



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: 102011-006 Project Number: 2011-06-053

Installation Number: 221-0031

Parent Company: IESI MO Landfill Corporation

Parent Company Address: 2301 Eagle Parkway, Suite 200, Fort Worth, TX 76177

Installation Name: Timber Ridge Landfill

Installation Address: 12581 State Highway H, Richwoods, MO 63071

Location Information: Washington County, LG 3022, T40N, R2E

Application for Authority to Construct was made for:
Modification of an existing 500 scfm candlestick flare to 2,000 scfm. This review was conducted in accordance with Section (6), 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.

OCT - 7 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 these air contaminant sources. 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 these air contaminant sources.

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 sources(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 (6) REVIEW

Project Number: 2011-06-053
Installation ID Number: 221-0031
Permit Number:

Timber Ridge Landfill
12581 State Highway H
Richwoods, MO 63071

Complete: June 20, 2011

Parent Company:
IESI MO Landfill Corporation
2301 Eagle Parkway, Suite 200
Fort Worth, TX 76177

Washington County, LG 3022, T40N, R2E

REVIEW SUMMARY

- Timber Ridge Landfill has applied for authority to modify an existing 500 scfm candlestick flare to 2,000 scfm.
- Insignificant amounts of hazardous air pollutant (HAP) emissions are expected from incomplete combustion of landfill gas. Also, HAP emissions are generated by the landfill and controlled to varying efficiencies by the flare.
- New Source Performance Standards (NSPS) 40 CFR 60 Subpart WWW, *Standards of Performance for Municipal Solid Waste Landfills* applies to the landfill. As the annual non methane organic compound (NMOC) emission rate does not meet or exceed 50 megagrams using a site specific NMOC concentration, the flare is not being installed for compliance with Subpart WWW.
- None of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) apply to this installation. Maximum Achievable Control Technology (MACT) Subpart AAAA, *National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills* does not apply to the installation as it is not a major source of HAPs and the estimated uncontrolled NMOC emissions are less than 50 megagrams per year.
- The flare is a control device (to varying efficiencies) for NMOC, HAP, volatile organic compounds (VOC), and methane (CH₄) emissions collected from the landfill, but a source of particulate matter less than 10 microns in diameter (PM₁₀), particulate matter less than 2.5 microns in diameter (PM_{2.5}), carbon monoxide (CO), sulfur oxides (SO_x), nitrogen oxides (NO_x), carbon dioxide (CO₂), nitrous oxide (N₂O), and other products of combustion. Fugitive emissions not collected by the flare are part of the installation, not the flare itself.

- This review was conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of CO are above the de minimis level.
- This installation is located in Washington 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 performed to determine the ambient impact of CO.
- Emissions testing are not required for the equipment.
- An amendment application to the Part 70 Operating Permit is required for this installation within 1 year of equipment startup.
- Approval of this permit is recommended without special conditions.

INSTALLATION DESCRIPTION

Timber Ridge Landfill is an existing municipal solid waste landfill that has accepted waste since 2003. It is a minor source under construction permits, and holds a Part 70 operating permit. It is located in Washington County near Richwoods. The following permits have been issued to Timber Ridge Landfill from the Air Pollution Control Program.

Table 1: Permit History

Permit Number	Description
072003-010	Section 6 construction permit
072003-010A	Amendment for haul roads
OP2006-099	Part 70 operating permit
072003-010B	Amendment for haul roads
112010-007	500 scfm candlestick flare

PROJECT DESCRIPTION

Timber Ridge Landfill installed a closure turf product as an alternative intermediate cover. According to the application, the alternate cover has been so effective that modification to the 500 standard cubic feet per minute (scfm) candlestick flare permitted under 112010-007 is needed to manage the increase in collected landfill gas (LFG). The modification will increase the maximum hour design rate (mhdr) of the flare to 1,500 scfm. However, the landfill believes that a 2,000 scfm flare may be necessary and has addressed this in the application. The flare will combust landfill gas produced by the decomposition of waste. The flare is not being modified to comply with NSPS Subpart

WWW. It will reduce methane, HAP, and VOC emissions from the collected landfill gas, but produce carbon monoxide and other combustion products. Also, the closure turf product and collection system will reduce fugitive gaseous emissions from the landfill.

EMISSIONS/CONTROLS EVALUATION

The emission factors and control efficiencies for criteria air pollutants, CO₂, VOCs, and HAPs 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. The emission factor for N₂O was obtained from the *Greenhouse Gas Reporting Rule*, 40 CFR 98 Subpart C, Table C-3. Potential emissions from haul roads and daily cover activities were not submitted nor calculated for the project or installation potential to emit.

