

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: 042016 - 001 Project Number: 2015-12-035
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 (LG3022, T40N, R2E)

Application for Authority to Construct was made for:

The replacement of an existing 500 scfm candlestick flare with a 1,300 scfm candlestick flare. 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.

Handwritten signature of Ryan Schott.

Prepared by
Ryan Schott
New Source Review Unit

Handwritten signature of Kyna L Moore.

Director of Designee
Department of Natural Resources

Handwritten date: April 4, 2016.

Effective Date

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 startup 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 startup 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.

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

The special conditions listed in this permit were included based on the authority granted the Missouri Air Pollution Control Program by the Missouri Air Conservation Law (specifically 643.075) and by the Missouri Rules listed in Title 10, Division 10 of the Code of State Regulations (specifically 10 CSR 10-6.060). For specific details regarding conditions, see 10 CSR 10-6.060 paragraph (12)(A)10. "Conditions required by permitting authority."

Timber Ridge Landfill
Washington County (LG3022, T40N, R2E)

1. Gas Flow Rate Monitoring
 - A. Timber Ridge Landfill shall install, calibrate, and maintain a gas flow rate measuring device that shall record the flow of landfill gas to the flare.
 - B. The flow rate of the landfill gas shall be recorded at regular intervals throughout the day (i.e. hourly) so that a daily average flow rate can accurately be established.
 - C. Mechanical malfunction, inclement weather, power outage, force majeure, etc. that leads to a loss of flow data is not considered a violation of this special condition, as long as the incident, its impact on flow data, and all corrective actions are documented.
 - D. The flow meter shall be located such that Department of Natural Resources' personnel may easily observe it.
2. Sampling Requirements for Sulfur Compounds
 - A. Timber Ridge Landfill shall sample the landfill gas monthly to determine the concentration of sulfur compounds.
 - B. The first sample collection shall be performed within 30 days after startup of operations. Sampling shall be performed using an approved EPA method or a method approved by the Missouri Air Pollution Control Program. Timber Ridge Landfill shall submit a testing protocol to the Missouri Air Pollution Control Program at least fourteen (14) days before the first test for approval.
 - C. Samples shall be collected no earlier than 15 days and no later than 45 days after the previous collection event.
 - D. During each collection event, three samples shall be taken and the results averaged. The averaging period used for each sample shall be one hour.

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- E. After six (6) months of sampling, Timber Ridge Landfill may petition the Air Pollution Control Program to change the sampling frequency or remove the sampling requirements of Special Condition 2.
3. Record Keeping Requirements
- A. Timber Ridge Landfill shall maintain all records required by this permit for not less than five years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (6) REVIEW

Project Number: 2015-12-035
Installation ID Number: 221-0031
Permit Number:

Installation Address:

Timber Ridge Landfill
12581 State Highway H
Richwoods, MO 63071
Washington County (LG3022, T40N, R2E)

Parent Company:

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

REVIEW SUMMARY

- Timber Ridge Landfill has applied for authority to replace an existing 500 scfm candlestick flare with a 1,300 scfm candlestick flare.
- The application was deemed complete on January 28, 2016.
- HAP emissions are expected from the combustion of landfill gas and as fugitive emissions.
- 40 CFR 60 Subpart WWW – *Standards of Performance for Municipal Solid Waste Landfills* applies to the facility. As the annual NMOC emission rate is less than 50 Megagrams, the flare is not being installed for compliance with Subpart WWW.
- None of the NESHAPs apply to this installation. 40 CFR 63 Subpart AAAA – *National Emission Standard for Hazardous Air Pollutants: Municipal Solid Waste Landfills* does not apply to the facility because it is not a major source for HAPs, and the annual NMOC emission rate is less than 50 Megagrams.
- The flare is a control device for VOC and HAP emissions collected from the landfill, but a source of PM, SO_x, NO_x, CO, and other combustion products. 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 SO_x are above the de minimis level, while potential emissions of all other pollutants are below de minimis levels.
- 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 SO_x.
- Operation in accordance with 40 CFR 60.18 is not required for the flare until the facility is required to operate the flare in accordance with the applicable requirements of 40 CFR Part 60, 61, or 63.
- Submittal of an application to update your Part 70 Operating Permit Renewal Application (Project# 2011-06-054) is required.
- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

