

NORTH CAROLINA DIVISION OF AIR QUALITY			Region: Mooresville Regional Office County: Catawba NC Facility ID: 1800488 Inspector's Name: Jim Westmoreland Date of Last Inspection: 03/17/2011 Compliance Code: 3 / Compliance - inspection
Air Permit Review – Significant Modification per 15A NCAC 2Q .0501(c)(1) Permit Issue Date: October XX, 2011			Permit Applicability (this application only)
Facility Data Applicant (Facility's Name): Blackburn Sanitary Landfill Facility Address: Blackburn Sanitary Landfill 3993 Rocky Ford Road Newton, North Carolina 28658 SIC: 4953 / Refuse Systems NAICS: 562213 / Solid Waste Combustors and Incinerators Facility Classification: Before: Title V After: Title V Fee Classification: Before: Title V After: Title V			SIP: 15A NCAC 2D .0524, 2D .1100, 2D.1111, 2Q .0705, 2Q .0501(c)(1) NSPS: Subpart WWW NESHAP: Subpart AAAA PSD: N/A PSD Avoidance: N/A NC Toxics: Last MACT toxics evaluation 112(r): N/A Other: N/A
Contact Data			Application Data
Facility Contact	Authorized Contact	Technical Contact	Application Number: 1800488.11A Date Received: 04/19/2011 Application Type: Modification Application Schedule: TV-Significant (one-step) Existing Permit Data Existing Permit Number: 08533/T07 Existing Permit Issue Date: 03/04/2010 Existing Permit Expiration Date: 07/31/2014
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Review Engineer: Booker Pullen Regional Engineer: Jim Westmoreland Review Engineer's Signature: _____	Begin Date: May 23, 2011	Comments / Recommendations: Issue: 08533T08 Permit Issue Date: October XXX, 2011 Permit Expiration Date: July 31, 2014	

I. Introduction/Description:

Blackburn Sanitary Landfill, is owned by Catawba County, and is located at 3993 Rocky Ford Road, in Newton, North Carolina. The landfill accepts solid municipal waste. This facility does not accept toxic substances or liquid waste. The non-active portion of the landfill is about 41 acres in size and contains 51 wells. The active portion is about 50 acres in size and contains twenty-four wells.

The application (1800488.11A) for this modification was received by the Division of Air Quality Central Office on April 19, 2011. The application was considered complete on this date. This application will be processed in accordance with 15A NCAC 2Q .0501(c)(1). This modification will go through the 30-day public and the 45-day EPA review at this time.

II. Purpose of this application (1800488.11A):

The design plan approval letter was issued to this facility in January 2011. Approval of the gas collection and control system included several alternate operating parameters and procedures as listed below:

- A. Under provisions in 40 CFR Sec. 60.753(b)(3), wells that experience positive pressure after being shutdown to accommodate declining landfill gas flow rates can be decommissioned if permission is granted by the Administrator. As an alternative to decommissioning wells under the provisions, the following changes to the standard operating procedure for wells where persistent oxygen exceedances are not the result of operations and/or maintenance issues were approved:
 - a. Wells where oxygen concentrations do not decline to acceptable levels after more than one hour of reduced vacuum will be shut off until the gas quality recovers.

- b. The monthly monitoring required by 40 CFR Sec. 60.755 will be conducted for wells that have been shutdown, but positive pressure or elevated oxygen concentrations will not be considered exceedances of the operating limits in 40 CFR §60.753.
- c. If monthly monitoring indicates that pressure has built up in the well and the oxygen concentration still exceeds five percent, the well will be opened to relieve the pressure and will be shutdown until it is monitored the following month.
- d. If the monthly monitoring indicates that gas quality has improved (i.e., the oxygen concentration has dropped below five percent), the well will be brought back on line until the gas quality declines again.
- e. The quarterly methane surface concentration monitoring required under 40 CFR §60.755 will be conducted for wells that have been shutdown. Standard remediation steps, including evaluating the need to return wells to full-time service, will be followed if exceedances of the 500 ppm methane surface concentration limit are detected.
- f. 40 CFR §60.756(b)(2) and (c)(2) specify the use of a device that records flow to or bypass of the control device or flare for an enclosed combustor and flare, respectively. Since the open flare in the gas collection and control system at the Blackburn Sanitary Landfill does not contain any bypasses of the flare, the requirement to record flow or bypass of the flare is not applicable.

B. The applicant was required in the design plan approval letter to submit within 90 days of receipt of this design plan approval letter, a permit application requesting the incorporation of the alternative operating procedures approved in the design plan, NSPS monitoring/recordkeeping requirements, and MACT requirements. Application No. 1800488.11A was submitted to fulfill these requirements.

III. Changes to existing Title V Permit No. 08533T07 per this application:

Old Page	New Page No.	Condition No.	Changes
Cover Letter			
Page 1	Page 1	Heading and body of letter	Revised issue date, revised permit number, changed “complete application” received date, added the Significant modification language to the permit, changed cover letter header
Page 2	Page 2	Heading and body of letter	Revised issued date at the top of letter, and changed the effective date of permit, added “J.D.” title to supervisor’s name
Page 3	Page 3	Attachment to permit	Revised the “Changes to permit” table to reflect modification request in application 1800488.11A
Insignificant Activities			
Page 3	Page 3	Table	Added capacities to the descriptions for IES-6 and IES-7
Operation Permit			
Page 1	Page 1	Cover Page	Revised: permit number, “replaces permit” number, issue date, effective date, complete application date, application number, added “J.D.” title to supervisor’s name
All pages	All pages	Header of page	Revised the permit number to T08
N/A	Pages 3-11	Specific Limitation and Conditions	Revised language for Subpart WWW, added MACT, Subpart AAAA regulations, and added toxic regulations to the table of regulated pollutants and to the permit
N/A	20-29	General Conditions	Added General Conditions (Revision 3.4)

IV. Statement of Compliance:

The DAQ has reviewed the compliance status of this facility. Mr. Jim Westmoreland of the Mooresville Regional Office, performed a facility inspection on March 17, 2011 and states that the facility appeared to be in compliance with all applicable requirements.

V. Summary Of The Emission Sources at this facility:

Emission Source ID No.	Emission Source Description	Control Device ID No.	Control Device Description
ES-1 NSPS, Subpart WWW MACT, Subpart AAAA	Non-active (unlined) portion of landfill	CD-GCCS-1	One landfill gas collection system (CD-GCCS-1) including:
ES-2 NSPS, Subpart WWW MACT, Subpart AAAA	Active (lined) portion of landfill	CD-1	One open-type flare (eight-inch tip, 1200 scfm, 36 million Btu per hour heat input capacity @500 Btu per standard cubic foot landfill gas heat content), and
		CD-8, CD-9, and CD-10	Three landfill gas-fired genset units (11 million Btu per hour heat input capacity each, 366 scfm each), operated in parallel
ES-3	Tub grinder (diesel-fired, 855 horsepower)	None	None
ES-11 NSPS, MACT	Tub grinder (diesel-fired, 1050 horsepower)	None	None

VI. Source-by Source Evaluation:

- A. Municipal solid waste landfill (ES-1 and ES-2) with associated landfill gas collection system (CD-GCCS-1) including one open-type flare (eight-inch tip, 36 million Btu per hour heat input capacity), and three landfill gas-fired genset units (11 million Btu per hour heat input capacity each)
1. Description: This facility is a Municipal Solid Waste Landfill (ES-1 and ES-2) that accepts solid municipal waste and does not accept toxic substances or liquid waste. The non-active portion of the landfill is about 41 acres in size and contains 51 wells. The active portion is about 50 acres in size and contains twenty-four wells.
 2. Applicable Regulatory Requirements for this modification:
This landfill is subject to 40 CFR Part 60, Subpart WWW because the facility was built after May 30, 1991. With the addition of Phase IV at this landfill, the design capacity of the landfill is greater than 2.5 million Mg by weight, and 2.5 million cubic meters by volume. Therefore, the landfill is subject to the Title V requirements of the Clean Air Act.

