

STATE OF MISSOURI



DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT

Under the authority of RSMo 643 and the Federal Clean Air Act the applicant is authorized to construct the air contaminant source(s) described below, in accordance with the laws, rules and conditions as set forth herein.

Permit Number: 022011-001 Project Number: 2010-11-045

Parent Company: BFI Waste Systems of Missouri, LLC

Parent Company Address: 2980 Granger Drive, Springfield, IL 62707

Installation Name: BFI Backridge Landfill, LLC

Installation Number: 111-0025

Installation Address: 26265 Route B, La Grange, MO 63448

Location Information: Lewis County, S11, T60N, R6W

Application for Authority to Construct was made for:
A horizontal expansion and 1,350 SCFM candlestick flare. This review was conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*.



Standard Conditions (on reverse) are applicable to this permit.



Standard Conditions (on reverse) and Special Conditions are applicable to this permit.

FEB 03 2011

EFFECTIVE DATE



DIRECTOR OR DESIGNEE
DEPARTMENT OF NATURAL RESOURCES

STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within two years from the effective date of this permit. Permittee should notify the Air Pollution Control Program if construction or modification is not started within two years after the effective date of this permit, or if construction or modification is suspended for one year or more.

You will be in violation of 10 CSR 10-6.060 if you fail to adhere to the specifications and conditions listed in your application, this permit and the project review. In the event that there is a discrepancy between the permit application and this permit, the conditions of this permit shall take precedence. Specifically, all air contaminant control devices shall be operated and maintained as specified in the application, associated plans and specifications.

You must notify the Department's Air Pollution Control Program of the anticipated date of start up of this (these) air contaminant source(s). The information must be made available within 30 days of actual startup. Also, you must notify the Department of Natural Resources Regional office responsible for the area within which you are located within 15 days after the actual start up of this (these) air contaminant source(s).

A copy of this permit and permit review shall be kept at the installation address and shall be made available to Department of Natural Resources' personnel upon request.

You may appeal this permit or any of the listed special conditions to the Administrative Hearing Commission (AHC), P.O. Box 1557, Jefferson City, MO 65102, as provided in RSMo 643.075.6 and 621.250.3. If you choose to appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed. If it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC.

If you choose not to appeal, this certificate, the project review and your application and associated correspondence constitutes your permit to construct. The permit allows you to construct and operate your air contaminant source(s), but in no way relieves you of your obligation to comply with all applicable provisions of the Missouri Air Conservation Law, regulations of the Missouri Department of Natural Resources and other applicable federal, state and local laws and ordinances.

The Air Pollution Control Program invites your questions regarding this air pollution permit. Please contact the Construction Permit Unit at (573) 751-4817. If you prefer to write, please address your correspondence to the Missouri Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176, attention: Construction Permit Unit.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (5) REVIEW

Project Number: 2010-11-045
Installation ID Number: 111-0025
Permit Number:

BFI Backridge Landfill, LLC
26265 Route B
La Grange, MO 63448

Complete: November 16, 2010

Parent Company:
BFI Waste Systems of Missouri, LLC
2980 Granger Drive
Springfield, IL 62707

Lewis County, S11, T60N, R6W

REVIEW SUMMARY

- BFI Backridge Landfill, LLC has applied for authority to construct a horizontal expansion and 1,350 SCFM candlestick flare.
- Hazardous Air Pollutant (HAP) emissions are expected from the proposed equipment.
- 40 CFR 60 Subpart WWW, *Standards of Performance for Municipal Solid Waste Landfills* of New Source Performance Standards (NSPS) applies to the landfill. Subpart A, Section 60.18, *General Control Device Requirements*, does not apply to the new flare because Subpart WWW does not yet require the flare.
- None of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) apply to this installation. Maximum Achievable Control Technology (MACT) 40 CFR 63 Subpart AAAA, *National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills* applies to the installation.
- A 1,350 SCFM candlestick flare is being used to control possible landfill gas migration and odors. The flare is not yet required for compliance with NSPS Subpart WWW. The flare is a control device for NMOC, but a source of combustion emissions.
- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of all pollutants are below their respective de minimis or screening model action level (SMAL) thresholds. Carbon monoxide (CO) emissions are above the insignificance level.
- This installation is located in Lewis County, an attainment area for all criteria pollutants.

- This installation is not on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2. The installation's major source level is 250 tons per year and fugitive emissions are not counted toward major source applicability.
- Ambient air quality modeling was not performed since potential emissions of the application are below de minimis levels.
- Emissions testing is not required for the equipment.
- A Part 70 Operating Permit application is required for this installation within 12 months of equipment startup.
- Approval of this permit is recommended without special conditions.

INSTALLATION DESCRIPTION

Browning Ferris Industries operates an existing municipal solid waste landfill (BFI Backridge) near La Grange, Missouri, herein referred to as BFI. BFI has accepted waste since 1991. From a recent expansion, the solid waste permitted design capacity of the entire landfill is 3,311,823 cubic meters. Using the waste in place density of 1,400 pounds per cubic yard the capacity approximates to 2.75 million megagrams. These capacities require BFI to either install a landfill gas collection system and control device, or calculate the NMOC mass emission rate. Using the NSPS Subpart WWW default values, the NMOC mass emission rate is above 50 megagrams per year. According to this permit's application, BFI is determining a site specific NMOC concentration and will recalculate the NMOC mass emission rate per Tier 2.

BFI is a de minimis source under construction permits due to uncontrolled potential NMOC emissions and a basic source under operating permits. The following permits have been issued to BFI Backridge Landfill, LLC from the Air Pollution Control Program.

Table 1: Permit History

Permit Number	Description
OP	Basic operating permit, project 2000-08-063
OP	Basic operating permit, project 2005-02-009
OP	Basic operating permit, project 2009-08-025
022010-006	Construction permit for 1,350 SCFM flare

PROJECT DESCRIPTION

BFI received construction permit 022010-006 for a 1,350 SCFM flare while an application for the 836,200 cubic yard horizontal expansion was being reviewed by the Solid Waste Program. An applicability determination was later submitted to the Air Pollution Control Program under project 2010-09-014 for the horizontal expansion. It was determined that the flare and expansion should be considered one project. Haul

road emissions have previously been unaccounted towards construction permitting and are accounted for in this review. This project considers the flare as being de-bottlenecked due to the increase in available landfill gas from the expansion.

The flare will combust landfill gas produced by the decomposition of waste. The flare is being installed to address possible landfill gas migration and odors, and is not yet required for compliance with NSPS Subpart WWW. The flare will be required if Tier 2 or Tier 3 testing results in NMOC emissions meeting or exceeding 50 megagrams a year. It will reduce methane, hazardous air pollutant (HAP), and volatile organic compound (VOC) emissions from the landfill gas, but produce carbon monoxide and other combustion products.

EMISSIONS/CONTROLS EVALUATION

The emission factors and control efficiencies used in this analysis were obtained from the Environmental Protection Agency (EPA) document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 2.4 *Municipal Solid Waste Landfills*, November 1998.

According to AP-42, the landfill gas collection system is by default 75 percent efficient. The flare is designed to control halogenated compounds at 98.0 percent efficiency, non-halogenated compounds at 99.7 percent efficiency, and NMOC at 99.2 percent efficiency. The combustion of landfill gas also creates particulate matter less than ten microns in diameter (PM₁₀), sulfur dioxide (SO₂), nitrogen oxides (NO_x), and CO.

The primary constituents of landfill gas are approximately 55 percent methane (CH₄) and 45 percent carbon dioxide (CO₂). Typically, landfill gas also contains a small amount of NMOC. This NMOC fraction often contains various organic hazardous air pollutants (HAP), greenhouse gases (GHG), volatile organic compounds (VOC), and other compounds associated with stratospheric ozone depletion.

Maximum production of landfill gas was found using LandGEM version 3.02. Potential emissions from the flare were calculated based upon this maximum. Potential emissions using the design rate of the flare were not calculated because given the current design capacity of the landfill and projected waste intake until that capacity is reached, the amount of landfill gas routed to the flare will be less than the design rate of the flare. The landfill gas generation rate is the bottleneck. Shall another expansion of the landfill occur, with the amount of landfill gas routed to this flare increasing; thereby changing the bottleneck, emissions from the flare should be reevaluated.