Timber Ridge Landfill is an existing municipal solid waste landfill with a design capacity of 10,886,160 Megagrams. It is a non co-disposal, open landfill that has accepted waste since 2003. It is classified as a minor source under construction permits, and currently has a Part 70 operating permit. The Part 70 Operating Permit is required due to NSPS Subpart WWW, not because of potential emissions. The landfill is located in Washington County, near Richwoods, Missouri. The following New Source Review permits have been issued to Timber Ridge Landfill from the Air Pollution Control Program:

Table 1: Permit History

| Permit Number | Description |
|---------------|--|
| 072003-010 | New municipal solid waste landfill |
| 072003-010A | Amendment for haul roads |
| 072003-010B | Amendment for haul roads |
| 112010-007 | 500 scfm candlestick flare |
| 112011-006 | Increase design rate of flare to 2,000 scfm (construction never began) |

PROJECT DESCRIPTION

Timber Ridge Landfill currently operates their landfill gas collection and control system with a 500 scfm candlestick flare. The alternative closure turf cover used for the gas collection system has been so effective that a flare with a higher design rate is needed to manage the increase in collected landfill gas. In order to provide additional capacity to extract and combust landfill gas, Timber Ridge Landfill is proposing to replace the existing 500 scfm flare with a 1,300 scfm flare. Also, the landfill has been experiencing fugitive odor emissions, which are expected to be mitigated by the increased vacuum draw rate of the new flare. No other changes are being made to the facility. Timber Ridge Landfill has no federally enforceable requirement to use the flare; its operation is voluntary.

Previously, Construction Permit 102011-006 was issued so that the 500 scfm flare could be modified to handle 2,000 scfm of landfill gas; however, construction on this project never began, and the design rate of the flare was never changed.

EMISSIONS/CONTROLS EVALUATION

The emission factors and control efficiencies used in this analysis, for all pollutants controlled by the flare and all secondary compounds generated by the flare, were obtained from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 2.4 *Municipal Solid Waste Landfills* (November 1998) and Section 13.5 *Industrial Flares* (April 2015).

According to AP-42, landfill gas collection systems average 75% efficiency, and higher efficiencies may be achieved at some sites. Site specific collection efficiency has not been determined; however, this landfill uses a closure turf product having an impermeable layer with a geomembrane. According to the EPA (GHG BACT white paper) document, *Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from Municipal Solid Waste Landfills*, Tables 2 and 3 (June 2011), an area with a geomembrane cover system and active gas collection is assigned 95% landfill gas collection efficiency.

The primary constituents of landfill gas are approximately 50% methane (CH₄) and 50% carbon dioxide (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). The maximum CH₄ generation rate was, therefore, calculated by multiplying the maximum design rate of the flare (1,300 scfm) by 50%.

Typically, landfill gas also contains a small amount of NMOC. This NMOC fraction often contains various organic HAPs, VOCs, and other compounds associated with stratospheric ozone depletion. Emission rates for VOC (calculated as NMOC), SO₂, and HCl were calculated using the maximum CH₄ generation rate, along with Equations (2) – (10) from AP-42 Section 2.4. PM, NO_x, and CO emissions were also calculated based on the CH₄ generation rate. Emission factors for these pollutants were taken from AP-42 Table 2.4-5 and flare manufacturer specifications. According to the footnote of the table, most of the particulate matter is less than 2.5 microns in diameter; therefore, the “particulate matter” emission factor was assumed to estimate PM, PM₁₀, and PM_{2.5} emissions. Hazardous landfill gas constituents and their default concentrations are listed in AP-42 Table 2.4-1. According to AP-42 Section 13.5, properly operated landfill gas flares are designed to control halogenated compounds at 98.0% efficiency, non-halogenated compounds at 99.7% efficiency, and NMOC at 99.2% efficiency. The combustion of landfill gas also creates PM, SO_x, NO_x, and CO emissions.

Because only 95% of the generated landfill gas is captured by the collection system, 5% is considered fugitive; therefore, these emissions must be accounted for based on the increase in maximum design rate of the flare. Using the controlled potential emissions for VOC and HAPs, the collection system’s capture efficiency, and the flare’s destruction efficiency for each constituent, fugitive emissions were estimated in a simple back-calculation.

The following table provides an emissions summary for this project. Existing potential emissions were taken from the installation's previous construction permit (072003-010). Existing actual emissions were taken from the installation's 2014 EIQ. Potential emissions of the project represent the potential of the new flare and the back-calculated fugitive emissions from the landfill gas collection system, assuming continuous operation (8,760 hours per year) at the maximum design rate (1,300 scfm). This represents the worst case scenario for annual emissions.

Table 2: Emissions Summary (tons per year)

| Pollutant | Regulatory <i>De Minimis</i> Levels | Existing Potential Emissions | Existing Actual Emissions (2014 EIQ) | Potential Emissions of the Project | New Installation Conditioned Potential |
|-------------------|-------------------------------------|------------------------------|--------------------------------------|------------------------------------|--|
| PM | 25.0 | N/D | N/D | 2.90 | N/D |
| PM ₁₀ | 15.0 | 14.39 | 1.88 | 2.90 | 17.29 |
| PM _{2.5} | 10.0 | N/D | 0.60 | 2.90 | N/D |
| SO _x | 40.0 | N/D | 0.38 | 195.93 | 195.93 |
| NO _x | 40.0 | N/D | 1.08 | 11.76 | 11.76 |
| VOC | 40.0 | 6.71 | 5.54 | 1.61 | 8.32 |
| CO | 100.0 | N/D | 20.43 | 53.59 | N/D |
| Total HAPs | 25.0 | 5.51 | 0.89 | 1.54 | 7.05 |

N/D = Not Determined

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 SO_x are above the de minimis level, while potential emissions of all other pollutants are below de minimis levels.

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
 - Per 10 CSR 10-6.110(4)(B)2.A, a full EIQ is required annually.
- *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
 - *Standards of Performance for Municipal Solid Waste Landfills*, 40 CFR Part 60, Subpart WWW
- *Control of Sulfur Dioxide Emissions*, 10 CSR 10-6.261

AMBIENT AIR QUALITY IMPACT ANALYSIS

Ambient air quality modeling was performed to determine the ambient impact of SO₂, because potential emissions of SO₂ were greater than the de minimis level. A NAAQS compliance demonstration was required because SO₂ exceeded the significance levels outlined in 10 CSR 10-6.060(11)(D) Table 4. Results show that the facility is in compliance with the NAAQS for SO₂ when the flare is operated at 1,300 scfm. In addition to demonstrating compliance with the NAAQS, Timber Ridge Landfill must demonstrate that they will not deteriorate the air quality beyond the limits outlined in 10 CSR 10-6.060(11)(A) Table 1. Results show the facility is in compliance with the increment for SO₂ when the flare is operated at 1,300 scfm.

Although using the maximum design rate of the flare represents the worst case scenario for calculating annual SO₂ emissions, it is not necessarily the case for modeling purposes. Because the flow rate of the flare affects the amount of heat released when the flare is in operation, it was determined that a reduced flow rate of 800 scfm should be modeled to ensure that compliance with the NAAQS continued to be demonstrated. The primary reason for concern is that the net heat released from the flare directly impacts the dispersive properties of the gas stream. At reduced velocities, the net heat released decreases as does the amount of dispersion that occurs once the gas is combusted. Results of re-modeling show that the facility is in compliance with the NAAQS for SO₂ and the increment for SO₂ when the flare is operated at 800 scfm.

More information regarding the AAQIA can be found in the memorandums “Ambient Air Quality Impact Analysis (AAQIA) for Timber Ridge Landfill – Flare Replacement Project” dated February 10, 2016; and “Ambient Air Quality Impact Analysis (AAQIA) for Timber Ridge Landfill – Flare Replacement Project – Flow Rate Reduction from 1,300 to 800 Standard Cubic Feet per Minute” dated March 24, 2016.

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*, it is recommended that this permit be granted with special conditions.

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated December 15, 2015, received December 21, 2015, designating IESI MO Landfill Corporation as the owner and operator of the installation
- Memo titled, "AAQIA for Timber Ridge Landfill – Flare Replacement Project" dated February 10, 2016
- Memo titled, "AAQIA for Timber Ridge Landfill – Flare Replacement Project – Flow Rate Reduction from 1,300 to 800 Standard Cubic Feet per Minute" dated March 24, 2016

APPENDIX A

Abbreviations and Acronyms

| | | | |
|-------------------------------|--|-------------------------------|--|
| % | percent | m/s | meters per second |
| °F | degrees Fahrenheit | Mgal | 1,000 gallons |
| acfm | actual cubic feet per minute | MW | megawatt |
| BACT | Best Available Control Technology | MHDR | maximum hourly design rate |
| BMPs | Best Management Practices | MMBtu | Million British thermal units |
| Btu | British thermal unit | MMCF | million cubic feet |
| CAM | Compliance Assurance Monitoring | MSDS | Material Safety Data Sheet |
| CAS | Chemical Abstracts Service | NAAQS ... | National Ambient Air Quality Standards |
| CEMS | Continuous Emission Monitor System | NESHAPs | National Emissions Standards for Hazardous Air Pollutants |
| CFR | Code of Federal Regulations | NO_x | nitrogen oxides |
| CO | carbon monoxide | NSPS | New Source Performance Standards |
| CO₂ | carbon dioxide | NSR | New Source Review |
| CO_{2e} | carbon dioxide equivalent | PM | particulate matter |
| COMS | Continuous Opacity Monitoring System | PM_{2.5} | particulate matter less than 2.5 microns in aerodynamic diameter |
| CSR | Code of State Regulations | PM₁₀ | particulate matter less than 10 microns in aerodynamic diameter |
| dscf | dry standard cubic feet | ppm | parts per million |
| EQ | Emission Inventory Questionnaire | PSD | Prevention of Significant Deterioration |
| EP | Emission Point | PTE | potential to emit |
| EPA | Environmental Protection Agency | RACT | Reasonable Available Control Technology |
| EU | Emission Unit | RAL | Risk Assessment Level |
| fps | feet per second | SCC | Source Classification Code |
| ft | feet | scfm | standard cubic feet per minute |
| GACT | Generally Available Control Technology | SDS | Safety Data Sheet |
| GHG | Greenhouse Gas | SIC | Standard Industrial Classification |
| gpm | gallons per minute | SIP | State Implementation Plan |
| gr | grains | SMAL | Screening Model Action Levels |
| GWP | Global Warming Potential | SO_x | sulfur oxides |
| HAP | Hazardous Air Pollutant | SO₂ | sulfur dioxide |
| hr | hour | tph | tons per hour |
| hp | horsepower | tpy | tons per year |
| lb | pound | VMT | vehicle miles traveled |
| lbs/hr | pounds per hour | VOC | Volatile Organic Compound |
| MACT | Maximum Achievable Control Technology | | |
| µg/m³ | micrograms per cubic meter | | |

Mr. Brady Stewart
MO/AR Area Engineer
Timber Ridge Landfill
2305 Creve Coeur Mill Road
Maryland Heights, MO 63043

RE: New Source Review Permit - Project Number: 2015-12-035

Dear Mr. Stewart:

Enclosed with this letter is your permit to construct. Please study it carefully and refer to Appendix A for a list of common abbreviations and acronyms used in the permit. 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 were adversely affected by this permit decision, you may be entitled to pursue an appeal before the Administrative Hearing Commission pursuant to Sections 621.250 and 643.075.6 RSMo. To appeal, you must file a petition with the Administrative Hearing Commission 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 Administrative Hearing Commission. You may contact the Administrative Hearing Commission by writing to them at the United States Post Office Building, 131 West High Street, Third Floor, P.O. Box 1557, Jefferson City, Missouri 65102 or by phone at (573) 751-2422 or by fax at (573) 751-5018. The Administrative Hearing Commission website is located at www.oa.mo.gov/ahc.

Mr. Brady Stewart
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If you have any questions regarding this permit, please do not hesitate to contact Ryan Schott at the Department of Natural Resources' 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

Susan Heckenkamp
New Source Review Unit Chief

SH:rsd

Enclosures

c: Southeast Regional Office
PAMS File: 2015-12-035

Permit Number: