 2L_O R(e^{-kc} - e^{-kt})(C_{NMOC})(3.6 \times 10^{-9})$$

.....Equation 2

- M_{NMOC} = mass emission rate of NMOC from the landfill, megagrams per year
- L_O = methane generation potential, cubic meters per megagram solid waste
- R = average annual acceptance rate, megagrams per year
- k = methane generation rate constant, year⁻¹
- t = age of the landfill, years
- C_{NMOC} = concentration of NMOC, parts per million by volume as hexane
- c = time since closure, years (for an active landfill $c = 0$ and $e^{-kc} = 1$)
- 3.6×10^{-9} = conversion factor

The mass of nondegradable solid waste may be subtracted from the average annual acceptance rate when calculating a value for R, if documentation of the nature and amount of such wastes is maintained.

(9 VAC 5-50-410 and 40 CFR § 60.754 (a) (1))

OPERATING/EMISSION LIMITATIONS

9. **Fuel (Generators)** – The approved fuel for the two generators (PCD-2 and PCD-3) is LFG. A change in the fuel may require a permit to modify and operate.
(9 VAC 5-80-1180)
10. **Fuel Specification (Generators)** - The LFG shall meet a minimum heat content of 365 Btu/scft LHV as determined by a DEQ-approved method.
(9 VAC 5-80-1180)
11. **Fuel Throughput (Generators)** – Total annual fuel throughput to the two generators (PCD-2 and PCD-3) shall not exceed the following levels, as indicated in the table below:

| Approved Fuel Type | Quantity Allowed |
|--------------------|----------------------------------|
| Landfill Gas | 470.6×10^6 SCF per year |

Throughput of the fuel shall be calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by

adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)

12. **Monitoring Device (Generators)** – The two generators (PCD-2 and PCD-3) shall be equipped with a device to continuously measure the landfill gas consumed by the engines. The monitoring device shall be installed, maintained, calibrated and operated in accordance with approved procedures which shall include, as a minimum, the manufacturer's written requirements or recommendations. The monitoring device shall be provided with adequate access for inspection and shall be in operation when the generators are operating.
(9 VAC 5-80-1180 D)

13. **Hourly Emission Limits (Generators)** - Emissions from the operation of each of the two generators (PCD-2 and PCD-3) shall not exceed the limits specified below:

| | |
|--|-----------|
| Particulate Matter | 0.5 lb/hr |
| PM-10 | 0.5 lb/hr |
| Sulfur Dioxide | 0.4 lb/hr |
| Nitrogen Oxides (as NO ₂) | 1.9 lb/hr |
| Carbon Monoxide | 9.7 lb/hr |
| Volatile Organic Compounds | 0.6 lb/hr |

These emissions are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Conditions 9, 10, and 18.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)

14. **Annual Emission Limits (Generators)** – Total emissions from the two generators (PCD-2 and PCD-3) shall not exceed the limits specified below:

| | |
|--|--------------|
| Particulate Matter | 4.2 tons/yr |
| PM-10 | 4.2 tons/yr |
| Sulfur Dioxide | 1.8 tons/yr |
| Nitrogen Oxides (as NO ₂) | 17.0 tons/yr |
| Carbon Monoxide | 85.0 tons/yr |
| Volatile Organic Compounds | 5.7 tons/yr |

These emissions are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Conditions 9, 10, 11, and 18.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)

15. **Fuel (Utility Flare)** - The approved fuel for the utility flare (PCD-1) is LFG. Propane gas may be used as fuel to ignite the pilot flame. A change in the fuel may require a permit to modify and operate.
(9 VAC 5-80-1180)

16. **Operating and Training Procedures** - Emissions from the utility flare (PCD-1) shall be controlled by proper operation and maintenance. The operators shall be trained in the proper operation of all such equipment. Training shall consist of a review and familiarization of the manufacturer's operating instructions, at minimum. The permittee shall maintain records of the required training including a statement of time, place and nature of training provided. The permittee shall have available good written operating procedures and a maintenance schedule for the utility flares. These procedures shall be based on the manufacturer's recommendations, at a minimum. All records required by this condition shall be kept on site and made available for inspection by the DEQ.
(9 VAC 5-80-1180)

17. **Emission Limits** - Emissions from the operation of the utility flare (PCD-1) shall not exceed the limits specified below:

| | | |
|--|-------------|--------------|
| Particulate Matter | 0.7 lbs/hr | 3.0 tons/yr |
| PM-10 | 0.7 lbs/hr | 3.0 tons/yr |
| Sulfur Dioxide | 0.3 lbs/hr | 1.4 tons/yr |
| Nitrogen Oxides (as NO ₂) | 2.8 lbs/hr | 12.2 tons/yr |
| Carbon Monoxide | 15.1 lbs/hr | 66.2 tons/yr |

These emissions are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Conditions 15 and 16.

(9 VAC 5-80-1180 and 9 VAC 5-50-260)

18. **Process Emission Limits** - Emissions from the operation of each of the two generators (PCD-2 and PCD-3) shall not exceed the limits specified below:

| | |
|------------------------------------|--------------------------------|
| Carbon Monoxide (CO) | 610 ppmvd @ 15% O ₂ |
| Nitrogen Oxides (NO _x) | 220 ppmvd @ 15% O ₂ |
| Volatile Organic Compounds (VOC) | 80 ppmvd @ 15% O ₂ |

Compliance with these emission limits may be determined by keeping records of engine manufacturer data or the most recent stack test data indicating compliance with these emission limits.

(9 VAC 5-80-1180 and 9 VAC 5-50-260)

19. **Visible Emission Limit** - Visible emissions from the two generators (PCD-2 and PCD-3) shall not exceed 10 percent opacity except during one six-minute period in any one hour in which visible emissions shall not exceed 20 percent opacity as determined by EPA Method 9 (reference 40 CFR 60, Appendix A). This condition applies at all times except during startup, shutdown, and malfunction.

(9 VAC 5-50-80 and 9 VAC 5-80-1180)

20. **Visible Emission Limit** - The utility flare (PCD-1) shall be designed for and operated with no visible emissions, except for periods not to exceed a total of five minutes during any two consecutive hours.

(9 VAC 5-50-260)

21. **Visible Emission Limit** - Visible emissions from the landfill shall not exceed 20 percent opacity as determined by EPA Method 9 (reference 40 CFR Part 60, Appendix A), except for one six-minute period in any one hour which shall not exceed 30 percent opacity.
(9 VAC 5-80-1180)
22. **Requirements by Reference** - Except where this permit is more restrictive than the applicable requirement, the MSW landfill shall be operated in accordance with 40 CFR 60, Subpart WWW.
(9 VAC 5-80-1180, 9 VAC 5-50-400 and 9 VAC 5-50-410)

TESTING

23. **Tier 2 Testing** - When determining the Tier 2 site-specific NMOC concentration, the permittee shall use the following sampling procedure. The permittee shall install at least two sample probes per hectare of landfill surface that has retained waste for at least two years. If the landfill is larger than 25 hectares in area, only 50 samples are required. The sample probes should be located to avoid known areas of nondegradable solid waste. The permittee shall collect and analyze one sample of landfill gas from each probe to determine the NMOC concentration using Method 25C of Appendix A of 40 CFR Part 60 or Method 18 of Appendix A of 40 CFR Part 60. If using Method 18 of Appendix A of 40 CFR Part 60, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42). If composite sampling is used, equal volumes shall be taken from each sample probe. If more than the required number of samples are taken, all samples shall be used in the analysis. The permittee shall divide the NMOC concentration from Method 25C of Appendix A of 40 CFR Part 60 by six to convert from C_{NMOC} as carbon to C_{NMOC} as hexane. If the landfill has an active or passive gas removal system in place, Method 25 or 25C samples may be collected from these systems instead of surface probes provided the removal system can be shown to provide sampling as representative as the two sampling probe per hectare requirement. For active collection systems, samples may be collected from the common header pipe before the gas moving or condensate removal equipment. For these systems, a minimum of three samples must be collected from the header pipe. The permittee shall submit a test protocol at least 30 days prior to testing. One copy of the test results shall be submitted to the DEQ within 45 days after test completion.
(9 VAC 5-50-410 and 40 CFR § 60.754 (a) (3))
24. **Tier 3 Testing** – The Tier 3 site-specific methane generation rate constant shall be determined using the procedure provided in 40 CFR Part 60, Appendix A, Method 2E. The permittee shall submit a test protocol at least 30 days prior to testing. One copy of the test results shall be submitted to the DEQ within 45 days after test completion.
(9 VAC 5-50-410 and 40 CFR § 60.754 (a) (4))

25. **Alternate Method Testing** – The permittee may use other methods to determine the NMOC concentration or a site-specific methane rate generation constant as an alternative to the methods required in Conditions 23 and 24 if the method has been approved by the EPA. (9 VAC 5-50-410 and 40 CFR § 60.754 (a) (5))

CONTINUING COMPLIANCE DETERMINATION

26. **Visible Emission Evaluation: Continuing Compliance** – Upon request by the DEQ, the permittee shall conduct additional visible emission evaluations on each of the two generators (PCD-2 and PCD-3) to demonstrate compliance with the visible emission limit contained in this permit. The details of the tests shall be arranged with the DEQ. (9 VAC 5-50-30 G)
27. **Fuel Testing (LFG)** - The permittee shall conduct annual testing of the on-site generated LFG to be burned in the two generators (PCD-2 and PCD-3) to demonstrate compliance with the fuel specifications contained in this permit, as stipulated in Condition 10. The annual test shall be conducted no later than 12 months after the previous test. Details of the tests shall be arranged with the DEQ. One copy of the test results shall be submitted to the DEQ, within 60 days after test completion and shall conform to the test report format enclosed with this permit. (9 VAC 5-50-30 G)
28. **Visual Survey** - At least daily, the permittee shall visually survey the trafficable roads at the site and landfill activities for any sources of excessive fugitive emissions. For the purpose of this survey, excessive emissions are considered to be any visible emissions that leave the facility site boundaries. The presence of excessive fugitive emissions shall require further investigation as to the cause of the emissions and timely corrective action shall be taken. If water is used to control the fugitive dust emissions, the permittee shall take care not to create a water quality problem from surface water runoff. All observations and corrective actions taken shall be logged and recorded. (9 VAC 5-80-1180)

RECORDS AND REPORTING

29. **On Site Records** - The permittee shall maintain records of emission data and operating parameters as necessary to demonstrate compliance with this permit. The content and format of such records shall be arranged with the DEQ. These records shall include, but are not limited to:
- a. Readily accessible, on-site records of the maximum design capacity.
 - b. Annual calculated mass emission rate of NMOC from the landfill.
 - c. The current amount of solid waste in-place.

- d. The year-by-year or average waste acceptance rate.
- e. Site-specific values for C_{NMOC} and k , if obtained.
- f. Age of landfill.
- g. Description, location, amount, and placement date of all nondegradable refuse including asbestos and demolition refuse placed in landfill areas, which are excluded from landfill gas estimation.
- h. Installation date and location of all vents.
- i. A copy of the DEQ-approved Dust Control Plan.
- j. Daily logs of the visual survey of the trafficable roads at the site and landfill activities to include the following:
 - i. The date, time, and name of the person performing each inspection;
 - ii. Whether or not excessive fugitive emissions are observed and the suspected cause of such emissions; and
 - iii. The date, time, and type of corrective actions taken.
- k. Monthly and annual throughput of LFG in cubic feet to the utility flare (PCD-1). Annual throughput shall be calculated monthly as the sum of each consecutive 12-month period.
- l. Annual throughput of LFG in cubic feet to the two generators (PCD-2 and PCD-3), calculated monthly as the sum of each consecutive 12-month period.
- m. Operation and control device monitoring records for the two generators (PCD-2 and PCD-3) as required in Condition 12.
- n. The results of all LFG fuel heat content tests to verify compliance with Condition 10.
- o. Scheduled and unscheduled maintenance, and operator training.
- p. The results of all visible emission evaluations.
- q. Records of the generator engines' manufacturer data, as required in Condition 4.
- r. Records to show compliance with the process emission limits as required in Condition 18.

These records shall be available for inspection by the DEQ and shall be current for the most recent five years.

(9 VAC 5-50-50, 9 VAC 5-80-1180 and 9 VAC 5-50-410)

30. **Annual NMOC Emission Report** - Not later than April 15 of each year, the permittee must submit an annual NMOC emission rate report to the DEQ. The NMOC emission rate shall be calculated in accordance with the methodology contained in Condition 8. The report shall include all data, calculations, sample reports and measurements used to estimate the emissions. If the estimated NMOC emission rate as reported in the annual report is less than 50 megagrams per year in each of the next five consecutive years, the permittee may elect to submit an estimate of the NMOC emission rate for the next five-year period in lieu of the annual report. This estimate shall include the current amount of solid waste-in-place and the estimated waste acceptance rate for each year of the five years for which an NMOC emission rate is estimated. This estimate shall be revised at least once every five years. If the actual waste acceptance rate exceeds the estimated waste acceptance rate in any year reported in the five-year estimate, a revised five-year estimate shall be submitted. The revised estimate shall cover the five-year period beginning with the year in which the actual waste acceptance rate exceeded the estimated waste acceptance rate.
(9 VAC 5-50-410 and 40 CFR § 60.757 (b))

31. **Requirements When Reported NMOC Emission Rate > 50 Mg/yr** - If the reported NMOC emission rate, in the annual report, is equal to or exceeds 50 megagrams per year, the permittee shall:
- a. Submit a LFG gas collection and control system design plan as per 40 CFR § 60.752 (b) (2); or
 - b. Within 180 days of the emission rate report in Condition 30, demonstrate, using a site-specific NMOC concentration (Tier 2), that NMOC emissions do not equal or exceed 50 megagrams per year, submit a revised NMOC emission rate report, resume annual NMOC emission rate reporting, and retest the site-specific NMOC concentration every five years.

(9 VAC 5-50-410, 40 CFR § 60.752 (b) (2) and 40 CFR § 60.757 (c) (1))

32. **Requirements When NMOC Emission Rate > 50 Mg/yr (when using site-specific C_{NMOC})** - If, using a site-specific NMOC concentration, the NMOC emission rate is equal to or exceeds 50 megagrams per year, the permittee shall:
- a. Submit an LFG collection and control system design plan as per 40 CFR § 60.752 (b) (2),
or

- b. Within one year of the emission rate report in Condition 30, demonstrate using a site-specific methane generation constant (Tier 3), that NMOC emissions do not equal or exceed 50 megagrams per year, submit a revised NMOC emission rate report and resume annual NMOC emission rate reporting.

(9 VAC 5-50-410, 40 CFR § 60.752 (b) (2) and 40 CFR § 60.757 (c) (2))

33. **LFG Collection and Control System Design Plan** - The LFG collection and control system design plan required by Condition 31 or Condition 32 shall be submitted to the DEQ, within one year after submitting the NMOC emission rate report required in Condition 30, reporting an NMOC emission rate which equals or exceeds 50 megagrams per year.

(9 VAC 5-50-410 and 40 CFR § 60.752 (b) (2) (i))

NOTIFICATIONS

34. **Solid Waste Permit Amendment** - If the permittee is required to install a gas collection and control system according to the provisions of 9 VAC 5-50-410 Subpart WWW, the permittee shall apply for a solid waste permit amendment in accordance with Part VII (9 VAC 20-80-480 et seq.) of 9 VAC 20 Chapter 80 (Solid Waste Management Regulations).

(9 VAC 5-80-1180)

35. **Closure Report** - The permittee shall submit a closure report to the DEQ, within 30 days of the date the MSW landfill stopped accepting waste.

(9 VAC 5-50-410 and 40 CFR § 60.757 (d))

36. **Annual Emission Report for Fee Calculation** - The actual emissions covered by the permit program fees for the preceding year shall be calculated by the owner and submitted to the department by April 15 of each year. The calculations and final amount of emissions are subject to verification and final determination by the department.

(9 VAC 5-80-340 C)

GENERAL CONDITIONS

37. **Permit Suspension/Revocation** - This permit may be suspended or revoked if the permittee:

- a. Knowingly makes material misstatements in the permit application or any amendments to it;
- b. Fails to comply with the conditions of this permit;
- c. Fails to comply with any emission standards applicable to a permitted emissions unit;
- d. Causes emissions from the stationary source which result in violations of, or interfere with the attainment and maintenance of, any ambient air quality standard; or

- e. Fails to operate in conformance with any applicable control strategy, including any emission standards or emission limitations, in the State Implementation Plan in effect at the time an application for this permit is submitted.

(9 VAC 5-80-1210 F)

38. **Right of Entry** - The permittee shall allow authorized local, state, and federal representatives, upon the presentation of credentials:
- a. To enter upon the permittee's premises on which the facility is located or in which any records are required to be kept under the terms and conditions of this permit;
 - b. To have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit or the State Air Pollution Control Board Regulations;
 - c. To inspect at reasonable times any facility, equipment, or process subject to the terms and conditions of this permit or the State Air Pollution Control Board Regulations; and
 - d. To sample or test at reasonable times.

For purposes of this condition, the time for inspection shall be deemed reasonable during regular business hours or whenever the facility is in operation. Nothing contained herein shall make an inspection time unreasonable during an emergency.

(9 VAC 5-170-130 and 9 VAC 5-80-1180)

39. **Maintenance/Operating Procedures** - The permittee shall take the following measures in order to minimize the duration and frequency of excess emissions, with respect to air pollution control equipment and process equipment which affect such emissions:
- a. Develop a maintenance schedule and maintain records of all scheduled and non-scheduled maintenance.
 - b. Maintain an inventory of spare parts.
 - c. Have available written operating procedures for equipment. These procedures shall be based on the manufacturer's recommendations, at a minimum.
 - d. Train operators in the proper operation of all such equipment and familiarize the operators with the written operating procedures. The permittee shall maintain records of the training provided including the names of trainees, the date of training and the nature of the training.

Records of maintenance and training shall be maintained on site for a period of five years and shall be made available to DEQ personnel upon request.

(9 VAC 5-50-20 E and 9 VAC 5-80-1180 D)

40. **Record of Malfunctions** – The permittee shall maintain records of the occurrence and duration of any bypass, malfunction, shutdown or failure of the facility or its associated air pollution control equipment that results in excess emissions for more than one hour. Records shall include the date, time, duration, description (emission unit, pollutant affected, cause), corrective action, preventive measures taken and name of person generating the record.
(9 VAC 5-20-180 J and 9 VAC 5-80-1180 D)
41. **Notification for Facility or Control Equipment Malfunction** - The permittee shall furnish notification to the DEQ, of malfunctions of the affected facility or related air pollution control equipment that may cause excess emissions for more than one hour, by facsimile transmission, telephone or telegraph. Such notification shall be made as soon as practicable but not later than four daytime business hours after the malfunction is discovered. The permittee shall provide a written statement giving all pertinent facts, including the estimated duration of the breakdown, within 14 days of the occurrence. When the condition causing the failure or malfunction has been corrected and the equipment is again in operation, the permittee shall notify the DEQ.
(9 VAC 5-20-180 C and 9 VAC 5-80-1180)
42. **Violation of Ambient Air Quality Standard** - The permittee shall, upon request of the DEQ, reduce the level of operation or shut down a facility, as necessary to avoid violating any primary ambient air quality standard and shall not return to normal operation until such time as the ambient air quality standard will not be violated.
(9 VAC 5-20-180 I and 9 VAC 5-80-1180)
43. **Change of Ownership** - In the case of a transfer of ownership of a stationary source, the new owner shall abide by any current permit issued to the previous owner. The new owner shall notify the DEQ, of the change of ownership within 30 days of the transfer.
(9 VAC 5-80-1240)
44. **Permit Copy** - The permittee shall keep a copy of this permit on the premises of the facility to which it applies.
(9 VAC 5-80-1180)

SOURCE TESTING REPORT FORMAT

Report Cover

1. Plant name and location
2. Units tested at source (indicate Ref. No. used by source in permit or registration)
3. Test Dates.
4. Tester; name, address and report date

Certification

1. Signed by team leader/certified observer (include certification date)
2. Signed by responsible company official
3. *Signed by reviewer

Copy of approved test protocol

Summary

1. Reason for testing
2. Test dates
3. Identification of unit tested & the maximum rated capacity
4. *For each emission unit, a table showing:
 - a. Operating rate
 - b. Test Methods
 - c. Pollutants tested
 - d. Test results for each run and the run average
 - e. Pollutant standard or limit
5. Summarized process and control equipment data for each run and the average, as required by the test protocol
6. A statement that test was conducted in accordance with the test protocol or identification & discussion of deviations, including the likely impact on results
7. Any other important information

Source Operation

1. Description of process and control devices
2. Process and control equipment flow diagram
3. Sampling port location and dimensioned cross section Attached protocol includes: sketch of stack (elevation view) showing sampling port locations, upstream and downstream flow disturbances and their distances from ports; and a sketch of stack (plan view) showing sampling ports, ducts entering the stack and stack diameter or dimensions

Test Results

1. Detailed test results for each run
2. *Sample calculations
3. *Description of collected samples, to include audits when applicable

Appendix

1. *Raw production data
2. *Raw field data
3. *Laboratory reports
4. *Chain of custody records for lab samples
5. *Calibration procedures and results
6. Project participants and titles
7. Observers' names (industry and agency)
8. Related correspondence
9. Standard procedures

* Not applicable to visible emission evaluations

ATTACHMENT B

Memo for Minor NSR Permit dated July 17, 2009, as amended September 6, 2012

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Valley Regional Office

INTRA-AGENCY MEMORANDUM

4411 Early Road - P. O. Box 3000

Harrisonburg, VA 22801-3000

| | | | | |
|---|------------------------------------|-----------------------------|---------|----------------------------|
| Permit Writer | Trevor H. Wallace <i>THW</i> | Date | 8/21/12 | |
| Air Permit Manager | Janardan R. Pandey <i>JRP</i> | Date | 8/29/12 | |
| Memo to | Air Permit File | | | |
| Facility Name | Frederick County Regional Landfill | | | |
| Registration Number | 81312 | | | |
| County-Plant I.D. | 069-0127 | | | |
| UTM Coordinates (Zone 17) | 749.1 | Easting (km) | 4336.4 | Northing (km) |
| Elevation (feet) | 710 | | | |
| Distance to Nearest Class I Area (select one) | ~14 | SNP (km) | -- | JRF (km) |
| FLM Notification Required (Y/N) | N | | | |
| AFS Classification (A, SM80, SM, B) | A | Before permit action | A | After permit action |
| Pollutants for Which the Source is Title V Major | CO | Before permit action | CO | After permit action |
| PSD Major Source (Y/N) | N | Before permit action | N | After permit action |
| Pollutants for Which the Source is PSD Major | NA | Before permit action | NA | After permit action |

61

I. Introduction

The Frederick County Regional Landfill (facility or Landfill) is a municipal solid waste (MSW) management facility. The 544-acre landfill accepts household and commercial waste, construction/demolition/debris (CDD) and sludge. The landfill includes three sites with solid waste permits, as indicated, with the following descriptions: an active landfill located south of Route 655 (Solids Waste Permit No. 529, NSR Permit Ref. EU-2), a closed landfill south of the active landfill and west of Opequon Creek (Solid Waste Permit No. 40, NSR Permit Ref. EU-1), and a CDD landfill located southwest of the closed landfill (Solid Waste Permit No. 591, NSR Permit Ref. EU-3).

The closed landfill operated from 1977 through 1993 and accepted approximately 1.5 million tons of waste. The active MSW landfill has a total proposed design capacity of 16.63 million yd³ (12.71 million m³) and began accepting waste in 1993. The CDD landfill has a total design capacity of 4.7 million yd³ (3.59 million m³) and began accepted waste in 1998 (see Attachment A). The active MSW landfill and the closed landfill contain an active gas collection and control system (GCCS). Landfill gas (LFG) is collected by the GCCS, which includes gas collection wells, and header lines leading to on-site pollution control devices, which include a LFG-fired utility flare (Ref. PCD-1) and two LFG engine generator sets (Refs. PCD-1 and PCD-2). The facility is currently permitted under a minor New Source Review (NSR) permit dated July 17, 2009.

On September 21, 2010, DEQ approved a minor amendment to the facility's Solid Waste Permit 529. The total landfill design capacity included in the amended permit is 16,630,563 yd³ (12.71 million m³) with a waste volume of 14,135,978 yd³. Given a potential waste density of 0.8 ton/yd³, the final waste in-place would be 11.31 million tons. The amended design capacity is an increase in the currently permitted (NSR permit approved July 17, 2009) capacity of 11.79 million m³ (15.42 million yd³) and is the result of proposed steeper base side slopes and lower base grades for Phases 2B, 3, and 4.

The facility submitted a minor NSR permit application (Form 7) dated June 24, 2012 that was received by the DEQ Valley Regional Office on June 28, 2012. The facility proposes to amend the NSR permit to reflect the increase in design capacity. The amended capacities noted above are divergent of those included in the NSR permit application request dated June 24, 2012. Given these values are the basis for the approved Solid Waste Permit No. 529, capacities matching those included in the solid waste permit will be reflected in the NSR permit. The applicant was notified of the discrepancy and resolution.

II. Emission Unit(s) / Process Description(s)

As noted above, Frederick County proposes to steepen the base side slopes and lower the base grades of the active MSW landfill Phases 2B, 3, and 4. The changes increase the landfill design capacity (volume) by approximately 1.21 million yd³.

The facility submitted a Tier 2 emissions rate report for non-methane organic compounds (NMOC) on June 20, 2012; the estimated annual NMOC emission was estimated to be 9 Mg (9.9 tons), based on a NMOC concentration of 82 ppmv (as hexane).

Pollutants emitted from the landfill are volatile organic compounds (VOC), non-methane organic NMOC, hydrogen sulfide (H₂S), total reduced sulfur (TRS), various hazardous air pollutants (HAPs), and greenhouse gases (GHG or CO_{2e}). Projected emissions from the landfill were calculated using the LandGEM model, AP-42 Section 2.4 – Municipal Solid Waste Landfills, and

the EPA/EREF Research Bulletin quantifying LFG emissions (Volume 5, Issue 3 – See Attachment F). Maximum emissions based on the proposed capacity were projected to occur in the year 2046.

III. Regulatory Review

A. 9 VAC 5 Chapter 80, Article 6 - Minor New Source Review

Although the project includes the modification of a New Source Performance Standards (NSPS) source, the proposed modification is not automatically subject to permitting; 9 VAC 5-80-1100 E (2) states that “An affected facility subject to Article 5 of Part II of 9 VAC 5 Chapter 50 shall not be exempt from the provisions of this article except where the affected facility is constructed, reconstructed, or modified at a stationary source which has a current permit for similar affected facilities that requires compliance with the emission standards and other requirements that are no less stringent than the provisions of Article 5 of 9 VAC 5 Chapter 50.” Because the permitted facility already includes NSPS affected “equipment”, the modification of the landfill which is subject to the NSPS does not automatically trigger permitting.

To determine NSR permitting applicability the net emissions increase (NEI) of criteria pollutants from the project and the potential emissions of hazardous air pollutants (HAPs) from the facility must be evaluated.

The net emission increase (NEI) of criteria pollutants to determine minor NSR permitting applicability is evaluated for the increase in design capacity. The NEI for criteria pollutants from the proposed projects is evaluated as the sum of the new uncontrolled (NU) emissions less the sum of current uncontrolled (CU) emissions; $NEI = NU - CU$.

The LandGEM model was used to calculate both NU and CU emissions; the site specific NMOC concentration of 82 ppmv, obtained through the Tier 2 testing, was used for all model runs. Emissions of TRS are based on the October 2011 LFG TRS measured value of 61.0 ppmv and a molecular weight of 32.07. Emissions of hydrogen sulfide (H₂S) are based on the EPA/EREF Research Bulletin emission rate of 97.24 ppmv, rather than the AP-42 default concentration of 35.50 ppmv, and a molecular weight of 34.02, as a conservative estimate.

There are no changes in the emissions resulting from LFG combusted by the flare and engine generator sets. These units are throughput limited with corresponding numeric emission limits for PM, PM-10, SO₂, NO_x, CO, and VOC. There are also no changes to the fugitive emissions of particulate matter (PM and PM-10) associated with this project; since the emissions are equal, a comparison of the emissions would result in a NEI of zero for each pollutant. Therefore, those pollutants have not been included in the permitting evaluation.

CU emissions are calculated using the previous landfill design capacity of 11.79 million m³ included in the NSR permit. CU emissions are based on emissions from the year 2043; the year maximum emissions are projected to occur. NU emissions are calculated using the proposed increased landfill design capacity of 12.71 million m³. NU emissions are based on emissions from the year 2046; the year maximum emissions are projected to occur based on the revised design capacity.

Emissions from the proposed project, calculated as described above, are compared to the exemption levels in 9 VAC 5-80-1320 D.1 for criteria pollutants. The NEI calculation is provided in Table 1 below. A summary of the LandGEM emission calculations and NEI calculation is provided in Attachment B; detailed LandGEM models are provided in Attachment C.

Table 1: Net Emissions Increase

| Pollutant | NU Emissions (tons/yr) | CU Emissions (tons/yr) | NEI = NU- CU (tons/yr) | Exemption Levels (tons/yr) ^a | Exempt? |
|------------------|------------------------|------------------------|------------------------|---|---------|
| NMOC | 14.22 | 13.88 | 0.35 | 22 | Yes |
| VOC ^b | 5.55 | 5.41 | 0.14 | 10 | Yes |
| CO | 7.89 | 7.70 | 0.19 | 100 | Yes |
| H ₂ S | 6.66 | 6.50 | 0.16 | 9 | Yes |
| TRS ^c | 3.94 | 3.84 | 0.10 | 9 | Yes |

^a Exemption levels taken from 9 VAC 5-80-1320 D.1. modified sources.

^b VOC emissions are assumed to be 39 percent of NMOC.

^c TRS was evaluated assumed to have a concentration of 61.0ppmv and a molecular weight of 32.07.

As shown above in Table 1, emissions of criteria pollutants are less than the exemption levels in 9 VAC 5-80-1320 D.1.

In determining whether the proposed changes are exempt from permitting, the change must be exempt from the provisions of 9 VAC 5-80-1320 D and 9 VAC 5-80-1320 E.

The landfill is subject to NSPS, Subpart WWW and is included in a source category that is subject to MACT, Subpart AAAA. This landfill is, however, not subject to the MACT, Subpart AAAA requirements given that it does meet any of the MACT applicability triggers, as discussed below in Section III.E. Compliance requirements under MACT, Subpart AAAA are compliance with NSPS, Subpart WWW. Given the landfill is a source in a source category subject to MACT, Subpart AAAA, DEQ deems this facility to be exempt from toxics evaluation based on 9 VAC 5-60-300 C.4. Although toxics are not required for formal evaluation, a summary of the LandGEM predicted uncontrolled toxic emissions is provided in Attachment B; detailed LandGEM models are provided in Attachment C.

Since the proposed project is exempt under 9 VAC 5-80-1320 D and toxics evaluation is not required, the proposed project is exempt from NSR permitting. The NSR permit must be amended to reflect the change in design capacity; the action is considered an exempt modification, or a significant amendment, in accordance with 9 VAC 5-80-1290 A.2(b).

B. 9 VAC 5 Chapter 80, Article 8 - PSD Major New Source Review

The PSD major source threshold is 250 tons per year for each regulated pollutant. The facility does not have the potential to emit greater than 250 tons/year of any regulated criteria pollutant or HAP to trigger PSD review; see tabulated annual emissions in Attachment B. The facility is not a PSD source for criteria pollutants or HAPs.

To determine if the source is a PSD source for greenhouse gas emissions (GHG), the mass basis and carbon dioxide equivalent (CO_{2e}) approach were used to calculate emissions to show “existing conditions”, as outlined in the EPA manual, *PSD and Title V*

Permitting Guidance for Greenhouse Gases flowchart (included as Attachment D of this engineering memo).

Under the PSD program the definition of *Major Stationary Source*, as defined in 9 VAC 5-80-1615 C, subsection “c” of the definition, excludes fugitive emissions of a stationary source in determining whether it is a major stationary source. Fugitive emissions are “those emissions that could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening” (9 VAC 5-80-1615 C). For MSW landfills EPA has determined, as provided in an October 21, 1994 policy memorandum (included as Attachment E), that LFG which cannot reasonably be collected is considered fugitive, while LFG that can be reasonably collected is not considered fugitive even if it is not currently being collected.

In the NSPS Subpart WWW, the EPA directs landfills to utilize AP-42 when calculating emissions for PSD purposes. In AP-42, Section 2-4 (11/98), the EPA provides direction on how to estimate landfill emissions and stipulates that, in lieu of site-specific data regarding collection efficiency, an average efficiency of 75 percent should be used. The GCCS serving the landfill is designed to collect 65 percent of the LFG emissions. Therefore, 35 percent of the uncontrolled emissions are considered fugitive and not considered with the PSD emission evaluation.

Additionally, in June 2011, the EPA deferred, for a period of three years, the application of PSD and Title V permitting requirements to carbon dioxide (CO₂) emissions from biogenic stationary sources. Biogenic CO₂ is defined as emissions of CO₂ resulting from the combustion or decomposition of biologically-based materials other than fossil fuels and mineral sources of carbon. A copy of the EPA Fact Sheet is provided in Attachment G.

Under the approach outlined above, maximum potential emissions from the facility prior to the modification are examined to determine if the facility is currently a PSD source for GHG. Using the current methane generation rate, and waste acceptance data provided by the facility, and the assumption that 35 percent of the gas generated is fugitive, emissions were calculated using the LandGEM model (V.3.02).

To determine if the source is a PSD source for greenhouse gases (GHG) prior to modification, the mass basis potential emissions must be greater than 250 tons/yr and carbon dioxide equivalent (CO_{2e}) potential emissions must be greater than 100,000 tons/yr. As shown in Table 2 below, prior to modification the facility is not a PSD source for GHG. Although the facility has mass basis potential emissions greater than 250 tons/yr, the CO_{2e} emissions are less than the PSD threshold of 100,000 tons/yr. Since the second portion of the applicability determination has not been met, the facility is not a PSD source for GHG prior to modification.

Table 2: Greenhouse Gas PSD Applicability Calculation

| Pollutant | Mass Basis (tons/yr) | CO _{2e} (tons/yr) | PSD Thresholds | | Subject to PSD? |
|--------------------------------------|-------------------------|-------------------------------|-------------------------|-------------------------------|--------------------|
| | | | Mass Basis (tons/yr) | CO _{2e} (tons/yr) | |
| Methane (GHG / CO _{2e}) | 28,150 | 28,150 | 250 | 100,000 | No |

Calculations outlining the PSD GHG calculations, including both the mass basis and CO_{2e} basis, are provided in Attachment E.

Although the facility is not a PSD source prior to modification, the emission increases must also be evaluated to determine if the proposed modification will cause emission increases greater than the PSD thresholds of 250 tons/yr for any regulated pollutants. In addition, GHG emission increases must also be evaluated to determine if the proposed modification will cause GHG emission increases greater than 250 tons/yr, on a mass basis, and 100,000 tons/yr carbon dioxide equivalent (CO_{2e}).

Table 3: Emissions Increases for PSD Applicability

| Pollutant | Increases | | PSD Thresholds | | Subject to PSD? |
|------------------------|----------------------|----------------------------|----------------------|----------------------------|-----------------|
| | Mass Basis (tons/yr) | CO _{2e} (tons/yr) | Mass Basis (tons/yr) | CO _{2e} (tons/yr) | |
| NMOC | +0.002 | -- | 250 | -- | No |
| VOC | +0.002 | -- | 250 | -- | No |
| CO ^a | 0 | -- | 250 | -- | No |
| H ₂ S | +0.003 | -- | 250 | -- | No |
| TRS | +0.001 | -- | 250 | -- | No |
| GHG / CO _{2e} | +702 | +702 | 250 | 100,000 | No |

a - Carbon monoxide (CO) is included as the worst case scenario of the emission increase for criteria pollutants resulting from LFG combustion, which include PM, PM-10, PM-2.5, SO₂, NO_x, VOC, and CO. These pollutants are each limited in the current permit, and the limits are unchanged with this action.

The proposed modification does not trigger the PSD thresholds for criteria pollutants; there are no increases above 250 ton/yr threshold for any criteria pollutants. Additionally, the proposed modification does not trigger the PSD threshold for GHG. Although the emission increase is greater than 250 tons/yr on a mass basis for GHG, there are no emissions increases above 100,000 tons/yr of CO_{2e}. A summary of the emission increases is provided in Table 3 above; detailed calculations are provided in Attachment E.

C. 9 VAC 5 Chapter 50, Part II, Article 5 - NSPS

Because the design capacity of the landfill is greater than 2.5 million megagrams (Mg) and 2.5 million m³, the landfill is subject to 40 CFR Part 60, Subpart WWW. Applicable requirements from Subpart WWW have been included in the permit.

D. 9 VAC 5 Chapter 60, Part II, Article 1 - NESHAP

Currently, there are no NESHAPs that apply to the facility.

E. 9 VAC 5 Chapter 60, Part II, Article 2 - MACT

40 CFR 63 Subpart AAAA, National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills, is not an applicable requirement for the Frederick County Regional Landfill. This is because this facility is not (1) a major source of HAP; (2) collocated with a major source of HAP; (3) an area source with a design capacity greater than or equal to 2.5 million m³ and 2.5 million Mg with estimated uncontrolled non-methane organic compounds (NMOC) emissions equal to or greater than 50 Mg/yr; or (4) an active area source landfill with a design capacity greater than or equal to 2.5 million m³ and 2.5 million Mg that operates an anaerobic bioreactor.

The uncontrolled NMOC emissions were determined to be less than 50 Mg/yr because this facility had site specific testing for the methane generation rate constant, “k value”, as per the Tier II testing requirements, completed prior to the first compliance date of 40 CFR 63 Subpart AAAAA.

F. 9 VAC 5 Chapter 40, Part II – Existing Source Regulations

9 VAC 5 Chapter 40, Article 1 – Visible Emissions and Fugitive Dust/Emissions (Rule 4-1) is applicable to the facility; however, the proposed NSR permit provides as or more stringent requirements than the existing emissions standards in Rule 4-1.

9 VAC 5 Chapter 40, Article 43 – Emission standards for Municipal Solid Waste Landfills (Rule 4-43) is applicable to the facility; however, the proposed NSR permit provides as or more stringent requirements than the existing emissions standards in Rule 4-43.

IV. **Best Available Control Technology Review (BACT) (9 VAC 5-50-260)**

As shown in Section III, Table 1, the NEI for each pollutant from the landfill is below the respective BACT exemption rates in 9 VAC 5-80-1320 D.1 for modified sources. As a result, no additional controls for the landfill are required at this time.

V. **Summary of Permitted Allowable Emissions**

With this action there is an increase in the uncontrolled emissions from the landfill as noted in Section III of the memo; however, the permit emission limitations are unchanged.

VI. **Dispersion Modeling**

A. Criteria Pollutants

As shown in Section III, Table 1, emissions of criteria pollutants fall below the significance levels contained in the *DEQ New Source Review Permits Program Manual (September 7, 2000)* and 9 VAC 5-80-1615. No modeling is required for these pollutants.

B. Toxic Pollutants

The landfill is included in a source category that is subject to MACT, Subpart AAAAA. The state toxics rule does not apply to this landfill as it is exempted under 9 VAC 5-60-300 C.4., and; therefore, no modeling is required.

VII. **Boilerplate Deviations**

The NSR Permit Template was used to draft the permit. The Landfill Review Procedures (September 1, 1999) and mswland2 were used as references and were not strictly followed since they have not been updated since 1999.

Condition numbers refer to the current permit action; condition numbers in parenthesis () refer to the NSR permit dated July 17, 2009. The following changes were made to the NSR permit dated July 17, 2009:

| Condition: | Change: |
|------------------------------|---|
| Permit-wide | "Director, Valley Region" revised to "DEQ". |
| Introduction | The permit application dates were added to the Introduction and the language updated to reflect the current boilerplate. |
| Condition 1 Condition 2 | The design capacity of the landfill was revised to reflect the proposed increase and current boilerplate language was added. |
| Condition 4 | Revised to require permittee to maintain documentation indicating the engines meet the emission limits included in Condition 18. |
| Condition 13 Condition 14 | The limit values were revised to include only one digit following the decimal as found elsewhere in the permit. Compliance demonstration language was also added to Condition 13 and updated in Condition 14. |
| Condition 17 | Compliance demonstration language referencing Conditions 15 and 16 was added. |
| Condition 18 | <p>Condition 18 assigns emission limits derived from 40 CFR 60 Subpart JJJJ according to the construction date of the engine(s) (i.e., whether construction was before or on/after July 1, 2010). Installation of PCD-2 and PCD-3 began June 11, 2010; therefore, the limits applicable to units constructed before July 1, 2010 apply and only these have been retained in the amended permit.</p> <p>The applicant requested the CO, NO_x, and VOC g/HP-hr limits be replaced with compatible concentration-based limits (ppmvd @ 15% O₂) as allowed by 40 CFR 60 Subpart JJJJ. This change will allow direct comparison of the limits with the permittee's stack test data. In EPA's Memorandum <i>Response to Public Comments on Proposed Standards of Performance for Stationary Spark Ignition Internal Combustion Engines and National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines</i> (see EPA Docket EPA-HQ-OAR-2005-0030), EPA notes they "agree with the commenter that recommended that the final rule include emission standards in concentration-based standards, and EPA has included concentration-based optional limits for NO_x, CO, and VOC in terms of ppmvd at 15 percent O₂ in the final rule. These concentration-based limits are equivalent to the g/HP-hr limits. The concentration-based limits are provided as an alternative to the g/HP-hr limits and are intended to provide flexibility and an easier compliance option for owners and operators."</p> <p>The compliance demonstration language was updated to include stack test records, as well as manufacturer data.</p> |
| Condition 23 | Additional language from the NSPS Subpart WWW was added to allow flexibility in the Tier 2 testing. The NSPS language allows facilities with active or passive gas collection systems the option to sample from the combined header pipe rather than from individual wells. |
| Condition 24 | Additional language regarding test protocol submittal was added. |

| Condition: | Change: |
|--|---|
| Condition 27 | The language for annual test was clarified. |
| (Condition 26) (Condition 27) (Condition 36) (Condition 40) | The Initial Compliance Determination Conditions 26 and 27 were addressed as required by the current permit, and as such, have been removed from the permit with this action. The Initial Notification and Permit Invalidation requirements for the Jenbacher generators (PCD-2 and PCD-3) were removed from the permit; the notification requirement has been fulfilled, and the modification is complete. |

VIII. Compliance Demonstration

No changes beyond those noted above in Section VII were made to the compliance demonstration requirements included in the July 17, 2009 NSR permit.

IX. Title V Review - 9 VAC 5 Chapter 80, Article 1

Frederick County Regional Landfill currently operates under a Title V operating permit dated September 30, 2009. The facility submitted a permit application, dated June 24, 2012 and received by DEQ June 28, 2012, to revise the Title V permit to reflect the proposed changes. The facility is classified as Title V by rule and based on their carbon monoxide potential emissions, which exceed 100 tons/yr.

Greenhouse Gases

Beginning in Step 2 of the Tailoring Rule (on or after July 1, 2011), a stationary source may be a major source subject to Title V permitting requirements solely on the basis of its GHG emissions, provided the source exceeds the thresholds established in the Tailoring Rule. Both of the following conditions must be met in order for Title V to apply under Step 2 of the Tailoring Rule to a GHG emission source:

- (1) An existing or newly constructed source emits or has the PTE GHGs in amounts that equal or exceed 100 tons/yr calculated as the sum of the six well-mixed GHGs on a mass basis (no GWP factors applied).
- (2) An existing or newly constructed source emits or has the PTE GHGs in amounts that equal or exceed 100,000 tons/yr calculated as the sum of the six well-mixed GHGs on a CO_{2e} basis (GWP factors are applied).

Table 2 included in the PSD evaluation above shows the CO_{2e} basis does not exceed the Title V threshold of 100,000 tons/yr.

X. Site Suitability

- A. The character and degree of injury to, or interference with safety, health, or the reasonable use of property which is caused or threatened to be caused:

The activities regulated in this permit have been evaluated consistent with 9 VAC 5-50-260, 9 VAC 5-60-220, and 9 VAC 5-60-320 and have been determined to meet these standards where applicable.

The emissions regulated in this permit are defined as de minimis consistent with existing DEQ policy and have therefore not been modeled as part of this permit development. Per DEQ guidance, toxic emissions were not evaluated based on the applicability of 40 CFR 60, Subpart WWW, which was promulgated as a 111(d) standard under Section 129.

B. The social and economic value of the activity involved:

This application has been deemed an exempt modification or significant amendment to an existing Minor NSR permit, and emissions increases associated with this project are below significance levels defined in 9 VAC 5-80 Article 8 and in 9 VAC 5-80 Article 9. This project is deemed to have de minimis impact on the current emissions levels and does not affect the current social and economic value of the facility.

C. The suitability of the activity to the area in which it is located:

Consistent with the Board's Suitability Policy dated 9/11/87, the activities regulated in this permit are deemed suitable as follows:

1. Air Quality characteristics and performance requirements defined by SAPCB regulations:

This permit is written consistent with existing applicable regulations. The source is a source of toxics emissions. However, the state toxics rule does not apply to this landfill as it is exempted under 9 VAC 5-60-300 C.4., and; therefore, toxics have not been evaluated. The emissions for criteria pollutants associated with this permit are below significance levels so no modeling was performed.

2. The health impact of air quality deterioration which might reasonably be expected to occur during the grace period allowed by the Regulations or the permit conditions to fix malfunctioning air pollution control equipment:

The permit requires the facility to notify the Regional Office within four business hours after discovery of any malfunction.

3. Anticipated impact of odor on surrounding communities or violation of the SAPCB Odor Rule:

No violation of Odor requirements is anticipated as a result of this permit action.

D. The scientific and economic practicality of reducing or eliminating the discharge resulting from the activity:

The state NSR program as well as the PSD and Non-Attainment programs require consideration of levels of control technology which are written into regulation to define the level of scientific and economic practicality for reducing or eliminating emissions. By properly implementing the Regulations through the issuance of this permit, the staff has addressed the scientific and economic practicality of reducing or eliminating emissions associated with this project.

XI. Other Considerations

Although this action was undertaken to address an increase in the landfill design capacity, there were changes to the emission limits for the generators, which appear to be subject to MACT, Subpart ZZZZ and NSPS, Subpart JJJJ. As noted in Section VII of the memo, the generator (PCD-2 and PCD-3) emission limits were updated based on the engine being installed prior to June 11, 2010. Only the limits applicable to units constructed before July 1, 2010 have been retained in the amended permit. Also, the applicant requested the generator g/HP-hr limits be replaced with compatible concentration-based limits (ppmvd @ 15% O₂) as allowed by 40 CFR 60 Subpart JJJJ. The concentration-based limits included in the amended permit are equivalent to the previous g/HP-hr limits. Permit language was also added to allow the permittee to demonstrate compliance with these limits via stack testing.

There are no other significant considerations for this permit. Please review the engineering memos/checklists associated with the following permits for the discussion on previous permit actions:

| CEDS Application Number | Permit Issuance Date |
|--------------------------------|-----------------------------|
| 1 | 4/3/2000 |
| 5 | 3/24/2003 |
| 6 | 6/17/2005 |
| 8 | 3/26/2007 |
| 10 | 7/17/2009 |

XII. Recommendations

Recommend issuance of the permit.

ATTACHMENTS

- Attachment A: Design Capacity of the Landfill
- Attachment B: Summary of LandGEM and NEI Calculations
- Attachment C: New Uncontrolled and Current Uncontrolled LandGEM Models
- Attachment D: Appendix D of *PSD and Title V Permitting Guidance for Greenhouse Gases*
- Attachment E: Prevention of Significant Deterioration (PSD) Applicability Calculations
- Attachment F: EPA/EREF Research Bulletin (Volume 5, Issue 3)
- Attachment G: June 2011 EPA Fact Sheet and October 21, 1994 EPA Policy Memorandum

ATTACHMENT C
Memo for Minor NSR Permit dated July 17, 2009

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
Valley Regional Office

INTRA-AGENCY MEMORANDUM

4411 Early Road - P. O. Box 3000

Harrisonburg, VA 22801-3000

| | | | | |
|---|------------------------------------|---------------------------------|------------------|--------------------------------|
| Permit Writer | Debbie D. Medlin <i>DDM</i> | Date | 17 July 2009 | |
| Air Permit Manager | Sharon G. Foley <i>S.G. Foley</i> | Date | 7.17.09 | |
| Regional Director | Amy T. Owens <i>ATO</i> | Date | 7/17/09 | |
| Memo To | Air Permit File | | | |
| Facility Name | Frederick County Regional Landfill | | | |
| Registration Number | 81312 | | | |
| County-Plant I.D. | 069-0127 | | | |
| UTM Coordinates (Zone 17) | 749.1 | Easting (km) | 4336.4 | Northing (km) |
| Elevation (feet) | 710 | | | |
| Distance to Nearest Class I Area (select one) | ~14 | SNP (km) | | JRF (km) |
| FLM Notification Required (Y/N) | N | | | |
| AFS Classification (A, SM, B) | A | Before permit action | A | After permit action |
| Pollutants for Which the Source is Title V Major | By definition | Before permit action | By definition | After permit action |
| PSD Major Source (Y/N) | N | Before permit action | N | After permit action |
| Pollutants for Which the Source is PSD Major | N/A | Before permit action | N/A | After permit action |

I. Introduction

The Frederick County Regional Landfill (facility or Landfill) is a municipal solid waste (MSW) management facility. The 544-acre landfill accepts household and commercial waste, construction/demolition/debris (CDD) and sludge. The landfill includes three sites with solid waste permits, as indicated, with the following descriptions: an active landfill located south of Route 655 (Permit No. 529), a closed landfill south of the active landfill and west of Opequon Creek (Permit No. 40), and a CDD landfill located southwest of the closed landfill (Permit No. 591).

The landfill contains an active gas collection and control system (GCCS) in two of the three waste management units, Permit No. 529 and Permit No. 40. Landfill gas is collected by the active GCCS, which includes gas collection wells, and header lines leading to an on-site pollution control device, a landfill gas-fired utility flare.

The facility is currently permitted under a minor New Source Review (NSR) permit dated June 17, 2005, as amended March 26, 2007.

II. Emission Unit(s) / Process Description(s)

The capacity of the landfill will remain the same. Frederick County proposes to add the following emission units to its permit:

- Two (2) landfill ((LFG) or biogas) fueled generators, GE Jenbacher Model JGC 320 GS-L.L, rated at 1,059 kilowatt (kW) each.

Pollutants of concern from the proposed two generators are particulate matter (PM), particulate matter equal or less than 10 μm (PM-10), carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen oxides (NO_x), volatile organic compounds (VOC), and various hazardous air pollutants (HAP). Throughout this memorandum, the HAP will be referred to as state air toxics or toxics except when discussing them in reference to federal emissions standards.

III. Regulatory Review

A. 9 VAC 5 Chapter 80 Article 6 - Minor New Source Review

Under Article 6, the proposed installation of the two LFG generators must be reviewed for permitting applicability. The uncontrolled emissions rate (UER) of criteria pollutants used to determine minor NSR permitting applicability for the proposed addition is calculated in the attachment - Facility Uncontrolled Emissions. The UER is based on unrestricted and uncontrolled emissions at 8,760 hours for the landfill because the proposed additions are new emissions units. The UER calculations are for landfill gas with a lower heating value (LHV) of 365 Btu/standard cubic foot (scft) fuel heat content in the generators. Per manufacturer specifications, this is the lowest fuel heat content that the generators can accept.

The two 1,059 kW generators' uncontrolled emissions are based on 8,760 annual operational hours each. The manufacturer emission factors are used to calculate the uncontrolled and controlled engine emissions values for NO_x, CO, PM-10 and VOC. Absent a specific emission factor for PM, the same emission factor as PM-10 is used. The emission of SO_x (as SO₂) is calculated by multiplying the generators maximum volumetric flow rate capacity for the LFG by the concentration (C) of total reduced sulfur compounds (TRS) and the mole-to-mole conversion factor of SO₂ to TRS (2.0 gram-mole (gmol) of SO₂ per 1.0 gmol of TRS). At the minimum fuel heat content of 365 Btu/scft, the generators have a combined volumetric capacity of 895.2 standard cubic feet per minute (scfm). Calculations are contained in the attachment.

In determining whether a source is exempt from the provisions of Article 6, the provisions of subsections B through D of section 1320 of the Article are independent from the provisions of subsections E and F of the same section (1320).

The two (2) 1,059 kW landfill gas (LFG) fueled generators exceed the permit exemption level of 9 VAC 5-80-1320 B.2.b for size; each engine has an aggregate rated (output) brake horsepower greater than 1,675 hp, the threshold limit. The combined output of the two 1,059 kW generators exceed the permitting applicability threshold emissions rate for NO_x for modified or reconstructed sources, as indicated in 9 VAC 5-80-1320 D. The generators' criteria emissions are summarized in Table 1 below; detailed emission calculations are contained in the attachment.

Table 1: New Uncontrolled Emissions Rate (UER) for Permitting Applicability (Criteria) for Two 1,059 kW Generators

| Pollutant | Unrestricted Emission Rate (tpy) | Permitting Applicability Thresholds¹ (tpy) | Permitting Required? |
|------------------|---|--|-----------------------------|
| PM | 4.25 | 15 | No |
| PM-10 | 4.25 | 10 | No |
| SO ₂ | 1.80 | 10 | No |
| NO _x | 17.01 | 10 | Yes |
| CO | 85.05 | 100 | No |
| VOC | 5.67 | 10 | No |

¹- Permitting applicability threshold values obtained from 9 VAC 5-80-1320 D, for modified and reconstructed sources.

In addition Table 2, below, illustrates the two generators' emissions of toxics based on the generators' maximum capacity, operating for 8,760 hours per year for the two generators. The individual toxics constituents are as listed in Table 2.4-1, Default Concentrations for LFG Constituents, in the AP-42 (11/98). As shown, all of the toxics listed are below the permitting applicability exemption levels for hourly and annual emissions. If the generators' toxics emissions had exceeded the permitting applicability exemption levels for hourly and annual emissions, said emissions would also be exempted under 9 VAC 5-60-300 C.4 as a stationary source in a source category

regulated by an emission standard (Maximum Achievable Control Technology, or MACT), as explained in Section III.E. However, because the “C.4” exemption is not referenced in 9 VAC 5-80-1320 E or F, calculations of the state air toxics emission levels have to first be determined, and compared to each toxic constituent’s permitting applicability exemption levels for hourly and annual emissions. Then the “C.4” exemption could be applied if necessary.

As a conservative estimate, the attached calculations (UER-Toxics) do not include the control efficiencies for LFG constituents as noted in Table 2.4-3 of AP-42 (11/98). For an internal combustion (IC) engine, the AP-42 “E” rated control efficiencies range from 25 – 99% depending on the type of constituent: non-methane organic compound (NMOC), halogenated or non-halogenated.

Because the two proposed generators’ emissions of toxics are below the permitting applicability exemption levels for hourly and annual emissions, the two generators are subject to minor NSR permitting under 9 VAC 5 Chapter 80, Article 6, solely as a result of the calculated NO_x emissions.

Table 2: Two 1,059 kW Generators - Toxics (Minor NSR Permitting Applicability)

| HAP | CAS Number | Generator Emissions (lb/hr) | Exemption Rate (lb/hr) ² | Hrly Emiss > Exempt Rate? | Generator Emissions (tpy) | Exemption Rate (tpy) ² | Ann. Emiss. > Exempt. Rate? |
|---------------------------|------------|-----------------------------|-------------------------------------|---------------------------|---------------------------|-----------------------------------|-----------------------------|
| 1,1,1-trichloroethane | 71-55-6 | 8.76E-04 | -- | -- | 3.84E-03 | -- | -- |
| 1,1,2,2-tetrachloroethane | 79-34-5 | 2.55E-03 | 0.4554 | NO | 1.12E-02 | 1.0005 | NO |
| 1,1-dichloroethane | 75-34-3 | 3.18E-03 | 22.8 | NO | 1.39E-02 | 100 | NO |
| 1,1-dichloroethene | 75-34-4 | 2.65E-04 | -- | -- | 1.16E-03 | -- | -- |
| 1,2-dichloroethane | 107-06-2 | 5.55E-04 | 2.64 | NO | 2.43E-03 | 5.8 | NO |
| 1,2-dichloropropane | 78-87-5 | 2.78E-04 | 16.764 | NO | 1.22E-03 | 50.315 | NO |
| acrylonitrile | 107-13-1 | 4.60E-03 | 0.2838 | NO | 2.01E-02 | 0.6235 | NO |
| benzene | 71-43-2 | 2.04E-03 | 2.112 | NO | 8.94E-03 | 4.64 | NO |
| carbon disulfide | 75-15-0 | 6.04E-04 | 2.046 | NO | 2.65E-03 | 4.495 | NO |
| carbon tetrachloride | 56-23-5 | 8.42E-06 | 2.046 | NO | 3.69E-05 | 4.495 | NO |
| carbonyl sulfide | 463-58-1 | 4.03E-04 | 0.0528 | NO | 1.76E-03 | 0.116 | NO |
| chlorobenzene | 108-90-7 | 3.85E-04 | 3.036 | NO | 1.69E-03 | 6.67 | NO |
| chloroethane | 75-00-3 | 1.10E-03 | -- | -- | 4.83E-03 | -- | -- |
| chloromethane | 74-87-3 | 8.36E-04 | 6.831 | NO | 3.66E-03 | 14.935 | NO |
| chloroform | 67-66-3 | 4.90E-05 | 3.234 | NO | 2.15E-04 | 7.105 | NO |
| 1,4-dichlorobenzene | 106-46-7 | 4.22E-04 | 21.813 | NO | 1.85E-03 | 65.395 | NO |
| dichloromethane | 75-09-2 | 1.66E-02 | 11.484 | NO | 7.28E-02 | 25.23 | NO |
| ethylbenzene | 100-41-4 | 6.70E-03 | 17.919 | NO | 2.93E-02 | 62.93 | NO |
| ethylene dibromide | 106-93-4 | 2.57E-06 | 0.033 | NO | 1.13E-05 | 0.05017 | NO |
| hexane | 110-54-3 | 7.75E-03 | 11.616 | NO | 3.39E-02 | 25.52 | NO |
| hydrogen chloride | 7647-01-0 | 2.10E-02 | 0.2475 | NO | 9.18E-02 | -- | -- |
| hydrogen sulfide | 7783-06-4 | 1.66E-02 | -- | -- | 7.25E-02 | -- | -- |
| mercury (alkyl) | N/A | 8.02E-07 | 0.00099 | NO | 3.51E-06 | 0.00145 | NO |

| HAP | CAS Number | Generator Emissions (lb/hr) | Exemption Rate (lb/hr) ² | Hrly Emiss > Exempt Rate? | Generator Emissions (tpy) | Exemption Rate (tpy) ² | Ann. Emiss. > Exempt. Rate? |
|------------------------|------------|-----------------------------|-------------------------------------|---------------------------|---------------------------|-----------------------------------|-----------------------------|
| mercury (aryl) | N/A | 8.02E-07 | 0.0066 | NO | 3.51E-06 | 0.0145 | NO |
| methyl isobutyl ketone | 108-10-1 | 2.56E-03 | 10.131 | NO | 1.12E-02 | 29.725 | NO |
| perchloroethylene | 127-18-4 | 8.46E-03 | 22.8 | NO | 3.71E-02 | 49.155 | NO |
| toluene | 108-88-3 | 4.95E-02 | 18.645 | NO | 2.17E-01 | 54.665 | NO |
| trichloroethylene | 79-01-6 | 5.07E-03 | 22.8 | NO | 2.22E-02 | 39.005 | NO |
| vinyl chloride | 75-01-4 | 6.28E-03 | 0.858 | NO | 2.75E-02 | 1.885 | NO |
| xylenes | 1330-20-7 | 1.76E-02 | 21.483 | NO | 7.70E-02 | 62.93 | NO |

¹ See calculations in UER - Toxics.

² Toxics applicability thresholds calculated from 9 VAC 5-60-300 C 1.

At 8,760 hours, each generator's fuel heat content of 365 Btu/scft yields a throughput of 235.28 million standard cubic feet (235.28 x 10⁶ SCF). For both generators this equates to a combined throughput of 470.6 million cubic feet (470.6 x 10⁶ SCF) per year, as listed in the permit.

B. 9 VAC 5 Chapter 80, Article 8 - PSD Major New Source Review

The facility is not subject to PSD major new permitting requirements. The PSD major source threshold level is 250 tons per year for any regulated pollutant for this category. The potential emissions of regulated pollutants from this facility fall below this threshold; therefore, this permit action is not subject to permitting requirements under 9 VAC 5 Chapter 80, Article 8.

C. 9 VAC 5 Chapter 50, Part II, Article 5 - NSPS

40 CFR 60 Subpart JJJJ: The two (2) generators are subject to the Subpart JJJJ standards of 40 CFR 60, *Standards of Performance for Spark Ignition Internal Combustion Engines*. The NSPS Subpart JJJJ (Subpart) emissions standards apply to manufacturers, owners and operators of stationary spark ignition internal combustion engines (SI ICE). Specifically, as listed in §60.4231 of the Subpart, Frederick County is subject to the Subpart as the owner and operator of the two Jenbacher engines that have a maximum engine power greater than or equal to 75 kW (100 horsepower (hp)). The engines must comply with the emission standards in Table 1 to the Subpart, which lists the engine emission factors for engines with a hp rating greater than or equal to 500 hp based on manufacture dates of July 1, 2007 – June 30, 2010, and on or after July 1, 2010. Further, the owner or operator of the affected SI ICE must keep records of the information specified in paragraphs (a) (1) through (4) of §60.4245. The records requirements are as follows:

- Of all notifications submitted to comply with the subpart and all documentation supporting any notification.
- Maintenance conducted on the engine.

- If the SI ICE is a certified engine, documentation from the manufacturer that the engine is certified to meet the emission standards and information as required in 40 CFR Parts 90 and 1048.
- If the stationary SI ICE is not a certified engine or is a certified engine operating in a non-certified manner and subject to §60.4243(a)(2), documentation that the engine meets the emission standards.

The engines' manufacturer, GE, has submitted engine emission factors that meet the emission standards of the Subpart. It appears that the engines will be certified engines, although manufacturer certification cannot be obtained until the engines are permitted and purchased.

Virginia has not accepted assignment of the NSPS Subpart JJJJ. However, emission standards are included in the proposed permit. Virginia minor NSR permitting guidelines allow 18 months following the issuance of a permit to install the proposed equipment. Therefore, both sets of the Subpart emission standards for construction before and after July 1, 2010, as listed in Table 1 of the Subpart, will be quoted in the proposed permit. Additionally, a copy of this NSPS will be sent to the facility via electronic mail.

40 CFR 60 Subpart WWW: Because the design capacity of the landfill is greater than 2.5 million megagrams and 2.5 million cubic meters, the landfill is subject to 40 CFR Part 60, Subpart WWW. Applicable requirements from Subpart WWW were previously included in the current permit.

D. 9 VAC 5 Chapter 60, Part II, Article 1 - NESHAPS

Currently, there are no applicable NESHAPS for the generators.

E. 9 VAC 5 Chapter 63, Part II, Article II - MACT

40 CFR 63 Subpart ZZZZ: The two (2) 1,059 kW landfill gas (LFG) fueled generators engines are subject to the Subpart ZZZZ standards of 40 CFR 63, *National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*. The Maximum Achievable Control Technology (MACT) Subpart ZZZZ emission standards apply to major and area sources of HAP emissions. Major sources of HAP are plant sites that emit or have the potential to emit any single HAP at a rate of 10 tons or more per year, or any combination of HAP at a rate of 25 tons or more per year. An area source of HAP emissions is a source that is not a major source. The Frederick County Regional Landfill is an area source of HAP. Virginia has not accepted assignment on the area source rules for this MACT. It is not currently part of the state implementation plan (SIP). The facility bears the responsibility for area source reporting requirements. Any applicable emission standards will be

included in the Title V permit, and a copy of this MACT standard will be sent to the facility via electronic mail.

40 CFR 63 Subpart AAAA: 40 CFR 63 Subpart AAAA, *National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills*, is not an applicable requirement for the Frederick County Regional Landfill. This is because this facility is not (1) a major source of HAP; (2) collocated with a major source of HAP; (3) an area source with a design capacity greater than or equal to 2.5 million m³ and 2.5 million Mg with estimated uncontrolled non-methane organic compounds (NMOC) emissions equal to greater than 50 Mg/yr; or (4) an active area source landfill with a design capacity greater than or equal to 2.5 million m³ and 2.5 million Mg that operates an anaerobic bioreactor.

The uncontrolled NMOC emissions were determined to be less than 50 Mg/yr because this facility had site specific testing for the methane generation rate constant, "k value", as per the Tier II testing requirements, completed prior to the first compliance date of 40 CFR 63 Subpart AAAA.

IV. Best Available Control Technology Review (BACT) (9 VAC 5-50-260)

Pursuant to 9 VAC 5-50-260 C, a BACT review is required for the generators because they are subject to minor New Source Review (NSR) permitting, per Section III.A above. The new uncontrolled emissions (NUE) of criteria pollutants used to evaluate BACT applicability for the generators are the same as the permit applicability emission levels per agency memorandum dated January 5, 2009, as amended March 17, 2009. Per cited memorandum, BACT applicability is determined by calculating NUE less current uncontrolled emissions (CUE), using no proposed throughput limits. CUE for the generators are zero (0) since they are new emissions units.

NUE less CUE for NO_x is greater than the threshold levels for modified and reconstructed sources in 9 VAC 5-80-1320 D, as depicted in Table 1, under Section III.A – Permitting Applicability. Therefore, BACT controls will apply for NO_x, as emitted from the two (2) 1,059 kW generators. BACT for the generators is considered to be compliance with the applicable federal emission standards as referenced in Table 1 to 40 CFR 60, Subpart JJJJ. BACT for the proposed generators is also proper engine operation in accordance with manufacturer recommendations.

V. Summary of Controlled Emissions Increases

The addition of the two (2) 1,059 kW emergency generators results in emission increases as listed below in Table 3. Permitted emissions are listed for 8,760 hours of operation for each generator.

Table 3: Annual (tpy) Emissions Increases – Proposed

| Pollutant | Proposed: 2 – 1,059 kW generators (PCD-1 and PCD-2) | Controlled Emissions Increase (tpy) | Modeling Threshold¹ (tpy) |
|-----------------------|--|--|---|
| PM | 4.25 | 4.25 | 25 |
| PM-10 | 4.25 | 4.25 | 15 |
| SO₂ | 1.80 | 1.80 | 40 |
| CO | 85.05 | 85.05 | 100 |
| NO_x | 17.01 | 17.01 | 40 |
| VOC | 5.67 | 5.67 | 40 |

¹ - Modeling levels obtained from 9 VAC 5-80-1615 C.

VI. Dispersion Modeling

A. Criteria Pollutants:

The controlled emissions increase of criteria pollutants fall below the modeling thresholds contained in the DEQ New Source Review Permits Program Manual (September 7, 2000). Therefore, no modeling was required for these pollutants.

B. Toxic Pollutants:

The two (2) 1,059 kW GE Jenbacher generators are exempted from toxics review under the provisions of 9 VAC 5-60-300 C.4 because the generators are subject to the MACT standards of 40 CFR 63, Subpart ZZZZ, as an area source.

VII. Boilerplate Deviations

Boilerplates included in drafting this permit are the Skeleton_NSR_BP_rev_11_06.doc, Generic_BP_102005 and Testing (2005). There were no significant deviations from the boilerplates. Criteria pollutants with controlled emissions less than 0.5 tons per year are not listed in the permit as per current DEQ policy. Language was changed throughout the permit to reflect current boilerplate language and /or guidance.

This permitting action shall supersede the current permit dated June 17, 2005, as amended March 26, 2007.

Changes to Existing Permit Conditions

The following are significant changes to the existing permit dated June 17, 2005, as amended March 26, 2007. Significant changes do not include those changes that occur as a result of updated boilerplate language. However, mention is made of condition name changes to make it easier to reference condition changes or additions. Please note that the condition numbers refer to the existing permit dated June 17, 2005, as amended March 26, 2007.

Condition 1: Per current boiler plate guidance, this information has now been included in the Introduction.

Condition 2: This information has been reformatted per current boilerplate guidance.

The following equipment is proposed for addition to the permit:

-Two (2) GE Jenbacher generators rated at 1,059 kW each.

The utility flare (PCD-1) has been renumbered from Ref. No. 1 per the facility application received February 27, 2009.

Condition 4: This condition has been renamed from “Testing/ Monitoring Ports” to “Emissions Testing”, and includes language changes per boilerplate guidance. Reference to the proposed generators have also been added to this condition.

Condition 6: This condition has been renamed “Pollution Prevention” to “Fugitive Dust and Fugitive Emissions Controls” per updated boilerplate language.

Conditions 9 and 10: These conditions have been renamed using updated boilerplate language. The “P2” has been removed as a result of current boilerplate guidance.

Condition 15: Per updated boilerplate language, this condition has been renamed to “Requirements by Reference”.

Condition 20: This condition has been expanded to include on-site records’ requirements related to the proposed generators.

Condition 34: Per updated boilerplate guidance, this Condition has been deleted and included in the Introduction.

All conditions have been renumbered because of the addition of new equipment or updated boilerplate guidance.

Conditions in the current permit listing the utility flare as “Ref. No. 1” have been changed to reference the flare as “PCD-1” per facility request.

Proposed Conditions

The following conditions are proposed for addition to the permit. Please note the condition numbers refer to the proposed permit.

- Condition 4: This condition was added to ensure specific maintenance and operation standards for the two proposed generators.
- Condition 9: This condition establishes the fuel approved for use in the two proposed generators.
- Condition 10: This condition establishes fuel specifications for the LFG in the two proposed generators.
- Condition 11: This condition establishes a fuel throughput for the two proposed generators.
- Condition 13: This condition establishes hourly emission limits for the two proposed generators.
- Condition 14: This condition establishes annual emission limits for the two proposed generators.
- Condition 18: These process emissions limits are the BACT standard for the two proposed generators. These limits are the applicable federal emission standards (40 CFR 60, Subpart JJJJ), which are written to include emissions from the applicable family of engines.
- Condition 19: This condition establishes visible emission limits for the two proposed generators.
- Condition 26: This condition requires an initial visible emissions evaluation on one of the two proposed generators.
- Condition 27: This condition requires initial fuel testing of the LFG to ensure it maintains compliance with the minimum fuel heat content listed in the permit.
- Condition 28: This condition requires a continuing visible emissions evaluation on an as needed basis for the proposed generators.
- Condition 29: This condition requires annual fuel testing of the LFG to ensure it maintains compliance with the minimum fuel heat content listed in the permit.
- Condition 36: This condition establishes the permittee's initial notifications timeline for facility modification.
- Condition 40: This condition details the circumstances which could invalidate the proposed permit.

VIII. Compliance Demonstration

Initial compliance for the generators (PCD-2 and PCD-3) with the visible emissions (VE) limit will be ensured through a visible emissions evaluation (VEE), determined by EPA Method 9 (40 CFR Part 60, Appendix A). Continuing compliance will be accomplished through additional VEE's upon request by the DEQ. Compliance with other permit requirements will be ensured through:

- Visible emission limits of 10% opacity from the generators, except during one six-minute period in any one hour in which visible emissions shall not exceed 20% opacity.
- Records of scheduled and unscheduled maintenance and operator training.
- Records of the results of all visible emissions evaluations.
- Initial fuel testing to ensure compliance with the stated minimum heat content of the LFG.
- Annual fuel testing to ensure continued compliance with the stated minimum heat content of the LFG.
- A monitoring device to continuously measure the flow of LFG consumed by the engines.
- Records of fuel throughputs.
- Records of the generator engines' manufacturer data.

IX. Title V Review - 9 VAC 5 Chapter 80, Article 1

The Frederick County Regional Landfill facility is currently classified as a Title V major source. This will not change upon issuance of the permit. Upon issuance of this permit, the existing Title V permit has to be modified to incorporate the applicable requirements of this permit.

X. Site Suitability

- A. The character and degree of injury to, or interference with safety, health, or the reasonable use of property which is caused or threatened to be caused:
The activities regulated in this permit have been evaluated consistent with 9 VAC 5-50-260, 9 VAC 5-60-200, and 9 VAC 5-60-300 and have been determined to meet these standards where applicable.

The emissions regulated in this permit are defined as de minimis consistent with existing DEQ policy and have therefore not been modeled as part of this permit development.

B. The social and economic value of the activity involved:

This application has been deemed a modification to an existing Minor NSR permit, and emissions increases associated with this project are below significance levels defined in 9 VAC 5-80 Article 8 and in 9 VAC 5-80 Article 9. This project is deemed to have de minimis impact on the current emissions levels and does not affect the current social and economic value of the facility.

C. The suitability of the activity to the area in which it is located:

Consistent with the Board's Suitability Policy dated 9/11/87, the activities regulated in this permit are deemed suitable as follows:

1. Air Quality characteristics and performance requirements defined by SAPCB regulations:

The source is a source of toxics emissions. However, the toxics emissions are below the respective exemption levels and therefore have not been modeled. The emissions for criteria pollutants associated with this permit are below significance levels so no modeling was performed.

2. The health impact of air quality deterioration which might reasonably be expected to occur during the grace period allowed by the Regulations or the permit conditions to fix malfunctioning air pollution control equipment;

Condition 45 of the permit requires the facility to notify the Regional Office within 4 business hours of any malfunction.

3. Anticipated impact of odor on surrounding communities or violation of the SAPCB Odor Rule;

No violation of Odor requirements is anticipated as a result of this permit action.

D. The scientific and economic practicality of reducing or eliminating the discharge resulting from the activity.

The state NSR program as well as the PSD and Non-Attainment programs require consideration of levels of control technology which are written into regulation to define the level of scientific and economic practicality for reducing or eliminating emissions. By properly implementing the Regulations through the issuance of this permit, the staff

has addressed the scientific and economic practicality of reducing or eliminating emissions associated with this project.

XI. Other Considerations: None

XII. Recommendations

Recommend issuance of the modified minor NSR permit.

Attachments

Calculations

Frederick County Regional Landfill

Registration # 81312

Uncontrolled (Permitted) Emission Calculations¹ - Two (2) 1,059 kW Generators (pg 1 of 2)

| Pollutant | Errata / Given Data | | | | Hours of Operation (hrs/yr) | One (1) Generator | | Two (2) Generators |
|----------------------|---------------------|---------------|--------------------|---------|--------------------------------|------------------------------|-------------------------------|-------------------------------|
| | Emission Factor | | Generator Rating | | | Hourly Emissions (lbs/hr) | Annual Emissions (tons/yr) | Annual Emissions (tons/yr) |
| | (g/bhp-hr) | (lb/mmBTU-hr) | (bhp) ⁴ | (mmBTU) | | | | |
| PM ⁽²⁾ | 0.15 | - | 1468 | - | 8760 | 0.49 | 2.13 | 4.25 |
| PM-10 ⁽²⁾ | 0.15 | - | 1468 | - | 8760 | 0.49 | 2.13 | 4.25 |
| SO2 ⁽³⁾ | - | - | 1468 | - | 8760 | 0.41 | 0.90 | 1.80 |
| NOx ⁽²⁾ | 0.6 | - | 1468 | - | 8760 | 1.94 | 8.51 | 17.01 |
| CO ⁽²⁾ | 3.0 | - | 1468 | - | 8760 | 9.71 | 42.53 | 85.05 |
| VOC ⁽²⁾ | 0.2 | - | 1468 | - | 8760 | 0.65 | 2.84 | 5.67 |

Notes:

- (1) No controls are applied to the generators' operation. The uncontrolled emissions levels are also the proposed permit emission levels.
- (2) Emission factors used are manufacturer submitted factors for the JGC 320 GS-L.L engine in "Full Standby" mode, except for sulfur (S) and PM. PM levels are assumed to be the same as PM-10.
- (3) SO2 produced by the combustion of total reduced sulfur compounds (TRS) in LFG (AP-42).
- (4) bhp as listed in manufacturer's engine specification data.

*** Generator fuel heat content (1,468 bhp * 6,678 Btu/bhp-hr = 9,803,304 Btu/hr) = **9.803 MMBtu/hr per generator**

****Annual Fuel Consumption****

$(9,803,304 \text{ Btu/hr}) / ((365 \text{ Btu/scft}) * 8760 \text{ hr/yr}) = 235,279,296 \text{ scf/yr} = 235.28\text{E}6 \text{ scf/yr} = 235.3 \times 10^6 \text{ scf/yr}$ (1 Generator)

$235.28\text{E}6 \text{ scf/yr} * 2 \text{ generators} = 4.70559\text{E}+08 \text{ scf/yr} = 470.6 \times 10^6 \text{ scf/yr}$ (2 generators)

$$[\text{m}^3\text{-atm/gmol-K} * (35.314667 \text{ ft}^3/\text{m}^3) * (298)] = 0.902 \text{ tpy (M(TRS))}$$

$$\text{gmol-SO}_2/\text{gmol-TRS} = \mathbf{1.804 \text{ tpy SO}_2}$$

$$(2000 \text{ lb/ton}) * (\text{yr}/8760 \text{ hr}) = \mathbf{0.41 \text{ lb/hr SO}_2}$$

$$1468 \text{ bhp} * 1 \text{ lb}/453.6 \text{ g} = 0.49 \text{ lb/hr}$$

$$8760 \text{ hr/yr} * 1 \text{ ton}/2000 \text{ lb} = 2.13 \text{ tons/yr (1 generator)}$$

$$2.13 \text{ tons/yr} * 2 \text{ gen} = 4.25 \text{ tons/yr (2 generators)}$$

Attachment: Frederick County LFG_UER - Toxics (pg 1 of 2)

LFG Flow² = 895.2 scfm

| HAP | CAS Number | Molecular Weight (g-mol) | Conc (ppmv) ³ | Volume flowrate of compound to generator (m ³ /hr) ⁴ | Generator Emissions (lb/hr) | Exemption Rate (lb/hr) ⁵ | Hourly Emissions > Exemption Rate? | Generator Emissions (lb/yr) | Generator Emissions (tpy) | Exemption Rate (tpy) ⁵ | Annual Emissions > Exemption Rate? |
|-----------------------------|------------|--------------------------|--------------------------|--|-----------------------------|-------------------------------------|------------------------------------|-----------------------------|---------------------------|-----------------------------------|------------------------------------|
| 1,1,1-trichloroethane | 71-55-6 | 133.41 | 0.48 | 7.30E-04 | 8.76E-04 | -- | -- | 7.68 | 3.84E-03 | -- | -- |
| 1,1,1,2,2-tetrachloroethane | 127-18-4 | 167.85 | 1.11 | 1.69E-03 | 2.55E-03 | 0.4554 | NO | 22.33 | 1.12E-02 | 1.0005 | NO |
| 1,1-dichloroethane | 75-34-3 | 98.96 | 2.35 | 3.57E-03 | 3.18E-03 | -- | -- | 27.87 | 1.39E-02 | -- | -- |
| 1,1-dichloroethene | 75-34-4 | 96.94 | 0.2 | 3.04E-04 | 2.65E-04 | -- | -- | 2.32 | 1.16E-03 | -- | -- |
| 1,2-dichloroethane | 107-06-2 | 98.96 | 0.41 | 6.24E-04 | 5.55E-04 | -- | -- | 4.86 | 2.43E-03 | -- | -- |
| 1,2-dichloropropane | 78-87-5 | 112.99 | 0.18 | 2.74E-04 | 2.78E-04 | -- | -- | 2.44 | 1.22E-03 | -- | -- |
| acrylonitrile | 107-13-1 | 53.06 | 6.33 | 9.63E-03 | 4.60E-03 | 0.2838 | NO | 40.26 | 2.01E-02 | 0.6235 | NO |
| benzene | 71-43-2 | 78.11 | 1.91 | 2.90E-03 | 2.04E-03 | 2.112 | NO | 17.88 | 8.94E-03 | 4.54 | NO |
| carbon disulfide | 75-15-0 | 76.13 | 0.58 | 8.82E-04 | 6.04E-04 | 2.046 | NO | 5.29 | 2.65E-03 | 4.495 | NO |
| carbon tetrachloride | 56-23-5 | 153.84 | 0.004 | 6.08E-06 | 8.42E-06 | 2.046 | NO | 0.07 | 3.69E-05 | 4.495 | NO |
| carbonyl sulfide | 463-58-1 | 60.07 | 0.49 | 7.45E-04 | 4.03E-04 | 0.0528 | NO | 3.53 | 1.76E-03 | 0.116 | NO |
| chlorobenzene | 108-90-7 | 112.56 | 0.25 | 3.80E-04 | 3.85E-04 | 3.036 | NO | 3.37 | 1.69E-03 | 6.67 | NO |
| chloroethane | 75-00-3 | 64.52 | 1.25 | 1.90E-03 | 1.10E-03 | -- | -- | 9.67 | 4.83E-03 | -- | -- |
| chloromethane | 74-87-13 | 50.49 | 1.21 | 1.84E-03 | 8.36E-04 | -- | -- | 7.32 | 3.66E-03 | -- | -- |
| chloroform | 67-66-3 | 119.39 | 0.03 | 4.56E-05 | 4.90E-05 | 3.234 | NO | 0.43 | 2.15E-04 | 7.105 | NO |
| dichlorobenzene | 106-46-7 | 147 | 0.21 | 3.19E-04 | 4.22E-04 | -- | -- | 3.70 | 1.85E-03 | -- | -- |
| dichloromethane | 75-09-2 | 84.94 | 14.3 | 2.17E-02 | 1.66E-02 | -- | -- | 145.59 | 7.28E-02 | -- | -- |
| ethylbenzene | 100-41-4 | 106.16 | 4.61 | 7.01E-03 | 6.70E-03 | 17.919 | NO | 58.66 | 2.93E-02 | 62.93 | NO |
| ethylenedibromide | 106-93-4 | 187.88 | 0.001 | 1.52E-06 | 2.57E-06 | 0.033 | NO | 0.02 | 1.13E-05 | 0.05017 | NO |
| hexane | 100-54-3 | 86.18 | 6.57 | 9.99E-03 | 7.75E-03 | 11.616 | NO | 67.87 | 3.39E-02 | 25.52 | NO |
| hydrogen chloride | 7647-01-0 | 36.46 | 42 | 6.39E-02 | 2.10E-02 | 0.2475 | NO | 183.55 | 9.18E-02 | -- | -- |
| hydrogen sulfide | 7783-06-4 | 34.08 | 35.5 | 5.40E-02 | 1.66E-02 | -- | -- | 145.02 | 7.25E-02 | -- | -- |
| mercury (alkyl) | N/A | 200.61 | 2.92E-04 | 4.44E-07 | 8.02E-07 | 0.00099 | NO | 0.01 | 3.51E-06 | 0.00145 | NO |
| mercury (aryl) | N/A | 200.61 | 2.92E-04 | 4.44E-07 | 8.02E-07 | 0.0066 | NO | 0.01 | 3.51E-06 | 0.0145 | NO |
| methyl isobutyl ketone | 141-79-7 | 100.16 | 1.87 | 2.84E-03 | 2.56E-03 | 10.131 | NO | 22.45 | 1.12E-02 | 29.725 | NO |
| perchloroethylene | 127-18-4 | 165.83 | 3.73 | 5.67E-03 | 8.46E-03 | -- | -- | 74.14 | 3.71E-02 | -- | -- |
| toluene | 108-88-3 | 92.13 | 39.3 | 5.98E-02 | 4.95E-02 | 18.645 | NO | 433.99 | 2.17E-01 | 54.665 | NO |
| trichloroethylene | 79-01-6 | 131.4 | 2.82 | 4.29E-03 | 5.07E-03 | 22.8 | NO | 44.41 | 2.22E-02 | 39.005 | NO |
| vinyl chloride | 75-01-4 | 62.5 | 7.34 | 1.12E-02 | 6.28E-03 | 0.858 | NO | 54.99 | 2.75E-02 | 1.885 | NO |
| xylenes | 1330-20-7 | 106.16 | 12.1 | 1.84E-02 | 1.76E-02 | 21.483 | NO | 153.97 | 7.70E-02 | 62.93 | NO |
| Total HAPs | | | | | | | | 1543.70 lb/yr | 0.772 ton/yr | | |

Attachment: Frederick County LFG_UER - Toxics (pg 2 of 2)

Notes:

- ¹ - Generator fuel heat content (1,468 bhp * 6,678 Btu/bhp-hr = 9,803,304 Btu/hr) = **9.803 MMBtu/hr**
- ² - LFG flow rate (Qs) = (9,803,304 Btu/hr) / ((365 Btu/scft) * (60 min/hr)) = **447.6 scft/min (scfm) per generator**
447.6 scfm per gen * 2 gen = **895.2 scfm = Qs**
- ³ - HAP concentrations obtained from AP-42, Tables 2.4-1 and 2.4-2 (11/98)
- ⁴ - Generator emissions calculated using temperature default value of 25 degrees Celsius (AP-42, Ch. 2 - 11/98) for landfills where temperature data is unknown.
- ⁵ - Calculated using exemption formulas set forth in 9 VAC 5-60-300 C.1

****Annual Fuel Consumption****

(9,803,304 Btu/hr) / ((365 Btu/scft) * 8760 hr/yr) = 235,279,296 scf/yr = **235.28E6 scf/yr = 235.3 x 10⁶ scf/yr** (1 Generator)
 235.28E6 scf/yr * 2 generators = 4.70559E+08 scf/yr **= 470.6 x 10⁶ scf/yr (2 generators)**

| Sample Calculations (hydrogen chloride): | |
|---|---|
| -Volume flow rate of compound to the 2 generators | [(895.2 scf LFG/min)*(1m ³ /35.3198 scf)*(60min/hr) *(42.0 ppmv/1E6)] = 6.39E-02 m³/hr |
| -Generator Emissions of HCL (lb/hr) | (6.39 E-02 m ³ /hr)*((36.46 g-mole HCL)(1 atm))/((1E3 g/kg)*(298 K)(8.205E-05m ³ -atm/g-mol K))*(2.2 lb/kg) = 2.10E-02 lb/hr |

ATTACHMENT D
2013 Emission Statement



DEQ

RECEIVED
Riley
APR 15 2014

VIRGINIA DEPARTMENT OF
ENVIRONMENTAL QUALITY

To: _____
File: _____

EMISSION STATEMENT CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering and evaluating the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

(see reverse side for instructions)

SIGNATURE:  DATE: 4-14-14

PRINTED NAME: JOHN R. RILEY

TITLE: COUNTY ADMINISTRATOR

COMPANY: FREDERICK COUNTY

REGISTRATION NUMBER: 81312

TELEPHONE NUMBER: (540) 665-5643



VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

2013 EMISSION STATEMENT

RECEIVED
 APR 15 2014

To: _____
 File: _____

| | | | |
|--|---|---|----------------------------|
| FACILITY NAME Frederick County Landfill | REGISTRATION # 81312 | CONTACT PERSON Ron Kimble | |
| LOCATION 280 Landfill Road Winchester, VA 22602 | | JURISDICTION Frederick County | |
| MAILING ADDRESS 107 N. Kent Street | MAILING CITY AND STATE Winchester, VA | ZIPCODE 22601-5000 | |
| PARENT COMPANY (IF APPLICABLE) Frederick County Landfill | TELEPHONE NUMBER (540) 665-5658 | PRIMARY NAICS CODE 562212 | For Agency Use Only |
| | | | TV |

FACILITY TOTALS (Sum emissions from attached pages)

| | ANNUAL | OZONE SEASON |
|--|---------------|---------------------|
| TOTAL VOC EMISSIONS FOR 2013 | 1.25 TONS/YR | 6.85 LBS/DAY |
| TOTAL NO_x EMISSIONS FOR 2013 | 15.08 TONS/YR | 82.63 LBS/DAY |
| TOTAL SO₂ EMISSIONS FOR 2013 | 1.44 TONS/YR | NA |
| TOTAL PM₁₀ EMISSIONS FOR 2013 | 14.5 TONS/YR | NA |
| TOTAL PB EMISSIONS FOR 2013 | -- TONS/YR | NA |
| TOTAL TRS EMISSIONS FOR 2013 | 0.85 TONS/YR | NA |
| TOTAL TNMOC EMISSIONS FOR 2013 (landfills only) | 3.2 TONS/YR | NA |
| TOTAL non-VOC/non-PM HAP EMISSIONS FOR 2013 | 0.06 TONS/YR | NA |
| TOTAL CO EMISSIONS FOR 2013 | 64.68 TONS/YR | NA |
| TOTAL PM_{2.5} EMISSIONS FOR 2013 | 6.53 TONS/YR | NA |
| TOTAL NH₃ EMISSIONS FOR 2013 | -- TONS/YR | NA |

PLEASE ATTACH "ANNUAL UPDATE" FORM.
 PLEASE ATTACH "EMISSION STATEMENT CERTIFICATION" with appropriate signature

ATTACHMENT E
Utility Flare Calculation Equations

Actual emissions of NO_x and CO from the operation of the utility flare are calculated using the following equation:

$$E = F \times N \quad \text{..... Equation 3}$$

Where:

- E = Emission Rate (lb/time period)
- F = Pollutant specific emission factors as follows:
 - NO_x = 0.068 lb/MMBtu
 - CO = 0.37 lb/MMBtu
- N = Heat release from the utility flare (MMBtu/hr)

Actual emissions of PM and PM-10 from the operation of the utility flare are calculated using the following equation:

$$E = A \times F \times H \times B \quad \text{..... Equation 4}$$

Where:

- E = Emission Rate for PM and PM-10 (lb/time period)
- A = Average Firing Rate of LFG (cfm)
- F = Pollutant specific emission factors = 0.001 lb/hr-cfm CH₄
- B = Conversion factor (0.5 cfm CH₄ / 1 cfm LFG)

Actual emissions of VOC from the operation of the utility flare were calculated using the following equation:

$$E = A \times F \times H \times B \quad \text{..... Equation 5}$$

Where:

- E = Emission Rate for VOC (lb/time period)
- A = NMOC Input to Flare (lb/time period), NMOC is calculated using the LandGEM model
- F = 0.39 (39% of NMOC assumed to be VOC)
- B = 0.02 (VOC destruction efficiency of 98 % based on manufacturer's recommendation)

Actual emissions of SO₂ from the operation of the utility flare are calculated using the following equation:

$$E = A \times F \times H \times B \times C \quad \text{..... Equation 6}$$

Where:

- E = Emission Rate for SO₂ (lb/time period)
- A = 2.0 (conversion factor from TRS to SO₂)
- F = Flow rate of LFG (ft³/time)
- B = 0.5 (LFG is assumed to be 50% methane)
- C = TRS concentration in LFG

ATTACHMENT F
GE Letter dated March 28, 2012 regarding Jenbacher Engines



March 28, 2012

GE Energy – Jenbacher Gas Engines confirms that the emissions, in the amounts listed below, are confirmed as valid "NOT TO EXCEED" values per engine, for stationary applications. Not to exceed values are based on conformity with GE Jenbacher standard site conditions, compliance with operations and maintenance instructions and recommended service and intervals for the following project:

Frederick Landfill – 2 * JGC 320 C82

| Pollutant | Emission Limit |
|--|-----------------------|
| • NO _x Evaluated using EPA method 7E | 0.6 g/bhp.hr |
| • CO Evaluated using EPA method 10 | 3.0 g/bhp.hr |

If the engine fails to meet the emissions representations the customer must provide the following supporting documentation to GEJ:

- (1) Fuel gas samples
- (2) Complete maintenance records
- (3) A full report including the calculations and results of any emissions testing.

GEJ will be given a reasonable amount of time to take any or all of the following actions:

- Perform additional testing in an effort demonstrate the emissions representations. If this testing demonstrates compliance with no adjustments required to the engine, customer will pay for added testing. If testing fails to demonstrate compliance with the emissions representations, the testing will be paid for by GEJ.
- Make such adjustments to the engine so as to bring the engine into compliance with the emissions limits provided in this letter.

Conformity Declaration (acc. ISO/IEC 17050-1:2004)

We hereby confirm that stationary Jenbacher Gas Engines comply with 40 CFR Part 60, subpart JJJJ and be labelled as follows:

"THIS ENGINE IS EXCLUDED FROM THE REQUIREMENT OF 40 CFR PART 1048 AS A "STATIONARY ENGINE". INSTALLING OR USING THIS ENGINE IN ANY OTHER APPLICATION MAY BE A VIOLATION OF FEDERAL LAW SUBJECTED TO CIVIL PENALTY AND THE OWNER/OPERATOR MUST COMPLY WITH THE REQUIREMENT OF CFR PART 60. THIS ENGINE IS NOT PART OF A REQUIRED OR VOLUNTARY CERTIFICATION PROGRAM AND IS CLASSIFIED AS NON-CERTIFIED PER 40 CFR PART 60, SUBPART JJJJ".

Sincerely,

Joseph Koshy

GE Energy
Jenbacher Gas Engines
5244 North Sam Houston Parkway East
Houston, TX 77032

ATTACHMENT G
Insignificant Unit Emission Calculations

EXHIBIT F
INSIGNIFICANT AND EXEMPT ACTIVITIES

DEQ-VALLEY

MAR 09 2009

TO: _____

FILE: _____

1 INTRODUCTION

This section addresses the insignificant and exempt sources of air pollution at the Landfill, which include small combustion sources and various liquids storage tanks. Insignificant activities require a three-part analysis, pursuant to 9 VAC 5-80-710.A. of the Virginia air pollution regulations. Part 1 is to determine if any of the facility's activities or emission units are named as insignificant in 9 VAC 5-80-720.A. Part 2 is to list sources, other than those identified in Part 1, which are proposed as insignificant due to emission levels that fall below the thresholds given in 9 VAC 5-80-720.B. Part 3 is to determine if the sources, other than those identified in Parts 1 or 2, are insignificant because their size or production rate are less than the thresholds in 9 VAC 5-80-720.C.

2 MOBILE SOURCES

Motor vehicles, machinery, or equipment that is normally used in a mobile manner are exempt from consideration in the permit application. This includes, but is not limited to, engine emissions from site vehicles, dozers, compactors, and other heavy machinery.

3 COMPOST CHIPPER

The diesel-fueled compost chipper (EU-6) processes brush, yard waste, and other suitable wood waste received at the Landfill by grinding these materials into smaller pieces, or chips. An independent contractor has historically operated the compost chipper for roughly two (2) weeks each year (100 hours or less per year). The compost chipper utilized varies; therefore, the model number nameplate capacity or maximum rated output is inconsistent. Based on discussions with the Landfill staff, the compost chipper engine is reported to be similar in size to the tire chipper engine. Thus, the rated capacity is assumed to be approximately 800 bhp.

Because the model number and compost chipper engine emission factors for NO_x, CO, SO_x, VOC, and PM₁₀ could not be obtained from the manufacturer, emission factors used to estimate the maximum projected emissions were based on AP-42, Section 3.3, Table 3.3-2. The projected emissions, listed in *Table F1* below, assume the compost chipper operates 100 hours per year.

TABLE F1. POTENTIAL COMPOST CHIPPER EMISSIONS

| Pollutant | Emission Factor ¹ (lb/hp/hr) | Potential Emissions ² (tpy) |
|------------------|--|---|
| VOC ³ | 2.51×10^{-3} | 0.10 |
| NO _x | 3.1×10^{-2} | 1.24 |
| CO | 6.68×10^{-3} | 0.26 |
| SO _x | 2.05×10^{-3} | 0.08 |
| PM ₁₀ | 2.2×10^{-3} | 0.08 |

¹ Emission factors for diesel-fueled engine based on Table 3.3-2 in AP-42, Section 3.3.

² Potential emissions calculated assuming 800 hp engine operates 100 hours per year.

³ The emission factor in Table 3.3-2 of AP-42 is for total organic compounds (TOC). The VOC potential emissions were calculated assuming VOC is equal to TOC. The emission factor includes exhaust and crankcase emissions.

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A sample calculation for estimated emissions from the compost chipper based on the emission factor, in this case for NO_x, is as follows.

$$NO_x = \left[\frac{3.1 \times 10^{-2} \text{ lb}}{\text{hp hr}} \right] [800 \text{ hp}] \left[\frac{100 \text{ hr}}{\text{yr}} \right] \left[\frac{1 \text{ ton}}{2000 \text{ lb}} \right] = 1.24 \text{ tpy}$$

Note that the potential and actual emissions for the compost chipper are assumed to be equivalent and are considered insignificant.

4 TIRE CHIPPER

The diesel-fueled tire chipper (EU-7) shreds whole, rimless tires into smaller pieces. The Landfill has historically operated the tire chipper for roughly two (2) months each year (360 hours or less per year). The tire chipper was manufactured by Columbus McKinnon (Model No. 8065-7416) and has an output of 400 bhp (which corresponds to 1,500 rpm). The tire chipper engine emission factors for pollutant NO_x, CO, and SO_x at various loads were obtained from the manufacturer. These emission factors and the maximum potential emissions are presented below in Table F2.

TABLE F2. POTENTIAL TIRE CHIPPER EMISSIONS

| Pollutant | Emission Factor | Potential Emissions (tpy) |
|-------------------------------|----------------------------------|---------------------------|
| VOC ² | 2.51 x 10 ⁻³ lb/hp/hr | 0.18 |
| NO _x ¹ | 9.0 lb/hr | 1.62 |
| CO ¹ | 5.0 lb/hr | 0.90 |
| SO _x ¹ | 1.5 lb/hr | 0.27 |
| PM ₁₀ ² | 2.2 x 10 ⁻³ lb/hp/hr | 0.16 |

¹ Emission factors based on 400 hp engine at 100 percent load as reported in "Engine Specification Data" provided by manufacturer.

² Emission factors for diesel-fueled engine based on Table 3.3-2 in AP-42, Section 3.3.

A sample calculation for estimated emissions from the tire chipper based on the emission factor, in this case for NO_x, is as follows.

$$NO_x = \left[\frac{9.0 \text{ lb}}{\text{hr}} \right] \left[\frac{360 \text{ hr}}{\text{yr}} \right] \left[\frac{1 \text{ ton}}{2000 \text{ lb}} \right] = 1.62 \text{ tpy}$$

Note that the potential and actual emissions for the compost chipper are assumed to be equivalent and are considered insignificant.

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TO: _____
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5 LFG-FUELED HEATERS

During May of 2001, the existing propane-fueled heaters in the maintenance buildings were supplemented with landfill gas (LFG) fired heaters (EU-9). Because of the limited fuel heat input of these units, they are still considered insignificant per 9 VAC 5-80-720.B. However, an analysis of the potential emissions and fuel usage has been included below. It should be noted that the calculations for potential emissions assumes the heaters are running 24 hours per day year round and therefore significantly overestimates the actual usage and emissions.

A total of nine LFG-fueled heaters were installed in the maintenance buildings, two (2) in one building and seven (7) in another. The heaters are Roberts Gorden Vantage II HE Infrared Radiant Tube Heaters, and a summary of the heat capacity and LFG requirements, as well as emission factors and projected emission for the units, are listed in below in *Table F3* and *F4*.

TABLE F3. LFG-FUELED HEATER INVENTORY

| Quantity Installed ¹ | Heater Capacity (Btu/hr) | Total LFG Requirements ² (cfm) |
|---------------------------------|--------------------------|---|
| 2 | 60,000 | 4.0 |
| 7 | 100,000 | 23.3 |

¹ Indicated the quantity installed in each of the two (2) maintenance buildings.

² See calculations below for conversion of Btu/hr to cfm.

EXHIBIT 7D. POTENTIAL LFG-FUELED HEATER EMISSIONS

| Pollutant | Emission Factor | Potential Emissions from 2-Heaters (tpy) | Potential Emissions from 7-Heaters (tpy) | Total Potential Emissions (tpy) |
|-------------------------------|---|--|--|---------------------------------|
| NMOC ³ | 99.2% destruction | t | t | t |
| VOC ³ | 98% destruction | t | t | t |
| NO _x ¹ | 100 ppm | 0.013 | 0.074 | 0.09 |
| CO ¹ | 20 ppm | 0.002 | 0.008 | 0.01 |
| SO _x ² | ² | 0.007 | 0.044 | 0.05 |
| PM ₁₀ ² | 0.001 lb PM ₁₀ /hr-cfm CH ₄ | 0.008 | 0.050 | 0.06 |

t Trace emission levels - below reporting thresholds per 9 VAC 5-80-720.

¹ Emission factors based on 60,000 Btu/hr Vantage II HE, Infrared Radiant Tube Heater at 100 percent load. Data provided by the manufacturer, Roberts Gorden Inc.

² The AP-42 (revised 11/98) default particulate matter emission factor for flares was used. The AP-42 default TRS concentration in LFG (46.9 ppmv) was also used in these calculations.

³ Emission Factor used assumes the AP-42 (revised 11/98) default destruction efficiency for flares (98% for VOCs and 99.2% for NMOCs). The flame temperature of heaters is estimated to be 3,276 °F, which is well above the average landfill gas flare temperature.

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5.1 NO_x and CO Emissions

Sample calculations for estimated NO_x and CO emissions from the LFG-fueled heaters are presented as follows.

*Converting ppm to lb/MMBtu to estimate a volumetric emission rate:

$$\text{Volumetric Rate} = \left[60,000 \frac{\text{Btu}}{\text{hr}} \right] \left[\frac{1 \text{ ft}^3}{500 \text{ Btu}} \right] = 120 \frac{\text{ft}^3}{\text{hr}} \text{ of LFG}$$

*Using the ideal gas law to convert this volumetric emission rate into a mass emission rate:

$$\text{Mass Rate} = n = \frac{PV}{RT} = \frac{\left(120 \frac{\text{ft}^3}{\text{hr}} \right) (1 \text{ atm})}{\left(0.7302 \frac{\text{atm ft}^3}{\text{lbmole R}} \right) (520 \text{ R})} = 0.316 \frac{\text{lbmole}}{\text{hr}}$$

$$\text{NO}_x = 100 \text{ ppm} = \left[\frac{100 \text{ lbmole NO}_x}{10^6 \text{ lbmole fuel}} \right] \left[\frac{0.316 \text{ lbmole}}{\text{hr}} \right] \left[\frac{46 \text{ lb NO}_x}{1 \text{ lbmole NO}_x} \right] = 0.00145 \frac{\text{lb}}{\text{hr}}$$

$$\text{CO} = 20 \text{ ppm} = \left[\frac{20 \text{ lbmole NO}_x}{10^6 \text{ lbmole fuel}} \right] \left[\frac{0.316 \text{ lbmole}}{\text{hr}} \right] \left[\frac{28 \text{ lb NO}_x}{1 \text{ lbmole NO}_x} \right] = 0.000177 \frac{\text{lb}}{\text{hr}}$$

*Use the maximum heat rate to calculate emission output rate:

$$\text{NO}_x = \left[\frac{0.00145 \text{ lb}}{\text{hr}} \right] \left[\frac{1 \text{ hr}}{0.06 \text{ MMBtu}} \right] = 0.0242 \frac{\text{lb NO}_x}{\text{MMBtu}}$$

$$\text{CO} = \left[\frac{0.000177 \text{ lb}}{\text{hr}} \right] \left[\frac{1 \text{ hr}}{0.06 \text{ MMBtu}} \right] = 0.00295 \frac{\text{lb NO}_x}{\text{MMBtu}}$$

*Now emissions can be calculated using each type of heater (ex. 60,000Btu/hr from 2-Heaters):

$$\text{NO}_x = \left[\frac{0.0242 \text{ lb NO}_x}{\text{MMBtu}} \right] \left[\frac{0.06 \text{ MMBtu}}{\text{hr}} \right] \left[\frac{8760 \text{ hr}}{\text{yr}} \right] \left[\frac{1 \text{ ton}}{2000 \text{ lb}} \right] = 0.006 \text{ tpy}$$

$$\text{CO} = \left[\frac{0.00295 \text{ lb CO}}{\text{MMBtu}} \right] \left[\frac{0.06 \text{ MMBtu}}{\text{hr}} \right] \left[\frac{8760 \text{ hr}}{\text{yr}} \right] \left[\frac{1 \text{ ton}}{2000 \text{ lb}} \right] = 0.0008 \text{ tpy}$$

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5.2 PM₁₀ Emissions

Sample calculations for estimated PM₁₀ emissions from the LFG-fueled heaters are presented as follows.

$$\text{Volume of LFG used} = \left[60,000 \frac{\text{Btu}}{\text{hr}} \right] \left[\frac{1 \text{ ft}^3}{500 \text{ Btu}} \right] \left[\frac{1 \text{ hr}}{60 \text{ min}} \right] = 2.0 \frac{\text{ft}^3 \text{ LFG}}{\text{min}}$$

$$\text{PM}_{10} = \left(\frac{0.001 \text{ lb PM}_{10}}{\text{hr} - \text{cfm CH}_4} \right) \left(\frac{2.0 \text{ ft}^3 \text{ LFG}}{\text{min}} \right) \left(\frac{0.5 \text{ ft}^3 \text{ CH}_4 / \text{min}}{1 \text{ ft}^3 \text{ LFG} / \text{min}} \right) \left(\frac{8,760 \text{ hr}}{\text{yr}} \right) \left(\frac{1 \text{ ton}}{2,000 \text{ lb}} \right)$$

$$= 0.004 \text{ tpy (for one LFG-fired heater rated at 60,000 Btu/hr)}$$

5.3 VOCs Emissions

Using the LandGEM and a site-specific NMOC concentration in the LFG of 136 ppmv, as hexane, and a maximum LFG fuel input of 2.0 scfm and 3.3 scfm for the two heater types, the NMOC concentrations of 0.018 tpy and 0.029 tpy were calculated. Assuming 99.2 percent control (destruction) efficiency, the NMOC emissions from the two heater types would be 0.0001 tpy and 0.0002 tpy.

Using the VOC concentration of 100 percent of total NMOCs and a VOC destruction efficiency of 98.0 percent, VOC emissions are calculated as follows. Note the destruction efficiency is conservative, since the flame temperature of the installed heaters is well above the average temperature of a standard flare.

$$\begin{aligned} \text{VOC} &= (\text{NMOC}) (100\%) (1-99.2\%) \\ &= (0.013 \text{ tons/yr}) (1.00) (1-0.992) \\ &= 0.0001 \text{ tons/yr (for one LFG-fired heater rated at 60,000 Btu/hr)} \end{aligned}$$

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5.4 SO₂ Emissions

The emissions of sulfur oxides, particularly sulfur dioxide (SO₂), from the LFG-fired heater units is dependent on the inlet concentration of sulfur-bearing compounds in the LFG. The calculation of the estimated SO₂ emissions from the heater is based on the assumption that reduced sulfur compounds in the LFG are oxidized to SO₂. Because site specific data for the TRS concentration in the LFG at the Frederick County Landfill was not available, SO₂ emissions from the heater are estimated based on a TRS concentration in LFG of 46.9 ppmv as cited in AP-42, Section 2.4. Sample calculations for estimated SO₂ emissions from the LFG-fueled heaters are presented as follows. Note that the mole-to-mole conversion between TRS and SO₂ is 2.0 mol-SO₂/mol-TRS

YELLING

$$TRS \left(\frac{m^3}{yr} \right) = (1.82) \left[14,883 \frac{m^3 \text{ of } CH_4}{yr} \right] \left[\frac{46.9 \text{ ppmv}}{10^6} \right] = 1.27 \frac{m^3}{yr} \text{ of } S$$

$$TRS = \left[\frac{1.27 m^3}{yr} \right] \left[\frac{\left(\left(\frac{32 \text{ g}}{gmol} \right) (1 atm) \right)}{\left(\left(\frac{8.205 \times 10^{-5} m^3 - atm}{gmol - K} \right) \left(\frac{1000 g}{kg} \right) (273 + 25 K) \right)} \right] \left[\frac{ton}{907.185 kg} \right] = 0.002 \frac{tons}{yr}$$

SO₂ = 0.004 tpy SO₂ (for one LFG-fired heater rated at 60,000 Btu/hr)

6 FUEL STORAGE TANKS

The facility has one 10,000 gallon tank for diesel fuel and one 1,000 gallon tank for gasoline. Emission estimates for these storage tanks were projected by TANKS 4.09d modeling software. The results from the model are presented in *Exhibit G-1* and *G-2*. Storage tanks with capacities less than 1,000 gallons are located at the maintenance buildings and used to store various grades of motor oil, hydraulic fluid, kerosene, antifreeze, and used motor oil. Because of the size and contents of these tanks, air pollutant emissions are considered negligible.

7 LEACHATE TREATMENT LAGOONS

Leachate generated by the buried waste material is collected by the leachate collection system and gravity fed to the leachate treatment system located on the east side of the Landfill. The leachate treatment system was upgraded to install Aqua Mats for bio-filtration and enhanced diffusion aeration. The primary cell consists of two zones, the mixing zone and the treatment zone. The second cell serves as a polishing lagoon. The treated leachate is then discharged into Opequon Creek. Note that leachate generation at the Landfill varies, but is estimated to approximately be 15 million gallons per year, to represent a worst-case scenario.

7.1 VOC Emissions

Laboratory analysis has been conducted on the treated leachate (polishing pond effluent) for concentration of metals. Because of the lack of site-specific lab data for VOCs in the untreated leachate, analyses performed at another MSW landfill in Northern Virginia was assumed to be typical and used to estimate VOC emissions. For the 56 VOCs for which analysis was performed, no compound was present in concentration equal to or above the detection limit of five (5) micrograms per liter (µg/L). To estimate the potential (PTE) emissions for the leachate treatment system, the following calculations assume that each compound of the 56 VOCs are present at a concentration of five (5) µg/L (5 ppb) in leachate. A sample calculation, to estimate the maximum VOC concentration in leachate and the potential VOC emissions from the leachate treatment lagoons, is as follows.

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$$\left[\frac{5 \frac{\mu g}{L}}{\text{compound}} \right] [56 \text{ compounds}] = 280 \frac{\mu g}{L} \text{ Total VOCs}$$

$$\left[\frac{280 \mu g}{L} \right] \left[\frac{15 \times 10^6 \text{ gal}}{\text{yr}} \right] \left[\frac{3.785 \text{ L}}{\text{gal}} \right] \left[\frac{1 \text{ ton}}{9.1 \times 10^{11} \mu g} \right] = 0.017 \text{ tpy VOC}$$

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TO: _____
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