According to AP-42, a landfill gas collection system averages 75 percent efficiency, and higher efficiencies may be achieved at some sites. Site specific collection efficiency has not been determined, however, the application states that the closure turf product has been effective. According to the EPA (GHG BACT white paper) document, *Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from Municipal Solid Waste Landfills*, June 2011, Tables 2 and 3, an area with a geomembrane cover system and active gas collection is assigned 95 percent LFG collection efficiency. The closure turf product is an impermeable layer with a geomembrane, therefore it was assigned 95 percent collection efficiency. Again citing AP-42, 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 PM₁₀, PM_{2.5}, SO_x, NO_x, CO, CO₂, and N₂O.

The primary constituents of landfill gas are approximately 50 percent methane and 50 percent CO₂, cited from the EPA GHG BACT white paper and *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2009*, Chapter 8.1, April 2011. Typically, landfill gas also contains a small amount of NMOC. This NMOC fraction often contains various organic HAPs, GHG, VOC, and other compounds associated with stratospheric ozone depletion.

Maximum production of landfill gas was found using LandGEM version 3.02. The known amount of waste accepted by the landfill from 2003 to 2009 was entered into LandGEM. The acceptance in 2010 was calculated based upon the remaining space in cells 1-4. The values used in the model for the methane generation potential (L₀) and methane generation constant (k) were the AP-42 recommended values of 100.0 cubic meters per megagram and 0.04 per year, respectively. Site specific NMOC concentration of 330 parts per million volume as hexane was entered. 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 cells 1-4 of 296.1 average scfm would be reached in the year 2011. With a collection efficiency of 95 percent, this would correspond to a flow rate of approximately 281 scfm of landfill gas. Therefore, the potential flow rate of methane in the collection system is 141 scfm. However, since the flare is not being modified to comply with NSPS Subpart WWW, and

the flare's maximum design rate exceeds LandGEM's, the potential emissions of the application were calculated using the maximum design rate of the flare, 2,000 scfm of landfill gas.

Based on the methane flow rate, the PM₁₀, CO, and NO_x emissions 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 7, June 3, 2011 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 as a NMOC, and HAP concentrations are provided in parts per million volume, which is converted to volumetric flow rate. Using the ideal gas law, the volumetric flow rate is converted to a mass flow rate. The mass flow rates of sulfur, VOC as a NMOC, and HAPs assuming continuous operation (8,760 hours per year) at the flare's maximum flow rate, are used to calculate their respective potential emissions for the application.

The landfill and flare are sources of GHG, including CO₂, CH₄, and N₂O. Carbon dioxide emissions from the landfill and flare were calculated as the sum of the fugitive CO₂, the collected CO₂ that passes through the flare, and the CO₂ generated from methane combustion. Methane emissions were calculated as the sum of the fugitive CH₄ and the non-combusted portion exiting the flare. Fugitive CH₄ was adjusted for the default soil oxidation fraction of 10% listed in 40 CFR 98 Subpart HH, *Mandatory Greenhouse Gas Reporting Municipal Solid Waste Landfills*. According to EPA's *PSD and Title V Permitting Guidance for Greenhouse Gases*, Appendix I, "While the GHG reporting rule is focused on estimating and reporting *actual* emissions from source categories, the basic approaches can be used to estimate a source's PTE when correctly adjusted to reflect future conditions and operating parameters". Therefore, emission factors and methods from the GHG reporting rule were used in this review. The flare was assigned 99.7 percent control efficiency for methane, cited from AP-42 Section 2.4 *Municipal Solid Waste Landfills* November 1998, as a non-halogenated species. Nitrous oxide is emitted from the combustion of LFG and in smaller amounts from the soil, landfill, and leachate collection tanks. The GHG 100 year global warming potentials of 1, 21, and 310 were used to calculate the carbon dioxide equivalent (CO₂e) from CO₂, CH₄, and N₂O respectively.

This permit will be issued under step two (July 1, 2011 to June 30, 2013) of the PSD and Title V GHG Tailoring Rule (75 FR 31514, June 3, 2010) ("Tailoring Rule"). In addition to step one sources, step two applies to new major sources emitting GHGs in excess of 100,000 tpy CO₂e and existing major sources making changes that would increase GHG emissions by at least 75,000 net tpy CO₂e, and that also exceed 100/250 tons per year of GHGs on a mass basis. Although Timber Ridge Landfill has a Part 70 operating permit, the installation is not a major source. The Part 70 operating permit is

required due to NSPS WWW, not based upon potential emissions. Step two does not apply to this review because the installation's CO₂e is less than 100,000 tpy and GHG emissions are less than 250 tons per year on a mass basis. Also, this review is not a PSD for carbon monoxide because the installation is a minor source.

Fugitive emissions, excluding HAPs, are not counted towards PSD and Title V applicability for landfills. All HAP emissions are counted towards Title V applicability per the major source definition in Section 112 of the Clean Air Act. According to an EPA memorandum dated October 21, 1994, LFG that is collected is not fugitive, and LFG that could be collected, even if it isn't, is also not fugitive.

Existing potential emissions are cited from permit 072003-010. Potential emissions of the application represent the potential of the modified flare, assuming continuous operation (8,760 hours per year). Potential emissions of the installation represent the potential of the modified flare and back-calculated fugitive emissions from the landfill cells producing LFG at a rate equal to 2,000 scfm in the collection system. Potential emissions towards PSD and Title V applicability represent the potential that can be considered towards those types of permits. The following table provides an emissions summary for this project.

Table 2: Emissions Summary (tons per year)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions	Existing Actual Emissions (2010 EIQ)	Potential Emissions of the Application	² Potential Emissions of the Installation	Potential Emissions Towards PSD and Title V Applicability
PM _{2.5}	10.0	N/D	N/D	4.47	4.47	4.47
PM ₁₀	15.0	14.39	4.73	4.47	4.47	4.47
SO _x	40.0	N/A	N/D	4.40	4.40	4.40
NO _x	40.0	N/A	N/D	10.51	10.51	10.51
VOC	40.0	6.71	1.22	0.31	2.31	0.31
CO	100.0	13.5	N/D	197.10	197.10	197.10
Combined HAPs	10.0/25.0	5.51	0.15	0.21	1.90	1.90
NMOC	50.0	N/D	N/D	0.31	2.31	0.31
CO ₂	N/A	N/D	N/D	58,971.55	60,525.74	0
Methane	N/A	N/D	N/D	32.80	542.60	32.80
N ₂ O	N/A	N/D	N/D	0.06	0.06	0.06
GHG mass basis	¹ 100/250	N/D	N/D	59,004.41	61,068.40	32.86
CO ₂ e	¹ 75,000/100,000	N/D	N/D	59,678.35	71,938.30	706.80

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

¹ Significance level

² Potential emissions of the installation upon completion of this project

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of CO are above the de minimis level.

APPLICABLE REQUIREMENTS

Timber Ridge Landfill 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.

AMBIENT AIR QUALITY IMPACT ANALYSIS

Ambient air quality modeling was performed to determine the ambient impact of carbon monoxide. Potential emissions of carbon monoxide exceed the de minimis level. As stated previously in the permit, the CO emission rate is based upon maximum flare flowrate. As can be seen in Table 3, the results of the model predict an ambient impact below the NAAQS. No further action is required.

Table 3: Ambient Air Quality Impact Analysis

Pollutant	Modeled Impact ($\mu\text{g}/\text{m}^3$)	¹ NAAQS ($\mu\text{g}/\text{m}^3$)	Time Period
CO	23.61	40,000	1 hour
CO	16.53	10,000	8 hour

¹ National Ambient Air Quality Standard

Table 4: SCREEN3 Input Parameters

Equipment Description	Stack Height (m)	¹ Heat Released (calories / second)	Emission Rate (grams / second)	Dispersion Coefficient
2,000 scfm candlestick flare	7.925	4,220,930	5.6699	Rural

¹ Lowercase c for calories, not capital C for Calories or kilocalories.

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (6), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, I recommend this permit be granted without 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 June 17, 2011, received June 20, 2011, designating IESI MO Landfill Corporation as the owner and operator of the installation.
- U.S. EPA AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- Southeast Regional Office Site Survey, dated June 28, 2011.
- U.S. EPA, *Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from Municipal Solid Waste Landfills*, June 2011.
- Missouri Department of Natural Resources Air Pollution Control Program *Table of Hazardous Air Pollutants, Screening Model Action Levels, and Risk Assessment Levels*, Revision 7, June 3, 2011.
- U.S. EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2009*, April 2011.
- U.S. EPA, *PSD and Title V Permitting Guidance for Greenhouse Gases*, March 2011.

Mr. Mike Friesen
Region Engineer
IESI MO Landfill Corporation
2301 Eagle Parkway, Suite 200
Fort Worth, TX 76177

RE: New Source Review Permit - Project Number: 2011-06-053

Dear Mr. Friesen:

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 these conditions, your new source review permit application, and with your amended 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 Department's 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: Southeast Regional Office
PAMS File: 2011-06-053

Permit Number: