

<b>NORTH CAROLINA DIVISION OF AIR QUALITY</b>			<b>Region:</b> Mooresville Regional Office
<b>Air Permit Review - Renewal</b>			<b>County:</b> Cabarrus
<b>Permit Issue Date:</b> XXX, XX, 2010			<b>NC Facility ID:</b> 1300110
			<b>Inspector's Name:</b> Jim Westmoreland
			<b>Date of Last Inspection:</b> 04/15/2010
			<b>Compliance Code:</b> 3 / Compliance - inspection
<b>Facility Data</b>			<b>Permit Applicability (this application only)</b>
<b>Applicant (Facility's Name):</b> BFI Waste Systems of North America, CMS Landfill V			<b>SIP:</b> 15A NCAC 2Q .0513
<b>Facility Address:</b> BFI Waste Systems of North America, CMS Landfill V 5105 Morehead Road Concord, NC 28027			<b>NSPS:</b> N/A
<b>SIC:</b> 4953 / Refuse Systems			<b>NESHAP:</b> N/A
<b>NAICS:</b> 562213 / Solid Waste Combustors and Incinerators			<b>PSD:</b> N/A
<b>Facility Classification: Before:</b> Title V <b>After:</b> Title V			<b>PSD Avoidance:</b> N/A
<b>Fee Classification: Before:</b> Title V <b>After:</b> Title V			<b>NC Toxics:</b> 15A NCAC 2Q. 0701, .0702, .0706, .0709
			<b>112(r):</b> N/A
			<b>Other:</b> Added insignificant activities
<b>Contact Data</b>			<b>Application Data</b>
<b>Facility Contact</b>	<b>Authorized Contact</b>	<b>Technical Contact</b>	<b>Application Number:</b> 1300110.09A
Brad Green General Manager (704) 782-2004 5105 Morehead Road Concord, NC 28027	James Amick Area President (864) 277-6500 864 Mauldin Road Greenville, SC 29607	Ed Hood Regional Engineer (704) 377-0161 3558 Hwy 51N Fort Mill, SC 29715	<b>Date Received:</b> 08/31/2009
			<b>Application Type:</b> Renewal
			<b>Application Schedule:</b> TV-Renewal
			<b>Existing Permit Data</b>
			<b>Existing Permit Number:</b> 08612T08
			<b>Existing Permit Issue Date:</b> 05/19/2008
			<b>Existing Permit Expiration Date:</b> 05/31/2010
<b>Consultant:</b> SCS Engineers <b>Contact:</b> J. Morgan <b>Phone:</b> 704-504-3107 (cell: 803-984-8816) <b>email:</b> jmorgan@scsengineers.com			
<b>Review Engineer:</b> Booker Pullen <b>Regional Engineer:</b> Jim Westmoreland		<b>Comments / Recommendations:</b>	
<b>Review Engineer's Signature:</b> _____		<b>Issue:</b> 08612T09	
<b>Begin Date:</b> July 27, 2010		<b>Permit Issue Date:</b> XXX, XXX, 2010	
		<b>Permit Expiration Date:</b> XXX, XXX, 2015	

**I. Introduction:**

BFI Waste Systems of America, Charlotte Motor Speedway Landfill, owns and operates a municipal solid waste landfill, located in Cabarrus County, Concord, North Carolina. The Division of Air Quality Central Office received application number 1300110.09A on August 31, 2009. The application was initially considered incomplete. The requested information was submitted by the applicant on September 14, 2009 and was considered complete on that date.

This permit renewal application **is required** to go through a 30-day public notice and a 45-day EPA review process.

**II. Purpose of this application (1300110.07A):**

- A. The purpose of application No. 1300110.09A is for the renewal of a Title V permit in accordance with 15A NCAC 2Q .0513.
- B. Add the following insignificant activities:  
Three diesel fuel storage tanks (10,000 gallons each, IES-DT2, DT3, and DT4).
- C. Add the following significant sources {because of revised (July 10, 2010) air toxic regulations}):  
Two diesel-fired emergency generators (250 kW each, ES-5 and 6).

**Review 08612T09, Page 2**

- D. Remove the following sources from the permit and insignificant activities list.
1. Stationary landfill gas-fired combustion turbine (CD-TURB1) – this turbine is currently on the permit of the Gas Recovery Systems, LLC, (Permit No. 09980).
  2. One diesel fuel storage tank (8,000 gallon, IES-DT) - this tank is currently on the permit of the Gas Recovery Systems, LLC, (Permit No. 09980).

**III. Changes to existing permit per application (1300110.07A):**

Old Page	New Page No.	Condition No.	Changes
<b>Cover Letter</b>			
Page 1	Page 1	Heading and body of letter	Changed name of the Director to Sheila Holman, revised issue date, revised permit number, changed “complete application” received date
Page 2	Page 2	Heading and body of letter	Revised issued date at the top of letter, and changed the effective date of permit,
<b>Insignificant Activities List</b>			
Page 3	Page 3	Table	Removed two diesel fuel-fired emergency generators (IES-2 and 4) from the insignificant activities list per new air toxic regulations, added three storage tanks (10,000 gallon capacity each, IES-DT2, 3, and 4)
<b>Air Permit</b>			
Page 1	Page 1	Cover Page	Revised: permit number, “replaces permit” number, issue date, effective date, complete application date, application number,
All pages	All pages	Header of page	Revised the permit number to T09
Page 3	Page 3	Table of Permitted Sources	Removed paragraphs under Part I Section, removed turbine (ID No. CD-TURB1) from the permit, added CD-Treatment as a separate line item control device,  Added four diesel fuel-fired emergency generators (ES-2, ES-4, ES-5, and ES-6) to the list of permitted sources per the new air toxics regulation
Page 4	Page 4	Specific Limitation and Conditions	Removed requirements for the turbine from table
N/A	Pages 4-10	Specific Limitation and Conditions	Added revised regulatory language for landfill
Page 12-14	N/A	Specific Limitation and Conditions	Removed regulations for the candlestick type flare and the turbine
N/A	Page 12	Specific Limitation and Conditions	Added four diesel fuel-fired emergency generators (ES-2, ES-4, ES-5, and ES-6) to the list of sources modeled for toxic air pollutants
Page 17	N/A	Specific Limitation and Conditions	Removed references to the landfill gas-fired turbine (CD-TURB1)
Pages 19-27	Pages 15-24	Specific Limitation and Conditions	Added revised General Conditions

**IV. Facility Description:**

This facility is a Municipal Solid Waste Landfill. This landfill accepts about 4500 tons per day of industrial, municipal, and construction waste. The facility does not accept hazardous material or any hospital wastes. The current capacity of the landfill is 8 million megagrams. There are approximately fifteen years of use left in the landfill before it will reach capacity, at diminishing rates of receipt.

**V. 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 April 15, 2010 and states that the facility appeared to be in compliance with all applicable requirements.

**VI. Summary Of Emission Sources at this facility:**

Emission Source ID	Emission Source Description	Control Device	Control Device Description
ES-1 NSPS, Subpart WWW MACT, Subpart AAAA	Municipal solid waste landfill	CD-GCCS1	One landfill gas collection and control system with a gas treatment system,
		CD-FLARE1	One landfill gas-fired enclosed-type flare (4000 scfm maximum gas flow rate, 120 million Btu per hour heat input capacity),
		CD-FLARE2	One landfill gas-fired enclosed-type flare (6000 scfm maximum gas flow rate, 180 million Btu per hour heat input capacity)

**VII. Emission Source-by-Source Evaluation**

**A. Municipal solid waste landfill (ID No. ES-1) with associated gas collection & control system (CD-GCCS1) including one enclosed-type flare (4000 scfm maximum gas flow rate, 120 million Btu per hour heat input capacity, CD-FLARE1), one enclosed-type flare (6000 scfm maximum gas flow rate, 180 million Btu per hour heat input capacity, CD-FLARE2) and gas treatment system (CD-Treatment)**

1. 15A NCAC 2D .0521: Visible Emissions
2. 15A NCAC 2D .0516: Sulfur dioxide Emissions
3. 15A NCAC 2D .0524: New Source Performance Standards (Subpart WWW)
4. 15A NCAC 2D .1100: Control of Toxic Air Pollutants
5. 15A NCAC 2D .1111: Maximum Achievable Control Technology
6. 15A NCAC 2D .1806: Control and Prohibition of Odorous Emissions
7. 15A NCAC 2Q .0705: Existing Facility and SIC Calls
8. 15A NCAC 2Q .0711: Emission Rates Requiring a Permit

No regulatory review is required for the regulations listed above since there are no changes to these sources since the permit last went through public notice. Compliance Assurance Monitoring (CAM) does not apply because these sources are regulated by both an NSPS and MACT that were promulgated after 1990 and control the pollutants that would be subject to the CAM.

**B. Two diesel fuel-fired emergency generators (250 kW each, ≈ 335.26 hp, ES-5 and 6).**

These units are subject to NSPS subpart IIII as new sources because they commenced construction after July 11, 2005. These units are also subject to MACT Subpart ZZZZ because they will be located at an area source (landfill) for HAPs. In accordance with 40 CFR §63.6590(c), the requirements of the MACT Subpart ZZZZ will be met by meeting the requirements of the NSPS Subpart IIII. The applicant can comply with NSPS Subpart IIII by purchasing a certified engine in accordance with 40 CFR 60.4211(c). The engine must be installed and configured according to the manufacture’s specifications.

- Owner/operators who purchase an emergency generator that is less than 30 liters per cylinder must purchase units that are certified by the manufacturer to meet the applicable engine design emission limits. {§60.4211 (c)}.
- Owners/operators must operate and maintain engines and control devices in accordance with the manufacturer’s written instructions or procedures developed by the owner or operator that are approved by the engine manufacturer, over the life of the engine. {§60.4206 and §60.4211 (a)}.
- No testing is required for units less than 30 liter per cylinder displacement that have been certified by the manufacturer to meet design limits.
- Install a nonresettable hour meter {(§60.4209(a)}.

- Engines built after July 11, 2005 must burn diesel fuel with less than or equal to 500 ppm sulfur content beginning October 1, 2007 {§60.4207(a)}.
- Engines built after July 11, 2005 must burn diesel fuel with less than or equal to 15 ppm sulfur content beginning October 1, 2010 {§60.4207(a)}.

The DAQ spreadsheet was used to calculate criteria pollutants from each of these diesel fuel-fired emergency generators operating at a maximum 500 hours annually.

Emission factors:

PM10 = 2.20E-03 lbs PM10/hp-hr

NOx = 3.10E-02 lbs NOx/hp-hr

SO<sub>2</sub> = 2.05E-03 lbs SO<sub>2</sub>/hp-hr

CO = 6.68E-03 lbs CO/hp hr

VOCs = 2.51E-03 lbs VOCs/hp hr

Total HAPs = 5.32E-05/hp hr

Emissions from each of the two 250 kW, 335.26 hp, emergency generators

Pollutant	Emission Factor	Hp rating	Tons/year @ 500 hours
PM10	2.20E-03 lbs PM10/hp-hr	335.26 hp	0.184 tpy
NOx	3.10E-02 lbs NOx/hp-hr	335.26 hp	2.6 tpy
SO <sub>2</sub>	2.05E-03 lbs SO <sub>2</sub> /hp-hr	335.26 hp	0.17 tpy
CO	6.68E-03 lbs CO/hp hr	335.26 hp	0.56 tpy
VOCs	2.51E-03 lbs VOCs/hp hr	335.26 hp	0.21 tpy
Total HAPs	5.32E-05 lbs total HAP/hp hr	335.26 hp	0.0045 tpy

All criteria pollutants are less than 5.0 tons per year and the emissions of total HAPs are less than 1000 pounds per year. However, these units emit a common air pollutant (benzene) that was previously modeled at the facility and will be added to the permit as significant sources in accordance with the revised air toxic pollutant regulations.

- C. Since the last permit significant modification for this facility, the regulatory language for landfill included in Title V permits was revised to place more of the NSPS requirements into the body of the permit. This new revised language will be placed into this permit along with the revised General Conditions.
  - D. Recent regulatory rule changes (2Q .0701, .0702, .0706 and .0709) removed the toxics exemption for new combustion sources permitted after July 10, 2010. Because this facility **does** already have modeled limits in the permit for specific toxic air pollutants and new insignificant sources are being added to the permit that emit common pollutants to those that have been previously modeled, a toxic pollutant evaluation must be performed. Otherwise these insignificant activities would not trigger a toxic pollutant review.
- VIII.** A Professional Engineers Seal **is not** required for this renewal application because there are no new sources being added.
- IX.** A zoning consistency determination **is not** required for this renewal application. .
- X.** An application fee **is not** required for this renewal application.
- XI.** **Air Toxics:** An air toxic review and evaluation is required for this facility because two new diesel fuel-fired emergency generators (250 kW output each), are being added and these units emit a common pollutant (benzene) that has previously been modeled at the facility.

The toxic air pollutants that will be emitted from the generators are Benzene, Toluene, Acetaldehyde, Acrolein, Benzoapyrene, 1, 3 Butadiene, Formaldehyde, and Xylene.

Because a facility-wide review is required, all of the sources at the facility will be evaluated for toxic air emissions.

Gasoline Storage tank (IES-GT)

One diesel-fire emergency generator (150 kW, IES-2)

One diesel-fire emergency generator (250 kW, IES-4)

One diesel-fire emergency generator (250 kW, ES-5)

One diesel-fire emergency generator (250 kW, ES-6)

Leachate storage pond (IES-3)

Diesel fuel storage tank (IES-DT2)

Diesel fuel storage tank (IES-DT3)

Diesel fuel storage tank (IES-DT4)

Landfill and control system (ES-1, CD-GCCS1, CD-FLARE1, CD-FLARE2)

#### State-Enforceable Only

Toxic Air Pollutant Emission Rate Calculation from the Landfill:

Twenty-eight of the 97 chemical compounds identified as TAPs under 15A NCAC 2Q .0711, are listed in AP-42 Table 2.4-1 and 2.4-2 (Default Concentrations for Landfill Gas constituents). These same 27 constituents are identified in another industry reference, the Waste Industry Air Coalition (WAIC) Report dated January 2, 2001. One additional compound, hydrogen chloride, is not listed in either AP-42 or WIAC and is believed to be absent in the raw landfill gas. This pollutant is formed at the outlet of the flares outlet as a by-product of landfill gas combustion.

Emission rates from the flares were based on the maximum landfill gas (lfg) generation rate from the landfill. According to the application, the maximum lfg generation rate has already occurred even though the landfill remains open and still continues to accept waste. The estimated lfg emissions rate for the year 2010 is 4.705E+07 and declines after this year.

In October 2005, this facility performed a facility wide toxic pollutant evaluation to meet compliance with the Last MACT. The toxics demonstration was revised in April 2007 using a slightly higher projected landfill gas emissions rate because of the addition of a larger flare. The gas flow rate used to project the toxic air pollutant emissions was increased and therefore the values for the TPER and the modeled emission rates were conservatively estimated.

Several criteria and assumptions used to calculate actual emission rates are as follows:

- The landfill gas collection system is assumed to have a collection efficiency of 75% (i.e. 25 % uncollected fugitive emissions)
- The landfill gas collected by the active system is routed to either the onsite enclosed flares or sold to the neighboring facility.
- The larger enclosed flare is rated at 6000 scfm and has a destruction efficiency of 98% for halogenated compounds and 99.7% for non-halogenated compounds as stated in AP-42.
- The smaller enclosed flare is rated at 4000 cfm and has a destruction efficiency of 98% for halogenated compounds and 99.7% for non-halogenated compounds as stated in AP-42.
- The leachate collection/storage pond is assumed to have a maximum volume 10 million gallons.
- Methane content of landfill gas = 50%.

Landfill gas generation from the landfill operation was calculated using the U.S. EPA's Landfill Gas Emissions Model (LandGEM). The formula is presented in 40 CFR Part 60.754 (a)(1)(i). The methane generation potential,  $L_0$ , for the sanitary landfill units (both closed and active) was set equal to 100 cubic meters ( $m^3$ ) of methane ( $CH_4$ ) per megagram (Mg) of waste. This value is published in EPA's Compilation of Air Pollutant Emission Factors (AP-42), Volume I, Section 2.4 revised November 1998. AP-42 recommends this value of  $L_0$  for municipal solid waste (MSW) landfills that are located in geographical regions that receive average or above average annual precipitation, such as Concord, North Carolina. The methane generation rate constant,  $k$ , was set at  $0.04 \text{ yr}^{-1}$  as published in AP-42. The concentration of NMOC in LFG was set to 595 part per million by volume (ppmv) as hexane, as published in AP-42 Section 2.4.

- The Methane generation rate for the BFI Landfill 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. This equation is based on the in-place waste amount and age of the waste for each individual disposal unit.

$$Q_M = \sum_{i=1}^n 2 k L_o M_i e^{-kt_i} \quad \{\text{Landfill gas generation rate}\}$$

AP-42 and the EPA LandGem Landfill Gas emission Model, assume that landfill gas is 50% methane. Therefore, the methane generation rate can be found by taking ½ of the landfill gas generation rate. 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 methane gas generation flow rate, cubic meters per year
- $k$  = methane generation rate constant, year<sup>-1</sup> (**0.04/year**, AP-42 inventory default value)
- $L_o$  = methane generation potential, cubic meter per megagrams solid waste (**100 m<sup>3</sup>/Mg**, AP- 42 inventory default value)
- $M_i$  = mass of solid waste in the i<sup>th</sup> section, megagrams
- $t_i$  = age of the i<sup>th</sup> section, years

The following table (Table 1) listing the methane emission rates for the BFI landfill were in the permit application for this facility. These emission rates were calculated using the EPA LandGem model.

**Table 1**

Calendar Year	Waste Acceptance Rate (Mg/yr)	In-place Waste- (design capacity)	LFG Rate (ft <sup>3</sup> /min)	CH <sub>4</sub> Rate * (ft <sup>3</sup> /min)	CH <sub>4</sub> Rate (m <sup>3</sup> /yr)
1992	591,449 Mg/yr	0	0	0	0
1993	467,421 Mg/yr	591,449 Mg	318	159	2.366E+06 m <sup>3</sup> /yr
1994	492,133 Mg/yr	1,058,871 Mg	557	279	4.143E+06 m <sup>3</sup> /yr
1995	531,261 Mg/yr	1,551,004 Mg	799	400	5.949E+06 m <sup>3</sup> /yr
-----	-----	-----	-----	-----	-----
2009	1,016,120	4.897E+07	6590	3295	4.041E+07 m <sup>3</sup> /yr
2010	1,016,120	4.705E+07	6322	3161	4.354E+07 m <sup>3</sup> /yr
2011	1,016,120	4.520E+07	6074	3037	4.655E+07 m <sup>3</sup> /yr
2012	1,016,120	4.343E+07	5836	2918	4.944E+07 m <sup>3</sup> /yr
2013	1,016,120	4.173E+07	5607	2804	4.821E+07 m <sup>3</sup> /yr

\* CH<sub>4</sub> collection rate is 50% of the landfill gas generation rate

The common toxic air pollutants that are emitted from the two new generators (ES-5 and 6, 250 kW each), the existing enclosed flares, the existing gasoline dispensing facility (IES-GT), the two existing emergency generators (IES-2 & IES-4), and the three new 10,000 gallon diesel fuel storage tanks (IES-DT2, DT3, and DT4) are as follows: Benzene, Hexane, Toluene, Xylene, Acetaldehyde, Acrolein, Benzopyrene, 1,3 Butadiene, Formaldehyde.

**Toxic air pollutant calculations from the landfill:**

The mass emissions of toxic air pollutants constituents found in landfill gas were calculated for the entire landfill area based on methane generation rates and average sampled constituent concentrations as determined by the Waste Industries Air Coalition (WIAC) report dated January 2001.

Table 2 {Emission factors from Waste Industries Air Coalition (WIAC) report and AP-42}

Constituent	Waste Industries Air Coalition emission factors (ppmv)	AP-42 (ppmv)
1,1,1-Trichloroethane (Methyl chloroform)	3.395 ppmv	14.3 ppmv
1,1,2,2-Tetrachloroethane	-----	1.11 ppmv
1,1-Dichloroethene (Vinylidene chloride)	0.092 ppmv	0.20 ppmv
1,2-Dichloroethane (Ethylene dichloride)	0.12 ppmv	0.41 ppmv
Acrylonitrile	0.036 ppmv	6.33 ppmv
Benzene	0.972 ppmv	1.91 ppmv
Carbon disulfide	0.32 ppmv	0.58 ppmv
Carbon tetrachloride	0.007 ppmv	0.004 ppmv
Chlorobenzene	0.227 ppmv	0.250 ppmv
Chloroform	0.21 ppmv	0.03 ppmv
Dichlorobenzene	1.607 ppmv	0.210 ppmv
Dichlorodifluoromethane	1.751 ppmv	15.7 ppmv
Dichlorofluoromethane	-----	2.62 ppmv
Dichloromethane (Methylene chloride)	3.395 ppmv	14.3 ppmv
Ethylene dibromide	0.005 ppmv	0.001 ppmv
Ethyl mercaptan (Ethanethiol)	-----	1.11 ppmv
Hydrogen sulfide	23.578 ppmv	35.5 ppmv
Hydrogen chloride	9.43 ppmv	42.0 ppmv
Mercury	-----	2.9E-04 ppmv
Methyl ethyl ketone	10.557 ppmv	7.09 ppmv
Methyl isobutyl ketone	-----	1.87 ppmv
Methyl mercaptan	1.292 ppmv	2.49 ppmv
n-hexane	6.57 ppmv	6.57 ppmv
Perchloroethylene (Tetrachloroethene)	1.193 ppmv	3.73 ppmv
Toluene	25.405 ppmv	39.3 ppmv
Trichlorofluoromethane	-----	0.76 ppmv
Trichloroethylene (Trichloroethene)	0.681 ppmv	2.82 ppmv
Vinyl chloride	1.077 ppmv	7.34 ppmv
Xylenes	16.582 ppmv	12.1 ppmv

The following equation from AP-42, fifth edition, Section 2.4.4.1 “Emissions”, Revised November 1998, was used to calculate the individual toxic air pollutants in methane.

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

**Where:**

$Q_p$  = Emission rate of pollutants,  $m^3/yr$

$Q_{CH_4}$  = Methane generation rate,  $m^3/yr$

$C_p$  = concentration of pollutant in landfill gas (from Table 2.4-1, “Default Concentration for Landfill gas constituents, Section 2.4.5

Multiplication factor = 2.0 (LFG data from 2004 @ BFI was used – 50 percent methane, 50 percent carbon dioxide, nitrogen, etc.)

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

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

**Where:**

$UM_p$  = Uncontrolled mass emissions of pollutants, kg/yr

$MW_p$  = Molecular weight of pollutant, g/mol

$Q_p$  = Emission rate of pollutant,  $m^3/yr$

$T^0$  =  $25^0 C$  ( $77^0 F$ ), recommended by AP-42 for landfill gas temperature if temperature is unknown

The following equation is an example calculation for the **emissions flow rate** ( $m^3/yr$ ) of benzene using the 2010 flow rate and the benzene constituents found in landfill gas. It was calculated based on methane generation rate in the year 2010 ( $4.705E+07 m^3/year$ ) and average sampled constituent concentrations determined by Waste Industry Air Coalition (WIAC) report dated January 2001.

$$Q_p = 2.0 \times Q_{CH_4} \left( \frac{C_p}{1 \times 10^6} \right) \quad \text{Where: } Q_{CH_4} = 4.705 \times 10^7 m^3/yr \text{ (maximum rate in the year 2010)}$$

$C_p$  (benzene) = 0.972 ppmv (WIAC factor)

$$Q_{benzene} = 2.0 \times \frac{4.705 \times 10^7 m^3}{year} \times \left( \frac{0.972 parts}{1 \times 10^6} \right) = \frac{91.47 m^3}{year}$$

The following equation is an example calculation for the **mass emissions rate** (lbs/yr) of benzene found in the landfill gas at this site. It was calculated using the maximum methane generation rate in the year 2010, and average sampled constituent concentrations determined by the Waste Industry Air Coalition (WIAC) report dated January 2001.

Where: Molecular weight of benzene = 78.11 grams/gmole

$Q_{benzene}$  = emission rate of benzene ( $91.47 m^3/yr$ )

$T = 25^0 C$

$$UM_p = \frac{91.47 m^3}{year} \times \left[ \frac{78.11 g / gmole \times 1 atmosphere}{\left( \frac{8.205 \times 10^{-5} m^3 - atmosphere}{gmol \cdot ^0 K} \right) \times \frac{1000 g}{kg} \times (273 + 25^0 C)^0 K} \right] \times \frac{2.2046 lbs}{kg} = \frac{644.2 lbs benzene}{year}$$

The total benzene emission rate has been calculated to be 644.2 lbs per year.

25% of this amount of benzene is not collected by the collection and control system and is fugitive:

$$644.2 lbs/year \times 0.25 = 161.05 lbs benzene/year$$

75% of the generated amount of benzene is collected by the collection and control system. Of this amount of collected landfill gas with a control efficiency of 98%, will be destroyed.

$$644.2 lbs/year \times 0.75 \times (1 - 0.98) = 9.663 lbs benzene/year \text{ emitted into the air}$$

**Benzene from landfill and control system:**

Total amount of benzene emitted from the enclosed flares = 9.663 (collected) + 161.05 (fugitive) = 170.71 lbs benzene per year.

**Benzene from emergency generators:**

The amount of total amount of benzene from the diesel-fired emergency generators (IES-2, IES-4, ES-5, and ES-6) was calculated at 500 hours of maximum usage, using the DAQ spread sheet and found to be: = 3.96 lbs per year.

**Benzene from storage tanks:**

The amount of total benzene emissions from the three diesel fuel storage tanks and the gasoline dispensing station were calculated by the applicant using the EPA's TANKS 4.09 Program and found to be:  
= 5.93 lbs/year

The total facility wide benzene emissions:  $170.71 + 3.96 + 5.93 = 180.6$  lbs per year.

The threshold TPER amount is 8.1 lbs of benzene per year. Therefore, the benzene emission rate is greater than the TPER listed in 15A NCAC 2Q .0711 and will be modeled for compliance with the National Ambient Air Quality Standards. As stated earlier in this review, the applicant performed a revised facility wide toxic pollutant evaluation and modeling in April 2007. The value that was modeled in the 2007 revision was 185.60 lbs benzene per year and was based on a higher landfill gas generation rate. The maximum potential gas flow rate at this facility has already occurred and the projected gas generation rate will decrease over the remaining life of the landfill due to the age of the landfill and the decreased waste acceptance rates. Because the landfill has already been model for benzene at a higher rate than the landfill currently has the potential to emit, no modeling for benzene is required with the addition of these sources.

The applicant calculated the emission rates of the other toxic air pollutants that are common in landfill gas, and placed them in Table 2 below.

*The two new generators (ES-5 and 6, 250 kW each), the existing enclosed flares, the existing gasoline dispensing facility (IES-GT), the two existing emergency generators (IES-2 and IES-4), the three new 10,000 gallon diesel fuel storage tanks (IES-DT2, DT3, and DT4), and the leachate pond (IES-3) do not emit the other previously modeled toxic air pollutants (hydrogen chloride, methyl mercaptan, hydrogen sulfide, and vinyl chloride).*

Pollutant	Four Tanks Total (IES-GT, IES-DT2, DT3, & DT4)	Four Generators Total (IES-2 & 4, ES-5, & 6)	Two flares total (CD-FLARE1 & 2)	Total Facility-wide Emissions	TPER or Permitted Modeled Limit
Benzene	5.93 lbs/yr	3.96 lbs/yr	170.71 lbs/yr	180.6 lbs/yr	185.60 lbs/yr *
Hexane	6.1E-04 lbs/day	-----	1.157 lbs/day	1.16 lbs/day	23 lbs/day
Toluene	1.84E-02 lbs/day 7.6E-04 lbs/hr	8.3E-02 lbs/day 3.46E-03 lbs/hr	15.15 lbs/day 0.63 lbs/hr	15.25 lbs/day 0.63 lbs/hr	98 lbs/day 14.4 lbs/hr
Xylene	5.2E-03 lbs/day 2.17E-04 lbs/hr	5.8E-02 lbs/day 2.41E-03 lbs/hr	11.396 lbs/day 0.475 lbs/hr	11.46 lbs/day 0.48 lbs/hr	57 lbs/day 16.4 lbs/hr
Acetaldehyde	-----	6.50E-03 lbs/hr	-----	6.50E-03 lbs/hr	6.8 lbs/hr
Acrolein	-----	7.9E-04 lbs/hr	-----	7.9E-04 lbs/hr	0.02 lbs/hr
Benzo(a)pyrene	-----	7.9E-04 lbs/yr	-----	7.9E-04 lbs/yr	2.2 lbs/yr
1,3 Butadiene	-----	5.03 lbs/yr	-----	5.03 lbs/yr	11 lbs/yr
Formaldehyde	-----	1.01E-03 lbs/hr	-----	1.01E-03 lbs/hr	0.04 lbs/hr

\* Modeled limit in 2007

*The facility-wide toxic evaluation indicates that the increase in emissions from adding the new combustion sources along with the existing sources are below the TPERs for all toxic air pollutants except benzene. Also, the modeled emission rate that was modeled for benzene is still higher than the rate that the facility is capable of producing. This is because the gas flow rate from the facility is currently declining and the maximum flow rate at the facility has already occurred.*

*However, the four diesel fuel-fired emergency generators will be added to the permit because they emit a common pollutant (benzene) that was previously modeled. The other insignificant sources do not emit a common toxic air pollutant that was previously modeled.*

Table 3 {Toxic air pollutant emissions from all sources at the BFI landfill have been added together and summarized in this table}

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)
1,1,1-Trichloroethane (Methyl chloroform)	-----	-----	250	0.146	64		No
1,1,2,2-Tetrachloroethane	430	2.46	-----	-----	-----	-----	No
1,1-Dichloroethene (Vinylidene chloride)	-----	-----	2.5	0.058	-----	-----	No
1,2-Dichloroethane (Ethylene dichloride)	260	28.65	-----	-----	-----	-----	No
Acetaldehyde	-----	-----	-----	-----	6.8	6.5E-03	No
Acrolein	-----	-----	-----	-----	0.02	7.9E-04	No
Acrylonitrile	10	5.01	-----	-----	-----	-----	No
Benzene	8.1	185.60	-----	-----	-----	-----	Yes
Benzo(a)pyrene	2.2		-----	-----	-----	-----	No
1,3 Butadiene	11	5.03	-----	-----	-----	-----	No
Carbon disulfide	-----	-----	3.9	0.109	-----	-----	No
Carbon tetrachloride	460	1.93	-----	-----	-----	-----	No
Chlorobenzene	-----	-----	46	0.167	-----	-----	No
Chloroform	290	3.31	-----	-----	-----	-----	No
Dichlorobenzene	-----	-----	-----	-----	16.8	0.058	No
Dichlorodifluoromethane	-----	-----	5200	0.75	-----	-----	No
Dichlorofluoromethane	-----	-----	10	1.754	-----	-----	No
Dichloromethane (Methylene chloride)	1600	681.79	-----	-----	0.39	0.078	No
Ethylene dibromide	27	2.7	-----	-----	-----	-----	No
Ethyl mercaptan (Ethanethiol)	-----	-----	-----	-----	0.025	0.0038	No
Formaldehyde	-----	-----	-----	-----	0.04	1.01E-03	No
Hydrogen sulfide	-----	-----	1.7	5.2	-----	-----	Yes
Hydrogen chloride	-----	-----	-----	-----	0.18	0.26	Yes
Mercury	-----	-----	0.013	0.0	-----	-----	No
Methyl ethyl ketone	-----	-----	78	5.93	22.4	0.247	No
Methyl isobutyl ketone	-----	-----	52	0.488	7.6	0.02	No
Methyl mercaptan	-----	-----	-----	-----	0.013	0.0164	Yes
n-hexane	-----	-----	23	1.16	-----	-----	No
Perchloroethylene (Tetrachloroethene)	13000	467.89	-----	-----	-----	-----	No
Toluene	-----	-----	98	15.25	14.4	0.63	No
Trichlorofluoromethane	-----	-----	-----	-----	140	0.10	-----
Trichloroethylene (Trichloroethene)	4000	211.86	-----	-----	-----	-----	No
Vinyl chloride	26	156.51	-----	-----	-----	-----	Yes
Xylenes	-----	-----	57	11.46	16.4	0.48	No

**STATE-ONLY REQUIREMENT:**

Pursuant to 15A NCAC 2Q .0705 and in accordance with the approved application for an air toxic compliance demonstration, the following permit limits shall not be exceeded in accordance with 15A NCAC 2D .1100. This table remains the same as currently listed in the existing permit.

Emission Sources	Toxic Air Pollutants	Emission Limits
Municipal Solid Waste Landfill (ES-1) Diesel fuel-fired emergency generator (ES-2) Diesel fuel-fired emergency generator (ES-4) Diesel fuel-fired emergency generator (ES-5) Diesel fuel-fired emergency generator (ES-6)	Benzene	185.60 lbs per year
Municipal Solid Waste Landfill (ES-1)	Hydrogen chloride	0.26 lbs per hour
	Hydrogen sulfide	5.20 lbs per day
	Methyl mercaptan	0.01643 lbs per hour
	Vinyl chloride	159.51 lbs per year

No monitoring, recordkeeping or reporting will be required in the permit because the modeled emissions from the facility are much less than 50% of the AAL for the respective toxic air pollutants.

- XII.** The appropriate number of copies of the application was received by the DAQ on September 14, 2009.
- XIII.** The application was signed by an authorized official as defined by 15A NCAC 2Q .0304(j).
- XIV.** **PSD does not apply** for this renewal.

Note - PSD Avoidance Condition:

The applicant wishes to change the allowable flow rate from 2500 scfm to 3500 scfm for flare CD-FLARE1. The current PSD restrictive limit of less than or equal to 8,500 scfm for the total flow rate of both flares will remain the same. Since the maximum total flow rate remains the same, there is no change in total emissions from the two flares.

Also, the toxic air pollutant limits were calculated based on the maximum landfill gas that will be generated over the life of the facility, and that value was much higher than 8,500 scfm from both flares.

- XV. Public Notice**  
A thirty-day public notice and EPA review period **is required**.

**Public notice:** The 30 day public notice period was from \_\_\_\_\_ through \_\_\_\_\_. \_\_\_ 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 June 16, 2009. The EPA 45-day review period was from \_\_\_\_\_ through \_\_\_\_\_. The USEPA did not have any comments on the renewal permit for this facility.

- XVI.** 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.

**XVII. Ozone Nonattainment:**

Cabarrus County is located in an 8-hour ozone nonattainment area. BFI Waste Systems of America is considered a minor source for nonattainment. The worse case NO<sub>x</sub> emission rate, from the two flares (CD-FLARE1 and 2), is less than 100 tons per year.

Calculation of the uncontrolled mass emissions of nitrogen dioxide from both flares:

Vendor emission factor: 0.06 lbs NO<sub>x</sub>/mmBtu heat input

Maximum heat input from the two flares: 180 mmBtu/hour + 120 mmBtu/hour = 300 mmBtu/hour

$$\frac{0.06 \text{ lbs NO}_x}{\text{mmBtu}} \times \frac{300 \text{ mmBtu}}{\text{hour}} \times \frac{8760 \text{ hours}}{\text{year}} \times \frac{1 \text{ ton}}{2000 \text{ lbs}} = \frac{78.84 \text{ tons NO}_x}{\text{year}}$$

The two diesel fuel-fired emergency generators (ES-5 and 6) that are being added will increase NO<sub>x</sub> emissions by 5.2 tons per year. Total NO<sub>x</sub> emissions from the facility = 84.04 tons per year.

**XVIII. Recommendations:**

This application renewal for the for BFI Waste Systems of America, Charlotte Motor Speedway Landfill V, located in Concord, Cabarrus 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. 08612T09.**