In accordance with NSPS Subpart WWW, 40 CFR §60.757(b)(i) and (c), the facility is required to submit a GCCS design plan within one year of the first annual report that shows NMOC emissions exceeding 50 Mg per year. A Tier 2 test was performed on July 23, 2008. The results indicated that the annual NMOC emissions from this facility were greater than 50 Mg. The first report showing the 50 Mg per year exceedance was in the annual report for the year 2008 making it subject to NSPS landfill gas collection and control requirements. The gas collection and control design plan was submitted to the Mooresville Regional Office on December 29, 2009.

This facility has an existing gas collection and control system that was “voluntarily” installed prior the NSPS, Subpart WWW requirements to install the system. This existing system is currently comprised of 105 vertical wells that began installation in 1997 in Unit 1. Initially the landfill gas was collected and routed to an open flare. In 1999, the facility began the operation of several landfill gas-fired internal combustion engines that produce electrical power that is routed to the power grid. Normal operation for this facility is to route the collected landfill gas to the gas-to-energy internal combustion engines. This gas collection and control system will ultimately consist of 390 vertical wells as this landfill reaches maturity and closure. The projected closure date is in the year 2075 based on the current and projected solid waste acceptance rates.

The current estimated average landfill gas generation rate for the landfill is 1135 cfm. The estimated efficiency for a well-designed collection system is expected to be in the range of 75 to 80 percent. Within this range the expected gas collection rate is 851 to 908 cfm. The current flare is rated at 1200 cfm, the blower is rated at 1400 cfm, and each engine is rated at 366 cfm (total of 1098 cfm).

The future plans of this facility are to continue to use the current gas collection and control system including the existing flare and the internal combustion engines until the landfill grows beyond the current capacity. The normal operating scenario of the collection system is to route the gas to the genset units to control the NMOC emissions from the landfill. The three genset engines shall be tested to show compliance with NSPS Subpart WWW §60.752(b)(iii)(B) to show 98 weight percent reduction of outlet NMOC because these units will be initially used as control devices for NSPS compliance since the system does not currently have a gas treatment system. The flare is used as a backup control device to burn the excess landfill gas that is not burned in the genset engines. The facility plans to construct a system that filters landfill gas to an absolute rating of 10 microns, dewater the gas to provide a 20 degree Fahrenheit reduction in dew point temperature, and that compresses the gas, by the year 2013.

The existing permit shall be modified to:

- include the testing of the engines as control devices,
- include a toxic air pollutant evaluation and modeling demonstration
- monitoring and recordkeeping requirements for the MACT, Subpart AAAA, and
- updated NSPS, Subpart WWW regulations.

The following table includes only those regulations that were revised/changed/added per this modification

Regulated Pollutant	Limits/Standards	Applicable Regulation
Nonmethane organic compounds (NMOC)	Route landfill gas to an enclosed combustion device that reduces NMOC emissions by 98 weight percent or reduces the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at three percent oxygen, or Route landfill gas to an open flare designed in accordance with 40 CFR Part 60, §60.18, or Route the collected landfill gas to a landfill gas treatment system that processes the collected gas for subsequent sale or use	15A NCAC 2D .0524 40 CFR Part 60, Subpart WWW
Visible emissions	20 percent opacity	15A NCAC 2D. 0521
Sulfur dioxide emissions	2.3 pounds per million Btu heat input	15A NCAC 2D .0516
Odorous emissions	Apply suitable odor control measures [State-enforceable only]	15A NCAC 2D .1806
Hazardous air pollutants	Operation standards	15A NCAC 2D .1111 40 CFR Part 63, Subpart AAAA
Toxic air pollutants	Modeled emission rates [State-enforceable only]	15A NCAC 2D .1100
	Toxics demonstration [State-enforceable only]	15A NCAC 2Q .0705 Last MACT, toxics demonstration

a. 15A NCAC 2D .0524, 40 CFR Part 60, Subpart WWW "New Source Performance Standards"

Regulation Analysis

- i. The Blackburn Sanitary Landfill was modified after May 1, 1991, and is subject to NSPS 40 CFR Part 60, Subpart WWW. It is subject to Title V because the design capacity of the landfill is greater than 2.5 million megagrams (2.75 million tons) by mass and 2.5 million cubic meters by volume. It is required to install a gas collection and control system that meets the requirements of this standard because the annual emissions of NMOC have exceeded 50 Mg per year.

Testing [15A NCAC 2Q .0524, 40 CFR §60.754]

- ii. If emission testing is required, the testing shall be performed in accordance with 15A NCAC 2D .0524, 40 CFR §60.754 and General Condition JJ located in Section 3 of the Title V Permit. If the results of this test are above the limits given in 40 CFR Part 60, Subpart WWW, the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0524, Subpart WWW.

iii. Additional Testing

NSPS Performance Testing - As required by 15A NCAC 2D .0524, the following initial performance test shall be conducted for the gas collection and control system. Within 60 days after achieving the maximum normal operation at which the landfill gas collection and control system will be operated, but not later than 180 days after the initial startup of the approved control system, the Permittee shall conduct the required performance test(s) and submit a written report of the test(s) results.

- (A) An initial performance test shall be performed on flare CD-1 by verifying that the open flare is designed and operated in accordance with §60.18.
- (B) An initial performance test shall be performed on genset units CD-8, CD-9, and CD-10 to verify that the enclosed combustion device reduces NMOC emissions by 98 weight percent or reduces the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at three percent oxygen,
- (C) The source shall be responsible for ensuring, within the limits of practicality, that the equipment or process being tested is operated at or near its maximum normal production rate or at a lesser rate if specified by the Director or his delegate.
- (D) All associated testing costs are the responsibility of the Permittee.
- (E) The control devices shall be operated within the parameter ranges established during the initial or most recent performance test. The operating parameters to be monitored are specified in 40 CFR §60.756.

iv. Operational Standards For Collection and Control Systems [40 CFR Part 60, §60.753]

Each owner or operator of a MSW landfill with a gas collection and control system used to comply with the provisions of §60.752(b)(2)(ii) of this subpart shall:

- (A) Operate the collection system such that gas is collected from each area, cell, or group of cells in the MSW landfill in which solid waste has been in place for 5 years or more if active; or 2 years or more if closed or at final grade;
- (B) Operate the collection system with negative pressure at each wellhead except under the following conditions:
- (1) A fire or increased well temperature. The owner or operator shall record instances when positive pressure occurs in efforts to avoid a fire. These records shall be submitted with the annual reports as provided in §60.757(f)(1);
 - (2) Use of a geomembrane or synthetic cover. The owner or operator shall develop acceptable pressure limits in the design plan;
 - (3) A decommissioned well. A well may experience a static positive pressure after shut down to accommodate for declining flows. All design changes shall be submitted for approval to the DAQ Regional Office;

- (C) Operate each interior wellhead in the collection system with a landfill gas temperature less than 55 °C and with either a nitrogen level less than 20 percent or an oxygen level less than 5 percent. The owner or operator may establish a higher operating temperature, nitrogen, or oxygen value at a particular well. A higher operating value demonstration shall show supporting data that the elevated parameter does not cause fires or significantly inhibit anaerobic decomposition by killing methanogens.
 - (1) The nitrogen level shall be determined using Method 3C, unless an alternative test method is established as allowed by §60.752(b)(2)(i).
 - (2) Unless an alternative test method is established as allowed by §60.752(b)(2)(i), the oxygen shall be determined by an oxygen meter using Method 3A or 3C except that:
 - (a) The span shall be set so that the regulatory limit is between 20 and 50 percent of the span;
 - (b) A data recorder is not required;
 - (c) Only two calibration gases are required, a zero and span, and ambient air may be used as the span;
 - (d) A calibration error check is not required;
 - (e) The allowable sample bias, zero drift, and calibration drift are ± 10 percent.
 - (D) Operate the collection system so that the methane concentration is less than 500 parts per million above background at the surface of the landfill. To determine if this level is exceeded, the owner or operator shall conduct surface testing around the perimeter of the collection area and along a pattern that traverses the landfill at 30 meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover. The owner or operator may establish an alternative traversing pattern that ensures equivalent coverage. A surface monitoring design plan shall be developed that includes a topographical map with the monitoring route and the rationale for any site-specific deviations from the 30 meter intervals. Areas with steep slopes or other dangerous areas may be excluded from the surface testing.
 - (E) Operate the system such that all collected gases are vented to a control system designed and operated in compliance with §60.752(b)(2)(iii). In the event the collection or control system is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within 1 hour; and
 - (F) Operate the control or treatment system at all times when the collected gas is routed to the system.
 - (G) If monitoring demonstrates that the operational requirements in paragraphs §60.753(b), (c), or (d) are not met, corrective action shall be taken as specified in §60.755(a)(3) through (5) or §60.755(c). If corrective actions are taken as specified in §60.755, the monitored exceedance is not a violation of the operational requirements.
- v. Compliance Provisions [40 CFR Part 60, §60.755]
- (A) For the purpose of demonstrating whether the gas collection system flow rate is sufficient to determine compliance with §60.752(b)(2)(ii)(A)(3), the owner or operator shall measure gauge pressure in the gas collection header at each individual well, monthly. If a positive pressure exists, action shall be initiated to correct the exceedance within 5 calendar days, except for the three conditions allowed under §60.753(b). If negative pressure cannot be achieved without excess air infiltration within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial measurement of positive pressure. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance shall be submitted to the DAQ Regional Office for approval.
 - (B) Owners or operators are not required to expand the system as required in paragraph §60.755(a)(3) during the first 180 days after gas collection system startup.

- (C) For the purpose of identifying whether excess air infiltration into the landfill is occurring, the owner or operator shall monitor each well monthly for temperature and nitrogen or oxygen as provided in §60.753(c). If a well exceeds one of these operating parameters, action shall be initiated to correct the exceedance within 5 calendar days. If correction of the exceedance cannot be achieved within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial exceedance. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance shall be submitted to the DAQ Regional Office for approval.
- (D) An owner or operator seeking to demonstrate compliance with §60.752(b)(2)(ii)(A)(4) through the use of a collection system not conforming to the specifications provided in §60.759 shall provide information satisfactory to the Director as specified in §60.752(b)(2)(i)(C) demonstrating that off-site migration is being controlled.
- (E) For purposes of compliance with §60.753(a), each owner or operator of a controlled landfill shall place each well or design component as specified in the approved design plan as provided in §60.752(b)(2)(i). Each well shall be installed no later than 60 days after the date on which the initial solid waste has been in place for a period of 5 years or more if active; or 2 years or more if closed or at final grade.
- (F) The following procedures shall be used for compliance with the surface methane operational standard as provided in §60.753(d).
 - (1) The owner or operator shall monitor surface concentrations of methane along the entire perimeter of the collection area and along a pattern that traverses the landfill at 30 meter intervals (or a site-specific established spacing) for each collection area on a quarterly basis in accordance with §60.756(f) using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in §60.753(d).
 - (2) The background concentration shall be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least 30 meters from the perimeter wells.
 - (3) Surface emission monitoring shall be performed in accordance with section 8.3.1 of Method 21 of appendix A of 40 CFR Part 60, except that the probe inlet shall be placed within 5 to 10 centimeters of the ground. Monitoring shall be performed during typical meteorological conditions.
 - (4) Any reading of 500 parts per million or more above background at any location shall be recorded as a monitored exceedance and the actions specified in paragraphs §60.755(c)(4) (i) through (v) shall be taken. As long as the specified actions are taken, the exceedance is not a violation of the operational requirements of §60.753(d).
 - (a) The location of each monitored exceedance shall be marked and the location recorded.
 - (b) Cover maintenance or adjustments to the vacuum of the adjacent wells to increase the gas collection in the vicinity of each exceedance shall be made and the location shall be re-monitored within 10 calendar days of detecting the exceedance.
 - (c) If the re-monitoring of the location shows a second exceedance, additional corrective action shall be taken and the location shall be monitored again within 10 days of the second exceedance. If the re-monitoring shows a third exceedance for the same location, the action specified in paragraph §60.755(c)(4)(v) shall be taken, and no further monitoring of that location is required until the action specified in paragraph §60.755(c)(4)(v) has been taken.
 - (d) Any location that initially showed an exceedance but has a methane concentration less than 500 ppm methane above background at the 10-day re-monitoring specified in paragraph §60.755 (c)(4) (ii) or (iii) shall be re-monitored 1 month from the initial exceedance. If the 1-month remonitoring shows a concentration less than 500 parts per million above background, no further monitoring of that location is required until the next quarterly monitoring period. If the 1-month remonitoring shows an exceedance, the actions specified in paragraph (c)(4) (iii) or (v) shall be taken.

- (e) For any location where monitored methane concentration equals or exceeds 500 parts per million above background three times within a quarterly period, a new well or other collection device shall be installed within 120 calendar days of the initial exceedance. An alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a corresponding timeline for installation shall be submitted to the DAQ Regional Office for approval.
 - (5) The owner or operator shall implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis.
 - (6) Each owner or operator seeking to comply with the provisions in paragraph §60.755(c) shall comply with the following instrumentation specifications and procedures for surface emission monitoring devices:
 - (a) The portable analyzer shall meet the instrument specifications provided in section 3 of Method 21 of appendix A of 40 CFR Part 60, except that “methane” shall replace all references to VOC.
 - (b) The calibration gas shall be methane, diluted to a nominal concentration of 500 parts per million in air.
 - (c) To meet the performance evaluation requirements in section 3.1.3 of Method 21 of appendix A of 40 CFR Part 60, the instrument evaluation procedures of section 4.4 of Method 21 of appendix A of this part shall be used.
 - (d) The calibration procedures provided in section 4.2 of Method 21 of appendix A of this part shall be followed immediately before commencing a surface monitoring survey.
 - (7) The provisions of this subpart apply at all times, except during periods of start-up, shutdown, or malfunction, provided that the duration of start-up, shutdown, or malfunction shall not exceed 5 days for collection systems and shall not exceed 1 hour for treatment or control devices.
- vi. Monitoring [15A NCAC 2Q .0508(f), 40 CFR §60.756]
- (A) Each owner or operator seeking to comply with §60.752(b)(2)(ii)(A) for an active gas collection system shall install a sampling port and a thermometer, other temperature measuring device, or an access port for temperature measurements at each wellhead and:
 - (1) Measure the gauge pressure in the gas collection header on a monthly basis as provided in 40 CFR §60.755(a)(3);
 - (2) Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis as provided in 40 CFR §60.755(a)(5);
 - (3) Monitor temperature of the landfill gas on a monthly basis as provided in §60.755(a)(5); and
 - (4) Monitor surface concentrations of methane along the entire perimeter of the collection area (or site-specific established spacing) for each collection area on a quarterly basis.
 - (B) The owner or operator shall calibrate, maintain, and operate according to the manufacture’s recommendations the following equipment when using an open flare to comply with this Subpart:
 - (1) A heat sensing device, such as an ultraviolet beam sensor or thermocouple, at the pilot light or the flame itself to indicate the continuous presence of a flame.
 - (2) A device that records flow to or bypass of the flare. The owner or operator shall either:
 - (a) Install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every 15 minutes; or
 - (b) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism shall be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

- (C) The owner or operator shall calibrate, maintain, and operate according to the manufacturer's recommendations the following equipment when using an enclosed combustor to comply with this Subpart:
 - (1) A temperature monitoring device equipped with a continuous recorder and having a minimum accuracy of ± 1 percent of the temperature being measured expressed in degrees Celsius or ± 0.5 degrees Celsius, whichever is greater. A temperature monitoring device is not required for boilers or process heaters with design heat input capacity equal to or greater than 44 megawatts.
 - (2) A device that records flow to or bypass of the control device. The owner or operator shall either:
 - (a) Install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every 15 minutes; or
 - (b) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism shall be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.
 - (D) Each owner or operator seeking to install a collection system that does not meet the specifications in 40 CFR §60.759, or seeking to monitor alternative parameters to those required by 40 CFR §60.753 through §60.756, shall provide information satisfactory to the EPA as provided in §60.752(b)(2)(i)(B) and (C) describing the design and operation of the collection system, the operating parameters that would indicate proper performance, and appropriate monitoring procedures.
- vii. Recordkeeping [40 CFR Part 60, §60.758]
- (A) Except as provided in §60.752(b)(2)(i)(B), each owner or operator of an MSW landfill subject to the provisions of §60.752(b) shall keep for at least 5 years up-to-date, readily accessible, on-site records of the design capacity report which triggered §60.752(b), the current amount of solid waste in-place, and the year-by-year waste acceptance rate. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.
 - (B) Except as provided in §60.752(b)(2)(i)(B), each owner or operator of a controlled landfill shall keep up-to-date, readily accessible records for the life of the control equipment of the data listed below in this section as measured during the initial performance test or compliance determination. Records of subsequent tests or monitoring shall be maintained for a minimum of 5 years. Records of the control device vendor specifications shall be maintained until removal.
 - (1) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with §60.752(b)(2)(ii):
 - (a) The maximum expected gas generation flow rate as calculated in §60.755(a)(1). The owner or operator may use another method to determine the maximum gas generation flow rate, if the method has been approved by the DAQ.
 - (b) The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in §60.759(a)(1).
 - (2) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with §60.752(b)(2)(iii)(A) through use of an open flare, the flare type (i.e., steam-assisted, air-assisted, or nonassisted), all visible emission readings, heat content determination, flow rate or bypass flow rate measurements, and exit velocity determinations made during the performance test as specified in §60.18; continuous records of the flare pilot flame or flare flame monitoring and records of all periods of operations during which the pilot flame of the flare flame is absent.

- (3) Except as provided in §60.752(b)(2)(i)(B), each owner or operator of a controlled landfill subject to the provisions of this subpart shall keep for 5 years up-to-date, readily accessible continuous records of the equipment operating parameters specified to be monitored in §60.756 as well as up-to-date, readily accessible records for periods of operation during which the parameter boundaries established during the most recent performance test are exceeded.
- (4) Each owner or operator subject to the provisions of this subpart shall keep up-to-date, readily accessible continuous records of the indication of flow to the control device or the indication of bypass flow or records of monthly inspections of car-seals or lock-and-key configurations used to seal bypass lines, specified under §60.756.
- (5) Each owner or operator seeking to comply with the provisions of this subpart by use of an open flare shall keep up-to-date, readily accessible continuous records of the flame or flare pilot flame monitoring specified under §60.756(c), and up-to-date, readily accessible records of all periods of operation in which the flame or flare pilot flame is absent.
- (6) Except as provided in §60.752(b)(2)(i)(B), each owner or operator subject to the provisions of this subpart shall keep for the life of the collection system an up-to-date, readily accessible plot map showing each existing and planned collector in the system and providing a unique identification location label for each collector.
- (7) Each owner or operator subject to the provisions of this subpart shall keep up-to-date, readily accessible records of the installation date and location of all newly installed collectors as specified under §60.755(b).
- (8) Each owner or operator subject to the provisions of this subpart shall keep readily accessible documentation of the nature, date of deposition, amount, and location of asbestos-containing or nondegradable waste excluded from collection as provided in §60.759(a)(3)(i) as well as any nonproductive areas excluded from collection as provided in §60.759(a)(3)(ii).
- (9) Except as provided in §60.752(b)(2)(i)(B), each owner or operator subject to the provisions of this subpart shall keep for at least 5 years up-to-date, readily accessible records of all collection and control system exceedances of the operational standards in §60.753, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance. The Permittee shall be deemed in noncompliance with 15A NCAC 2D if these records are not maintained.

viii. Specifications of Active Collection Systems [40 CFR Part 60, §60.759]

- (A) Each owner or operator seeking to comply with §60.752(b)(2)(i) shall site active collection wells, horizontal collectors, surface collectors, or other extraction devices at a sufficient density throughout all gas producing areas using the following procedures unless alternative procedures have been approved by the Division of Air Quality as provided in §60.752(b)(2)(i)(C) and (D).
 - (1) The collection devices within the interior and along the perimeter areas shall be certified to achieve comprehensive control of surface gas emissions by a professional engineer, who is registered in the State of North Carolina. The following issues shall be addressed in the design plan: depths of refuse, refuse gas generation rates and flow characteristics, cover properties, gas system expandability, leachate and condensate management, accessibility, compatibility with filling operations, integration with closure end use, air intrusion control, corrosion resistance, fill settlement, and resistance to the refuse decomposition heat.
 - (2) The sufficient density of gas collection devices determined above in this section shall address landfill gas migration issues and augmentation of the collection system through the use of active or passive systems at the landfill perimeter or exterior.

- (3) The placement of gas collection devices determined above in this section shall control all gas producing areas, except as provided below:
 - (a) Any segregated area of asbestos or nondegradable material may be excluded from collection if documented as provided under §60.758(d). The documentation shall provide the nature, date of deposition, location and amount of asbestos or nondegradable material deposited in the area. If any area of the landfill qualifies for exclusion under §60.758(d), the Permittee shall provide the stipulated data as a request for approval to the DAQ Regional Office.
 - (b) Any nonproductive area of the landfill may be excluded from control, provided that the total of all excluded areas can be shown to contribute less than 1 percent of the total amount of NMOC emissions from the landfill. The amount location, and age of the material shall be documented and provided to the Division of Air Quality upon request. A separate NMOC emissions estimate shall be made for each section proposed for exclusion, and the sum of all such sections shall be compared to the NMOC emissions estimate for the entire landfill. If any area of the landfill qualifies for exclusion under §60.759(a)(3)(ii), the Permittee shall provide the stipulated data by letter as a request for approval to the DAQ Regional Office.

(B) Site Specific Requirements

Under provisions in 40 CFR Sec. 60.753(b)(3), wells that experience positive pressure after being shutdown to accommodate declining landfill gas flow rates can be decommissioned if permission is granted by the Administrator. As an alternative to decommissioning wells under the provisions, the following changes to the standard operating procedure for wells where persistent oxygen exceedances are not the result of operations and/or maintenance issues have been proposed:

- (1) Wells where oxygen concentrations do not decline to acceptable levels after more than one hour of reduced vacuum will be shut off until the gas quality recovers.
- (2) The monthly monitoring required by 40 CFR Sec. 60.755 will be conducted for wells that have been shutdown, but positive pressure or elevated oxygen concentrations will not be considered exceedances of the operating limits in 40 CFR §60.753.
- (3) If monthly monitoring indicates that pressure has built up in the well and the oxygen concentration still exceeds five percent, the well will be opened to relieve the pressure and will be shutdown until it is monitored the following month.
- (4) If the monthly monitoring indicates that gas quality has improved (i.e., the oxygen concentration has dropped below five percent), the well will be brought back on line until the gas quality declines again.
- (5) The quarterly methane surface concentration monitoring required under 40 CFR §60.755 will be conducted for wells that have been shutdown. Standard remediation steps, including evaluating the need to return wells to full-time service, will be followed if exceedances of the 500 ppm methane surface concentration limit are detected.
- (6) 40 CFR §60.756(b)(2) and (c)(2) specify the use of a device that records flow to or bypass of the control device or flare for an enclosed combustor and flare, respectively. Since the open flare in the gas collection and control system at the Blackburn Sanitary Landfill does not contain any bypasses of the flare, the requirement to record flow or bypass of the flare is not applicable.

ix. Well Closure [40 CFR Part 60, §60.753]

If any gas collection well qualifies for exclusion under §60.753(b)(3) as a decommissioned well, the Permittee shall provide adequate documentation and data to justify well closure. This information shall be provided by letter to the DAQ Regional Office as a request for approval.

- x. Reporting [40 CFR Part 60, §60.757]
 - (A) Each owner or operator seeking to comply with §60.752(b)(2) using an active collection system designed in accordance with §60.752(b)(2)(ii) shall submit to the Division of Air Quality annual reports of the recorded information listed below in this section.
 - (1) Value and length of time for exceedance of applicable parameters monitored under 40 CFR §60.756(a), (b), (c), and (d).
 - (2) Description and duration of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow as specified in 40 CFR §60.756.
 - (3) Description and duration of all periods when the control device was not operating for a period exceeding one hour and length of time the control device was not operating.
 - (4) All periods when the collection system was not operating in excess of 5 days.
 - (5) The location of each exceedance of the 500 parts per million methane concentration and the concentration recorded at each location for which an exceedance was recorded in the previous month.
 - (6) The date of installation and the location of each well or collection system expansion added in accordance with 40 CFR §60.755(a)(3), (b), and (c)(4).
 - (7) Summary of all DAQ approved well closures that have been decommissioned in accordance with wells §60.753(b)(3).
 - (8) Summary of all DAQ approved nonproductive areas of the landfill in accordance with §60.759(a)(3)(ii).
 - (B) The initial annual report shall be submitted within 180 days of the installation and start-up of the collection and control system, and shall include the initial performance test report required under 40 CFR §60.8.
 - (C) The Permittee shall submit a summary report of monitoring and recordkeeping activities by January 30 of each calendar year for the preceding six-month period between July and December and July 30 of each calendar year for the preceding six-month period between January and June. All instances of deviations from the requirements of this permit must be clearly identified.

b. 15A NCAC 2D .0540 “Fugitive dust”

- 1. Description: Fugitive dust emissions will be generated from the facility roadways and landfill operations.
- 2. Applicable Regulatory Requirements for this modification:

Regulated Pollutant	Limits/Standards	Applicable Regulation
PM	Work practice standards with written compliance plan (General Condition “MM) - State Enforceable Only	15A NCAC 2D .0540

Fugitive Dust Control Requirement [15A NCAC 2D .0540] - STATE ENFORCEABLE ONLY
 As required by 15A NCAC 2D .0540 "Particulates from Fugitive Dust Emission Sources," the Permittee shall not cause or allow fugitive dust emissions to cause or contribute to substantive complaints or excess visible emissions beyond the property boundary. If substantive complaints or excessive fugitive dust emissions from the facility are observed beyond the property boundaries for six minutes in any one hour (using Reference Method 22 in 40 CFR, Appendix A), the owner or operator may be required to submit a fugitive dust plan as described in 2D .0540(f).

"Fugitive dust emissions" means particulate matter from process operations that does not pass through a process stack or vent and that is generated within plant property boundaries from activities such as: unloading and loading areas, process areas stockpiles, stock pile working, plant parking lots, and plant roads (including access roads and haul roads).

All facility roads are watered depending on season and need.

Note: The fugitive dust emissions from haul roads and landfill operations will not be included as permitted emission sources. All facility roads will be watered daily depending on season and need. During dry periods the water truck will operate full time. Fugitive dust emissions are subject to General Condition MM.

- c. 15A NCAC 2D .1111, 40 CFR Part 63, Subpart AAAA: National Emission Standards for Hazardous Air Pollutants, Municipal Solid Waste Landfills

Applicability

- i. Blackburn Sanitary Landfill (ES-1 and ES-2) shall comply with all requirements of 15A NCAC 2D .1111 “Maximum Achievable Control Technology” and 40 CFR Part 63, Subpart AAAA “National Emission Standards for Hazardous Air Pollutant, Municipal Solid Waste Landfills” [40 CFR §63.1935]

Definitions and Nomenclature [40 CFR §63.1990]

- ii. For the purpose of this permit condition, the definitions and nomenclature contained in 40 CFR §63.1990 shall apply.

REGULATED POLLUTANTS [40 CFR §63.2]

- iii. Hazardous Air Pollutant (HAP) means any air pollutant listed in or pursuant to section 112(b) of the Clean Air Act. [40 CFR §63.2]

40 CFR Part 63 Subpart A “GENERAL PROVISIONS”

- iv. The Permittee shall comply with the requirements of 40 CFR §63 Subpart A “General Provisions” according to the applicability of Subpart A to such sources as identified in 40 CFR Part 63, Subpart AAAA, §63.1935.

Compliance dates [40 CFR §63.1945]

- v. The Permittee is an existing affected area source in accordance with 40 CFR Part 63, §63.1935 (a)(3). An area source is by definition a landfill that is not major due to the annual emission rate of HAPs, but one that has a design capacity equal to or greater than 2.5 million megagrams (Mg) and 2.5 million cubic meters (m³) and has estimated uncontrolled emissions equal to or greater than 50 megagrams per year (Mg/yr) NMOC emissions. This facility shall be in compliance with this regulation by the date this landfill is required to install a collection and control system in accordance with 40 CFR §60.752(b)(2) of the New Source Performance Standards, Subpart WWW. [40 CFR §63.1945]

Monitoring [40 CFR §63.1955 and §63.1960]

- vi. Compliance with this Subpart (AAAA) is determined in accordance with the New Source Performance Subpart WWW, including performance testing, monitoring of the collection system, continuous parameter monitor, and other credible evidence. In addition, continuous parameter monitoring data, collected under 40 CFR §60.756(c)(1) and (d) of Subpart WWW, are used to demonstrate compliance with the operating conditions for control systems.

For the purposes of this rule, deviation means any instance in which an affected source subject to this subpart, or an owner or operator of such a source:

- (A) fails to meet any requirement or obligation established by this subpart, including, but not limited to, any emissions limitation (including any operating limit) or work practice standard;
- (B) fails to meet any term or condition that is adopted to implement an applicable requirement in this subpart and that is included in the operating permit for any affected source required to obtain such a permit;
- (C) fails to meet any emission limitation, (including any operating limit), or work practice standard in this subpart during SSM, regardless of whether or not such failure is permitted by this subpart; or

If a deviation occurs, the Permittee has failed to meet the control device operating conditions describe in this subpart and have deviated from the requirements of this subpart.

vii. Recordkeeping/Reporting Requirements [40 CFR Part 63, §63.1980]

Keep records and reports as specified in the general provisions of 40 CFR Part 60, and in Subpart WWW, except the semi-annual report described in 40 CFR §60.757(f) shall be submitted every 6 months.

d. 15A NCAC 2D .0516 "Sulfur Dioxide Emissions From Combustion Sources"

Regulation Analysis:

- i. Emissions of sulfur dioxide from the flare (CD-1) and the genset engines (CD-8, 9, and 10) shall not exceed 2.3 pounds per million Btu heat input. Sulfur dioxide formed by the combustion of sulfur in fuels, wastes, ores, and other substances shall be included when determining compliance with this standard. [15A NCAC 2D .0516]
- ii. Testing [15A NCAC 2D .0501(c)(4)]
If emission testing is required, the testing shall be performed in accordance with 15A NCAC 2D .0501(c)(4) and General Condition JJ found in Section 3. If the results of this test are above the limit given above, the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0516.

Monitoring/Recordkeeping/Reporting [15A NCAC 2Q .0508(f)]

- iii. No monitoring, recordkeeping, or reporting is required for sulfur dioxide emissions from the flare or the engines while firing landfill gas.

e. 15A NCAC 2D .0521 "Control Of Visible Emissions"

Regulation Analysis:

- i. The genset engines (CD-8, 9, 10) and the flare (CD-1) were installed on the landfill after July 1, 1971, and are therefore subject to 15A NCAC 2D .0521(d). Per this regulation visible emissions shall not be more than 20 percent opacity each when averaged over a six-minute period except that six-minute periods averaging more than 87 percent opacity may occur not more than once in any hour nor more than four times in any 24-hour period.

Testing [15A NCAC 2D .0501(c)(8)]

- ii. If emission testing is required, the testing shall be performed in accordance with 15A NCAC 2D .0501(c)(8) and General Condition JJ. If the results of this test are above the limit given above, the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0521(d).

Monitoring/Recordkeeping/Reporting [15A NCAC 2Q .0508(f)]

- iii. No monitoring, recordkeeping, or reporting is required for visible emissions from the flare or the engines when firing landfill gas.

- f. 15A NCAC 2D .1806 "Control And Prohibition Of Odorous Emissions" [State-enforceable only]
The Permittee shall not operate the facility without implementing management practices or installing and operating odor control equipment sufficient to prevent odorous emissions from the facility from causing or contributing to objectionable odors beyond the facility's boundary.

- g. Toxic Air pollutants - STATE ENFORCEABLE ONLY
 - ES-1 {Non active (unlined) portion of landfill}
 - ES-2 {Active (lined) portion of landfill}
 - CD-1 {Flare, 36 million Btu per hour heat input, 1200 scfm}
 - CD-8 {Landfill gas-fired genset unit (11 million Btu per hour heat input)}
 - CD-9 {Landfill gas-fired genset unit (11 million Btu per hour heat input)}
 - CD-10 {Landfill gas-fired genset unit (11 million Btu per hour heat input)}
 - ES-3 {Tub grinder (Diesel-fired, 855 hp)}
 - ES-11 {Tub grinder (Diesel-fired 1050 hp, NSPS, MACT)}

- i. 15A NCAC 2Q .0705 "EXISTING FACILITIES AND SIC CALLS"
For sources at a facility subject to a MACT standard, a permit application shall be required demonstrating compliance with the 15A NCAC 2D .1100 by the same deadline that the facility is required to comply with the last MACT, excluding the MACT for combustion sources, as outlined in 15A NCAC 2D .0705.

Toxic Air Pollutant (TAP) Emission Rate Calculation Methodology:

The methodology used to calculate toxic air pollutant ambient concentrations for the Blackburn Sanitary Landfill are based on the methodologies used in the U.S. EPA document AP-42 and the US EPA Gas Emission Model (LANGEM).

The normal operating scenario at this facility is to route all of the generated landfill gas to the three genset units for the production of electricity. The remainder of the collected landfill gas is sent to the flare. The maximum landfill gas generation rate for the landfill through the year 2029 is estimated to be 1552.11 acfm. The following estimate was done using a conservative estimate. (The maximum amount of landfill gas generated would never go to the flare and the genset units at the same time.)

Landfill gas emission rates predicted from LandGEM through the year 2029

Estimated landfill gas emission rate from EPA LandGem model	Potential landfill gas rate to the three engines	Landfill gas flow rate to flare	Fugitive landfill gas flow rate
1,552.11 acfm	1,120 acfm	305 acfm	127 acfm

The landfill gas emission rate was calculated using the first order rate of decay equation to calculate landfill gas generation in accordance with NSPS, 40 CFR Part 60, Subpart WWW which based on the amount and age of waste for each individual disposal unit. The EPA landGEM model uses this equation.

$$Q_M = \sum_{i=1}^n 2 k L_o M_i \left(e^{-kr_i} \right) \quad \{ \text{Landfill gas generation rate} \}$$

AP-42 and the EPA LandGem Landfill Gas emission Model, assumes that landfill gas is 50% methane. Therefore, the methane generation rate can be found by taking ½ of the landfill gas generation rate equation. The equation can be modified as follows:

$$Q_{CH_4} = \sum_{i=1}^n k L_o M_i e^{-kt_i} \quad \{\text{Methane gas generation rate}\}$$

Where:

- Q_{CH_4} = maximum expected gas generation flow rate, cubic meters per year
- k = methane generation rate constant, year⁻¹ (0.04/year, AP-42 inventory default value)
- L_o = methane generation potential, cubic meter per megagrams solid waste (100 m³/Mg, AP-42 inventory default value)
- M_i = mass of solid waste in the ith section, megagrams
- t_i = age of the ith section, years

The total benzene emissions from this facility will equal the emissions from the:
 Flare (@98% control efficiency of the gas collection system, 75% collection efficiency) + fugitive emission (25% of total emissions generated by the landfill) + the three genset units (CD-8, 9, 10) + tub grinder (ES-3) + tub grinder (ES-11).

The following equation from AP-42, fifth edition, Section 2.4.4.1 “Emissions”, Revised November 1998, is used to calculate the individual toxic air pollutants flow rate (m³/yr) as a constituent of the methane generation from the landfill. The example below calculates the emissions of vinyl chloride from the flare.

TAP emissions from the landfill gas-fired flare were estimated using AP-42 factors for open flares. A control efficiency of 98% was used for NMOC destruction in the flare. 50% of the landfill gas flow is methane. The only TAP of significance generated by combustion of other pollutants by the flare was hydrogen chloride.

Annual emissions of Methane (CH₄):

$$\frac{1552.11 \text{ ft}^3}{\text{min ute}} \times 50\% \times \frac{60 \text{ min utes}}{\text{hour}} \times \frac{8760 \text{ hours}}{\text{year}} \times \frac{1 \text{ meter}^3}{(3.28 \text{ ft})^3} = \frac{1.156E^{+07} \text{ m}^3 \text{ CH}_4}{\text{year}}$$

$$Q_p = 2.0 \times Q_{CH_4} \left(\frac{C_p}{1 \times 10^6} \right)$$

Where:

- Q_p = Emission rate of pollutants, m³/yr
- Q_{CH_4} = 1.156 x 10⁷ m³/year
- C_{benzene} = concentration of pollutant in landfill gas (from Table 2.4-1, “Default Concentration for Landfill gas constituents”, Section 2.4.5 for benzene (Cp) 1.91 ppmv)

Multiplication factor = 2.0 assumes 50% landfill gas is methane

The following equation (4) from AP-42, fifth edition, Section 2.4.4.1 “Emissions”, Revised November 1998, is used to calculate the uncontrolled emission of individual toxic air pollutants present in landfill gas.

$$UM_p = Q_p \times \left[\frac{MW_p \times 1 \text{ atmosphere}}{\left(\frac{8.205 \times 10^{-5} \text{ m}^3 - \text{atmosphere}}{\text{gmol}^{-0}K} \right) \times \frac{1000 \text{ g}}{\text{kg}} \times (273 + 25^0 \text{ C})^0 K} \right]$$

Where:

UM_p = Uncontrolled mass emissions of pollutants, kg/yr

MW_p = Molecular weight of pollutant, g/mol

Q_p = Emission rate of pollutant, m³/yr

T^0 = Temperature of the landfill gas (default value = 25 °C)

Benzene from the flare:

The following equation is an example calculation for the mass emissions flow rate (m³/yr) of benzene emitted from the flare. The flow rate from the flare was calculated based on the maximum methane generation rates in 2029, 75% capture efficiency of the gas collection and control system (gccs), 98% destruction efficiency in the flare, and the average sampled constituent concentrations determined by EPA during emission factor compilation in AP-42 from the LandGEM model for landfills.

$$Q_p = 2.0 \times Q_{CH_4} \left(\frac{C_p}{1 \times 10^6} \right)$$

Where: $Q_{CH_4} = 1.156 \times 10^7 \text{ m}^3/\text{year}$

C_p (benzene) = 1.91 ppmv

$$Q_{chlorine} = 2.0 \times \frac{1.156 \times 10^7 \text{ m}^3}{\text{year}} \times \left(\frac{1.91 \text{ parts}}{1 \times 10^6} \right) = \frac{44.16 \text{ m}^3 \text{ benzene}}{\text{year}}$$

The following equation is an example calculation for the mass emissions rate (lbs/year) of toxic air pollutant constituents found in landfill gas. This rate was calculated based on methane generation rates and average sampled constituent concentrations determined by EPA during emission factor compilation in AP-42.

Where: Molecular weight of benzene = 78.11 grams/gmole

$Q_{benzene} = 44.16 \text{ m}^3/\text{yr}$

$T^0 = 25^0 \text{ C}$ (default temperature)

$$UM_p = 44.16 \text{ m}^3 \frac{\text{benzene}}{\text{year}} \times \left[\frac{78.11 \text{ g / gmole} \times 1 \text{ atmosphere}}{\left(\frac{8.205 \times 10^{-5} \text{ m}^3 - \text{atmosphere}}{\text{gmol}^{-0}K} \right) \times \frac{1000 \text{ g}}{\text{kg}} \times (273 + 25^0 \text{ C})^0 K} \right] = \frac{141.07 \text{ kg benzene}}{\text{year}}$$

$$Q_{benzene} = \frac{141.07 \text{ kg benzene}}{\text{year}} \times \left(\frac{2.2 \text{ lbs}}{\text{kg}} \right) = \frac{310.35 \text{ lbs benzene}}{\text{year}} \text{ (generated by landfill with no control)}$$

at 75% collection efficiency and 98% destruction in the flare, benzene emissions equal:

$$\frac{310.35 \text{ lbs benzene}}{\text{year}} \times (0.75, \text{ collection}) \times (1 - 0.98, \text{ flare control}) = \frac{4.66 \text{ lbs benzene}}{\text{year}}$$

Fugitive benzene emissions from the landfill at 75% collection efficiency of the gccs:
25% of the total benzene produced will not be collected by the gas collection system and will be considered fugitive emissions.

$$\frac{310.35 \text{ lbs benzene}}{\text{year}} \times (0.25, \text{ percentage not collected by gccs}) = \frac{77.59 \text{ lbs benzene}}{\text{year}}$$

Example calculation for Benzene emissions from the three genset units.

TAP emissions from the landfill gas-fired “rich burn” genset units were estimated using AP-42 factors for natural gas-fired reciprocating engines, table, Table 3.2-3. A control efficiency of 98% was used for NMOC destruction in the engines. The only TAP of significance generated by combustion of other pollutants by the engines was hydrogen chloride.

Total heat input of three units = 33 million Btu per hour

AP-42 factor for natural gas firing in IC engines = 1.58E-03 lbs benzene per million Btu heat input

$$Q_{\text{benzene}} = \frac{33.0 \times 10^6}{\text{hour}} \times \frac{1.58 \times 10^{-3} \text{ lbs}}{10^6 \text{ Btu}} \times \frac{8760 \text{ hours}}{\text{year}} \times (1 - 0.98, \text{ flare control}) = \frac{9.135 \text{ lbs benzene}}{\text{year}}$$

Benzene emissions from Diesel fuel-fired tub grinder (ES-3, 855 horse power):

TAP emissions from the two diesel fuel-fired tub grinders were estimated using AP-42 factors for large stationary Diesel engines and manufacturer data for each engine.

Fuel consumption @1800 rpm = 139.1 liters per hour

Fuel lower heating value = 18,390 Btu/lb

Fuel density = 838.9 grams/liter

Fuel density = 7.001 lbs/gallon

Conversion (liters to gallons) = 0.264172037 gallons/liter

Fuel mass consumption = 257.261059 lbs/hour

Heat input = 4.731030876 mmBtu/hour

AP-42 factor for Diesel fuel fired IC engines = 7.76E-04 lbs benzene per million Btu heat input

$$\text{Heat input} = \frac{257.26 \text{ lbs fuel}}{\text{hour}} \times \frac{18,390 \text{ Btu}}{\text{lb fuel}} \times \frac{\text{mmBtu}}{10^6} = \frac{4.73 \text{ mmBtu}}{\text{hour}}$$

$$Q_{\text{benzene}} = \frac{4.73 \times 10^6 \text{ Btu}}{\text{hour}} \times \frac{7.76 \times 10^{-4} \text{ lbs benzene}}{10^6 \text{ Btu}} \times \frac{8760 \text{ hours}}{\text{year}} = \frac{32.15 \text{ lbs benzene}}{\text{year}}$$

Benzene emissions from Diesel fuel-fired tub grinder (ES-11, 1050 horse power):

TAP emissions from the two diesel fuel-fired tub grinders were estimated using AP-42 factors for large stationary Diesel engines and manufacturer data for each engine.

Benzene emissions from tub grinder ES-11 = 49.93 lbs per year.

The total benzene emission rate has been calculated to be 173.47 lbs per year.

4.66 (flare) + 77.59 (fugitive) + 9.135 (gensets) + 32.15 (tub grinder, ES-3) + 49.93 (tub grinder, ES-11) = 173.47 lbs benzene per year. The threshold TPER amount for benzene 8.1 lbs/year.

Therefore, the benzene emission rate is greater than the TPER listed in 15A NCAC 2Q .0711 and will require modeling to show compliance with the National Ambient Air Quality Standards.

The applicant calculated pollutant emission rates using a more conservative collection efficiency (90%) and input values into the flare and engines to obtain mass flow rates of the other toxic air pollutants common in landfill gas, as listed in Table 4 below. The applicant indicated that five pollutants (formaldehyde, benzene, vinyl chloride, hydrogen chloride, and acrolein) were greater than the TPER listed in the North Carolina Air Toxic regulations.

Table 4 {The toxic air pollutant emissions from all sources (landfill, flare, engines)}

Constituent	Threshold (lbs/yr)	Emission Rate (lbs/yr)	Threshold (lbs/day)	Emission Rate (lbs/day)	Threshold (lbs/hr)	Emission Rate (lbs/hr)	Threshold Exceedance (Yes/No)
1,1,2,2-Tetrachloroethane	430	45.41	-----	-----	-----	-----	No
Ethylene dichloride	260	11.39	-----	-----	-----	-----	No
Acetaldehyde	-----	-----	-----	-----	6.8	0.08	No
Acrylonitrile	-----	-----	0.4	0.194	0.22	0.008	No
Acrolein	-----	-----	-----	-----	0.02	0.074	Yes
Benzene	8.1	501.0	-----	-----	-----	-----	Yes
Benzo(a)pyrene (PAH)	2.2	0.03	-----	-----	-----	-----	No
Carbon disulfide	-----	-----	3.9	0.0257	-----	-----	No
Carbon tetrachloride	460	4.48	-----	-----	-----	-----	No
Chlorobenzene	-----	-----	46	0.026	-----	-----	No
Chloroform	290	4.13	-----	-----	-----	-----	No
Dichlorobenzene	-----	-----	-----	-----	16.8	0.00075	No
Dichlorodifluoromethane	-----	-----	5200	1.13	-----	-----	No
Dichlorofluoromethane	-----	-----	10	0.156	-----	-----	No
Ethylene dibromide	27.0	5.27	-----	-----	-----	-----	No
Ethyl mercaptan	-----	-----	-----	-----	0.025	0.003	No
Formaldehyde	-----	-----	-----	-----	0.04	0.58	Yes
Hydrogen sulfide	-----	-----	1.7	0.714	-----	-----	No
Hydrogen chloride	-----	-----	-----	-----	0.18	1.07	Yes
Mercury	-----	-----	0.013	0.0000338	-----	-----	No
Methyl chloroform	-----	-----	250	0.037	64	0.0016	No
Methyl ethyl ketone	-----	-----	78	0.298	22.4	0.012	No
Methylene chloride	1600	262.55	-----	-----	0.39	0.03	No
Methyl isobutyl ketone	-----	-----	52	0.111	7.6	0.0046	No
Methyl mercaptan	-----	-----	-----	-----	0.013	0.003	No
n-hexane	-----	-----	23.0	0.331	-----	-----	No
Perchloroethylene	13000	130.24	-----	-----	-----	-----	No
Toluene (AP-42 no. or unknown co-disposal)	-----	-----	98	2.94	14.4	0.12	No
Trichlorofluoromethane	-----	-----	-----	-----	140	0.003	No
Trichloroethylene (Trichloroethene)	4000	78.10	-----	-----	-----	-----	No
Vinyl chloride	26	98.61	-----	-----	-----	-----	Yes
Vinylidene chloride	-----	-----	2.5	0.0113	-----	-----	No
Xylene	-----	-----	57	1.19	16.4	0.05	No

A dispersion modeling analysis was performed for this facility and was reviewed by Mr. Jerry Freeman, Meteorologist, of the Air Quality Analysis Branch. Five pollutants from the eight emission sources were modeled as being emitted continuously (ie. 8760 hrs/yr for annual pollutants, 24 hr/day for daily pollutants). Blackburn used AERMOD with regulatory defaults, and with five years of DAQ processed meteorology (Charlotte 1991-1995) to model the emissions. Prior approval from NCDAQ was obtained to use this meteorological data on this specific project. Adequate receptors were incorporated, along with digital elevation data, to determine maximum impacts, which occurred on the property lines and reached the levels noted in the table below.

Maximum Impacts

Pollutant	Averaging Period	Emission rate	% of AAL
Acrolein	1 -hour		15
Benzene	Annual		80
Formaldehyde	1-hour		60
Hydrogen chloride	1-hour		21
Vinyl Chloride	Annual		18

B. Internal Combustion (genset) Engines For Electrical Power Generation

- CD-8 (Landfill gas-fired genset unit, 11 million Btu per hour heat input)
 - CD-9 (Landfill gas-fired genset unit, 11 million Btu per hour heat input)
 - CD-10 (Landfill gas-fired genset unit, 11 million Btu per hour heat input)
1. Description: This facility initially began the operation of two landfill gas-fired internal combustion engines (genset units, CD-8 and CD-9) to produce electrical power that was routed to the power grid. Genset unit CD-10 began operation in the 2003/2004 time frame. Normal operation for this facility is to route the collected landfill gas to the three genset units. These units are not being modified in this application.
 2. Applicable Regulatory Requirements: All the gas-to-energy generators were installed after July 1, 1971.

NSPS, Subpart JJJJ *does not* apply to any of these generators because the provisions of this subpart are applicable to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines (ICE) with a displacement of less than 30 liters per cylinder where the model year is 2006 or later. All of these engines commenced construction prior to 2006 and are considered existing engines. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator.

This landfill is considered an area source of HAPs. For stationary reciprocating internal combustion (RICE) engines located at an area source of HAP emissions, the engines are considered existing if they commenced construction or reconstruction of the stationary RICE before June 12, 2006. All of these engines commenced construction prior to 2006 and are considered existing engines. (For the purposes of MACT, Subpart ZZZZ, commenced construction means placed onsite). Existing RICE at an area source of HAPs *do not* have requirements under Subpart ZZZZ.

The following provides a summary of limits and/or standards for the emission source(s) described above.

Regulated Pollutant	Limits/Standards	Applicable Regulation
Sulfur dioxide	2.3 pounds per million Btu heat input	15A NCAC 2D .0516
Visible emissions	20 percent opacity	15A NCAC 2D .0521

a. 15A NCAC 2D .0516 “Sulfur Dioxide Emissions from Combustion Sources”

Regulation Analysis:

- i. Emissions of sulfur dioxide from each generator shall not exceed 2.3 pounds per million Btu heat input. Sulfur dioxide formed by the combustion of sulfur in fuels, wastes, ores, and other substances shall be included when determining compliance with this standard.

Landfill gas is low in sulfur content by weight. Compliance is expected.

Monitoring/Recordkeeping/Reporting [15A NCAC 2Q .0508(f)]

- ii. No monitoring, recordkeeping, or reporting is required for sulfur dioxide emissions from the firing of diesel fuel in any emergency generator.

Note: These engines have been included in the sulfur dioxide regulations for the municipal solid waste landfill in this engineering review. The engines will be used as control devices initially. After the landfill gas treatment is installed, these units will be placed into the permit as “end user” sources.

b. 15A NCAC 2D .0521"Control Of Visible Emissions"

Regulation Analysis:

- i. These generators were installed after July 1, 1971, and each is therefore subject to the State regulation 15A NCAC 2D .0521(d). Per this regulation visible emissions shall not be more than 20 percent opacity when averaged over a six-minute period except that six-minute periods averaging more than 87 percent opacity may occur not more than once in any hour nor more than four times in any 24-hour period for each boiler.

Compliance is expected with this regulation because all of the generators will be firing landfill gas.

Monitoring/Recordkeeping/Reporting [15A NCAC 2Q .0508(f)]

- ii. No monitoring, recordkeeping, or reporting is required for visible emissions from the firing of landfill gas in any generator because they should always be in compliance with the opacity standard during normal operation.

Note: These engines have been included in the visible emissions regulations for the municipal solid waste landfill in this engineering review. The engines will be used as control devices initially. After the landfill gas treatment is installed, these units will be placed into the permit as “end user” sources.

C. Diesel-fired Tub Grinders

- ES-3 (855 horsepower)
- ES-11 (1050 horsepower, NSPS, MACT)

1. 15A NCAC 2D .0515:
2. 15A NCAC 2D .0516: Sulfur Dioxide Emissions From combustion Sources
3. 15A NCAC 2D .0521: Visible Emissions
4. 15A NCAC 2D .0524: Standards Of Performance For Stationary Compression Ignition Internal Combustion Engines
5. 15A NCAC 2D .1111: MACT, Subpart ZZZZ, Hazardous Air Pollutants

No regulatory review is required for the regulations listed above at this time since these units are not being modified in this application. No additional monitoring, recordkeeping, or reporting is required in the permit.

- VII. A Professional Engineers Seal was included with the application. Mr. Martin D Sanford (registered in the State of North Carolina) signed and sealed the application on April 18, 2011.
- VIII. A zoning consistency determination is not required since no new sources are being added with this modification. This application is a follow up to the previous permit to revise the Title V permit to reflect the design plan and NSPS Subpart WWWW requirements.
- IX. An application fee (\$867.00) is required and was received by the Division of Air Quality Raleigh Central Office on April 19, 2011.

X. The appropriate number of copies of the application was received by the DAQ on April 19, 2011.

XI. The application was signed by an authorized official as defined by 15A NCAC 2Q .0304(j).

XII. PSD does not apply for this application because no new sources are being added.

XIII. Public Notice:

A thirty-day public notice and EPA review period is required.

Public notice: The 30 day public notice period was from _____ through _____. No public comments were received for this permit application.

EPA 45-Day review Period: The DAQ sent copies of the appropriate information to the USEPA on _____. The EPA 45-day review period was from _____ through _____. The USEPA did not have any adverse comments on the renewal permit for this facility.

XIV. This facility is not subject to 15A NCAC 2Q .0508(g) "Prevention of Accidental Releases" because it does not store any of the listed 112(r) chemicals in quantities above the thresholds.

XV. Ozone Nonattainment:

Catawba County is not located in an 8-hour ozone nonattainment area

XVI. GHG emissions:

No new combustion sources are being added with this application.

XVII. Recommendations:

This Significant modification for Blackburn Sanitary Landfill, located in Newton, Catawba County, North Carolina, has been reviewed by the DAQ to determine compliance with all procedures and requirements. The Mooresville Regional Office made comments on the initial application, and on the draft permit. The DAQ has determined that this facility is complying or will achieve compliance as specified in the permit with all applicable requirements. The Mooresville Regional Office concurs.

Issue permit No. 08533T08.