Based on the emission rate of methane, the emissions of PM₁₀, CO, and NO_x can be calculated. Particulate emissions are calculated using the emission factor for flares found in Table 2.4-5 in AP-42. According to the footnote to this table, most of the particulate matter will be less than 2.5 microns in diameter, therefore the emission factor can be assumed to estimate total PM, PM₁₀, and PM_{2.5} emissions. CO and NO_x emissions are also calculated by utilizing factors found in Table 2.4-5 of AP-42.

Landfill gas constituents and their default concentrations are listed in Table 2.4-1 of AP-42. The HAPs in that table were checked against the *Table of Hazardous Air Pollutants, Screening Model Action Levels, and Risk Assessment Levels*, Revision 6, August 16, 2010, from the Missouri Department of Natural Resources Air Pollution Control Program. Any delisted HAP from the AP-42 table was removed from this review.

Sulfur, VOC, NMOC, and HAP concentrations are provided in parts per million volume, which is converted to volumetric flow rate. For co-disposal landfills 85 percent of the NMOC concentration is VOC. Using the ideal gas law, the volumetric flow rate is converted to a mass flow rate. The mass flow rates of sulfur, VOC, NMOC, and HAP assuming continuous operation (8,760 hours per year), are used to calculate their respective potential emissions.

The potential emissions from the flare are directly related to landfill gas production. Landfill gas production was based on a certain number of assumptions. Waste acceptance rates may differ from the 3 percent growth projection. The actual volume of in-place waste may differ due to daily covering activities. Variation in temperature, moisture, and pressure can cause seasonal and daily fluctuations in production. Landfill waste is not comprised of a constant proportion of household and industrial waste. Typically, larger amounts of household waste will increase the landfill gas generation rate.

The known amount of waste accepted by the landfill from 1991 to 2009 was entered into LandGEM. The acceptance rates from 2010 to 2023 were calculated using a growth rate of 3% annually, projected from the 2009 acceptance. The maximum capacity of the landfill was predicted to be reached in 2024. The acceptance rate for 2024 was the remainder of available capacity up to the design capacity of 2.75 million megagrams. The values used in the model for the methane generation potential (L_0) and methane generation constant (k) were the AP-42 recommended values of 100.0 cubic meters per megagram and 0.04 per year, respectively. Lacking site specific information, the NMOC concentration was cited from AP-42 for a landfill known to co-dispose municipal solid waste and non-residential waste, 2,420 parts per million volume as hexane. The AP-42 recommended values were used instead of those presented in the NSPS Subpart WWW since the purpose of these calculations is to estimate the most realistic potential emissions of the landfill and not for showing compliance with the NSPS.

It was determined that a maximum landfill gas generation rate from the landfill of 782.1 average standard cubic feet per minute (SCFM) would be reached in the year 2025. With a collection efficiency of 75 percent, this would correspond to a flow rate of approximately 587 SCFM of landfill gas. AP-42 approximates landfill gas at 55 percent methane. Therefore, the potential flow rate of methane in the collection system is 323 SCFM. The emission factor unit for NO_x , CO, and PM_{10} is pounds of pollutant per million dry standard cubic feet (DSCF) of methane. It was assumed that through conditioning, the landfill gas would be dry upon reaching the flare, and that SCFM would be equal to DSCFM.

Haul road emissions were calculated using AP-42 Section 13.2.2 *Unpaved Roads*, November 2006. The waste receiving road (EU-04) one way distance was estimated from CAD drawings submitted for project 2009-10-032 and this review, 600 feet. Waste truck full and empty weights were cited from the Emissions Inventory Questionnaire (EIQ). Hourly waste throughput was calculated by selecting the maximum projected annual waste acceptance from the year 2023 and dividing by an estimated 2,600 annual hours as a bottleneck, 45.41 tons per hour. The borrow pit road (EU-05) distance and truck weights were cited from the EIQ. Hourly soil throughput was calculated by scaling the annual soil hauled reported in the EIQ to the ratio of annual waste accepted in the EIQ and projected waste acceptance in 2023. Borrow pit in-situ moisture was assumed high such that negligible particulate emissions were expected from excavation, truck loading, truck unloading, and daily cover activities. An increase in haul road emissions was not expected for the expansion.

The following table provides an emissions summary for this project. Existing uncontrolled potential NMOC emissions were calculated using the emission rate from LandGEM and the predictive equations (3) and (4) from AP-42 Section 2.4. Existing uncontrolled potential emissions are pre-expansion. The new installation potential emissions represent the potential emissions of the landfill after the expansion, considering the flare, and fugitive emissions. Potential emissions of the application, excluding haul road emissions, are equal to potential emissions of the new installation.

Table 2: Emissions Summary (tons per year)

Pollutant	Regulatory De Minimis Levels	Existing Uncontrolled Potential Emissions	Existing Actual Emissions (2009 EIQ)	Potential Emissions of the Application	New Installation Potential Emissions
PM ₁₀	15.0	N/D	1.66	1.44	4.43
PM _{2.5}	10.0	N/D	N/D	1.44	1.74
SO _x	40.0	N/D	N/A	1.29	1.29
NO _x	40.0	N/D	N/A	3.39	3.39
VOC	40.0	N/D	1.16	23.82	23.82
CO	100.0	N/D	N/A	63.59	63.59
HAPs	10.0/25.0	N/D	0.15	2.98	2.98
NMOC	50.0	96.68	N/D	28.02	28.02

N/A = Not Applicable; N/D = Not Determined

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of all pollutants are below their respective de minimis or screening model action level (SMAL) thresholds. Carbon monoxide (CO) emissions are above the insignificance level.

APPLICABLE REQUIREMENTS

BFI Backridge Landfill, LLC shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved. For a complete list of applicable requirements for your installation, please consult your operating permit.

GENERAL REQUIREMENTS

- *Submission of Emission Data, Emission Fees and Process Information*, 10 CSR 10-6.110. The emission fee is the amount established by the Missouri Air Conservation Commission annually under Missouri Air Law 643.079(1). Submission of a hardcopy Emissions Inventory Questionnaire (EIQ) is required April 1 for the previous year's emissions. Alternatively, submission of an electronic EIQ via MoEIS is required May 1.
- *Operating Permits*, 10 CSR 10-6.065
- *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*, 10 CSR 10-6.170
- *Restriction of Emission of Visible Air Contaminants*, 10 CSR 10-6.220
- *Restriction of Emission of Odors*, 10 CSR 10-6.165

SPECIFIC REQUIREMENTS

- *New Source Performance Regulations*, 10 CSR 10-6.070 – *New Source Performance Standards (NSPS) for Municipal Solid Waste Landfills*, 40 CFR Part 60, Subpart WWW
- *Maximum Achievable Control Technology (MACT) Regulations*, 10 CSR 10-6.075, *National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills*, 40 CFR Part 63, Subpart AAAA
- *Restriction of Emission of Sulfur Compounds*, 10 CSR 10-6.260

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, I recommend this permit be granted with special conditions.

David Little
Environmental Engineer

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated November 9, 2010, received November 16, 2010, designating BFI Waste Systems of Missouri, LLC as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- Northeast Regional Office Site Survey, dated December 6, 2010.

Mr. Terry Bent
Environmental Manager
BFI Backridge Landfill, LLC
2980 Granger Drive
Springfield, IL 62707

RE: New Source Review Permit - Project Number: 2010-11-045

Dear Mr. Bent:

Enclosed with this letter is your permit to construct. Please study it carefully. The document entitled, "Review of Application for Authority to Construct," is part of the permit and should be kept with this permit in your files. Operation in accordance with your new source review permit application and with your modified operating permit is necessary for continued compliance. The reverse side of your permit certificate has important information concerning standard permit conditions and your rights and obligations under the laws and regulations of the State of Missouri.

If you have any questions regarding this permit, please do not hesitate to contact David Little, at the Departments' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or at (573) 751-4817. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Kendall B. Hale
New Source Review Unit Chief

KBH:dll

Enclosures

c: Northeast Regional Office
PAMS File: 2010-11-045

Permit Number: