

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: 122015 - 004 Project Number: 2015-06-070
Installation Number: 019-0091

Parent Company: City of Columbia Sanitary Landfill

Parent Company Address: P.O. Box 6015, Columbia, MO 65205-6015

Installation Name: City of Columbia Sanitary Landfill

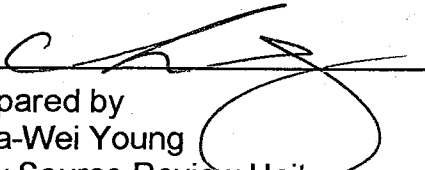
Installation Address: 5700 Peabody Road, Columbia, MO 65205

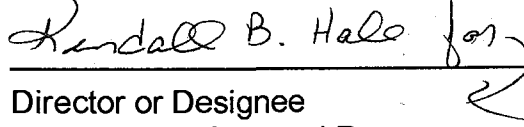
Location Information: Boone County, S22, T49N, R12W

Application for Authority to Construct was made for:

Increasing flowrate to a flare and revising NO_x and CO emission limits. 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.


Prepared by
Chia-Wei Young
New Source Review Unit


Director or Designee
Department of Natural Resources

DEC 08 2015

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 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.

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."

City of Columbia Sanitary Landfill
Boone County, S22, T49N, R12W

1. **Superseding Condition**
The conditions of this permit supersede all of the special conditions found in the previously issued construction permits 082007-007, 082007-007A, and 082007-007B issued by the Air Pollution Control Program.
2. **NO_x Emission Limitation**
 - A. City of Columbia Sanitary Landfill shall emit less than 40.0 tons of NO_x in any consecutive 12-month period from the three (3) landfill gas (LFG) to energy generators (EP-10, 11, and 12) and the flare (EP-02).
 - B. Forms, such as electronic forms, approved by the Air Pollution Control Program shall be used to demonstrate compliance with Special Conditions 2.A. (The electronic spreadsheet currently utilized by the City of Columbia Sanitary Landfill personnel was approved by MDNR staff in June 2013 and is acceptable for continued use.)
3. **Operating Restriction**
The LFG collected by the landfill shall be either sent to one of the three LFG generators or to the open flare.
4. **Record Keeping and Reporting Requirements**
 - A. City of Columbia Sanitary Landfill shall maintain all records required by this permit for not less than five years and shall make them available to any Missouri Department of Natural Resources' personnel upon request.
 - B. City of Columbia Sanitary Landfill shall report to the Air Pollution Control Program's Compliance/Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than 10 days after the end of the month during which any record required by this permit show an exceedance of a limitation imposed by this permit.

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

Project Number: 2015-06-070
Installation ID Number: 019-0091
Permit Number:

Installation Address:
City of Columbia Sanitary Landfill
5700 Peabody Road
Columbia, MO 65205

Parent Company:
City of Columbia Sanitary Landfill
P.O. Box 6015
Columbia, MO 65205-6015

Boone County, S22, T49N, R12W

REVIEW SUMMARY

- City of Columbia Sanitary Landfill has applied for authority to modify its existing facility to account for the following.
 - The current permit (082007-007B) for the landfill gas (LFG) generators contains four generators. The facility would like to remove one of the generators from the permit.
 - Permit 082007-007B contains a flowrate limit of 1,500 scfm for the open flare. The facility would like to remove this restriction.
 - Revise the generator NO_x emission limits from 0.6 g/bhp-hr to the NSPS limits (3.0 g/bhp-hr for EP-10 and EP-11, 2.0 g/bhp-hr for EP-12).
 - Revise the generator CO emission limit from 3.27 g/bhp-hr to the NSPS limit of 5.0 g/bhp-hr.
 - Adopt a facility-wide NO_x limit of less than 40 tpy.
- The application was deemed complete on July 21, 2015.
- HAP emissions are expected from the combustion equipment, but are expected to be less than their respective SMAL.
- 40 CFR Part 60, NSPS Subpart JJJJ, "Standards of Performance for Stationary Spark Ignition Internal Combustion Engines," applies to the LFG generators.
- 40 CFR Part 60, NSPS Subpart WWW, "Standards of Performance for Municipal Solid Waste Landfills," applies to the installation. The facility received a permitted landfill expansion after May 30, 1991 to make it subject to the requirements of Subpart WWW.
- 40 CFR Part 63, MACT Subpart CCCCC, "National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Dispensing Facilities," applies to the gasoline storage tanks at the installation.

- 40 CFR Part 63, MACT Subpart AAAA, “National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills,” does not apply to the landfill because it does not have uncontrolled emissions of NMOC equal to or greater than 50 Mg/yr.
- 40 CFR Part 63, Subpart ZZZZ, “National Emission standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines,” applies to the LFG generators. The facility is considered an area source under this rule. An area source with a new or reconstructed stationary RICE located at an area source must meet the requirements of Subpart ZZZZ by meeting the requirements of 40 CFR Part 60, Subpart JJJJ. No further requirements apply under Subpart ZZZZ.
- None of the NESHAPs apply to this installation.
- The LFG collected may either be sent to the generator or an open flare. The generators and the open flare are considered both control devices and emissions units.
- 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 and VOCs are greater than the de minimis level but less than the major source level.
- This installation is located in Boone 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 on CO because its potential emissions are greater than the de minimis level. Modeling was not performed on VOCs because no model is currently available which can accurately predict ambient ozone concentrations caused by this installation’s VOC emissions.
- Emissions testing is not required for the equipment as a condition of this permit.
- An amendment to the facility’s Part 70 Operating Permit renewal application (Project 2013-04-107) is required for this installation within one (1) year of permit issuance.
- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

The City of Columbia owns and operates a 107 acre solid waste landfill located in the northern portion of a 560 acre site. The landfill is located approximately 1.2 miles east

of Route B on Peabody Road in Columbia, MO. The landfill consists of a 51 acre pre-Subtitle D area and a 56 acre Subtitle D area.

In 2007, the landfill was permitted, through Permit 082007-007, to operate four (4) General Electric model JGS 320 reciprocating engines each equipped with a 1,059 kilowatt (kW) generator. The engines are each rated at 1,468 brake horsepower (bhp) of mechanical output at full load with a maximum heat input of approximately 10 mmBtu/hr. Exhaust from the engines will pass through a silencer prior to releasing to the atmosphere. An existing flare was replaced through permit amendment 082007-007A.

The following New Source Review permits have been issued to City of Columbia Sanitary Landfill from the Air Pollution Control Program.

Table 1: Permit History

Permit Number	Description
0298-016	Opening a new landfill cell
122001-005	Opening a new waste cell
082007-007	Installation of four (4) LFG generators
082007-007A	Replacement of a flare
082007-007B	Allow operation of a bioreactor and concurrent operation of flare and engines
082007-007C	Revise CO emission factor and ambient air quality modeling

PROJECT DESCRIPTION

The City of Columbia proposes the following modification to the landfill.

- The current permit (082007-007B) for the landfill gas (LFG) generators contains four generators. The facility would like to remove one of the generators from the permit.
- Permit 082007-007B contains a flowrate limit of 1,500 scfm for the open flare. The facility would like to remove this restriction.
- Revise the generator NO_x emission limits from 0.6 g/bhp-hr to the NSPS limits (3.0 g/hp-hr for EP-10 and EP-11, 2.0 g/hp-hr for EP-12).
- Revise the generator CO emission limit from 3.27 g/bhp-hr to the NSPS limit of 5.0 g/bhp-hr.
- Adopt a facility-wide NO_x limit of less than 40 tpy.

The NO_x, CO and VOC emissions limits do not appear as a special condition in this permit because they are based on NSPS Subpart JJJJ limits. The facility will have to maintain compliance with all of the conditions in NSPS Subpart JJJJ. Furthermore, there are no performance testing requirements in this permit because the facility is required to test per NSPS Subpart JJJJ. Permit No. 082007-007 contained a limit for 250 tons per year of CO. However, with the elimination of one of the generators, the emissions from the project will no longer be greater than 250 tons per year. Therefore, the 250 tons per year CO limit is no longer required.

EMISSIONS/CONTROLS EVALUATION

Emissions were calculated for two (2) separate scenarios: 1) when the LFG generators operate at full load and the remaining LFG flows to the flare, or 2) when all of the LFG flows to the flare. The highest emission occurs when the LFG flows to the generators, so emissions from this scenario were used as the potential emissions from the project. For the LFG generators, particulate emissions, including PM_{2.5}, PM₁₀, and PM, were calculated using emission factors from EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Chapter 2.4, "Municipal Solid Waste Landfills," 10/2008. NO_x, VOC, and CO emissions were calculated using NSPS limits. CO₂, N₂O, and CH₄ emissions were calculated using both mass balances and emission factors from 40 CFR 98, Table C-2, and the highest emissions were used for this project. GHG-mass emissions were calculated by summing the CO₂, N₂O, and CH₄ emissions. GHG-CO₂ equivalent were calculated by multiplying the CO₂, N₂O, and CH₄ emissions by their respective global warming potentials (GWP) and summing the results. HAPs and SO_x emissions were calculated from mass balances using the concentration data given in AP-42, Chapter 2.4.

For GHG-mass emissions calculations, it was assumed that all of the LFG are captured, while for GHG-CO₂e emissions calculations, it was assumed that only 75% of the LFG are captured. For all of the other pollutants, it was assumed that all of the LFG are captured. These assumptions give the most conservative level of emissions. The 75% capture efficiency comes from AP-42, Chapter 2.4.

The following table provides an emissions summary for this project. Existing potential emissions are taken from Permit 082007-007. Existing actual emissions were taken from the installation's 2014 EIQ. Potential emissions of the application represent the potential of the three (3) LFG engines and the flare, assuming continuous operation (8760 hours per year). The facility accepted a NO_x limit of 40 tpy in order to avoid modeling requirements. However, because the VOC and CO emissions were calculated using NSPS limits and not actual emission factors, the CO and VOC emissions would not be proportionally reduced because of the NO_x limit. Modeling was performed on CO emissions to ensure compliance with the NAAQS.

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 Application	New Installation Conditioned Potential
PM	25.0	N/D	N/D	4.62	N/A
PM ₁₀	15.0	25.17	6.72	4.62	N/A
PM _{2.5}	10.0	N/D	N/D	4.62	N/A
SO _x	40.0	N/D	3.00	4.88	N/A
NO _x	40.0	34.61	10.82	119.91	<40.0
VOC	40.0	73.99	1.42	49.28	N/A
CO	100.0	189.56	74.94	220.30	N/A

GHG (CO ₂ e)	100,000	N/D	N/D	87,702.99	N/A
GHG (mass)	250.0	N/D	N/D	44,889.05	N/A
HAPs	10.0/25.0	4.46	1.25	3.72	N/A

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 CO and VOCs are greater than the de minimis levels but less than the major source levels.

APPLICABLE REQUIREMENTS

City of Columbia Sanitary 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.

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.B(II) and (4)(B)2.C(II) a full EIQ is required for the first full calendar year the equipment (or modifications) approved by this permit are in operation.
- *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 Stationary Spark Ignition Internal Combustion Engines*, 40 CFR Part 60, Subpart JJJJ
 - *Standards of Performance for Municipal Solid Waste Landfills*, 40 CFR Part 60, Subpart WWW

- *MACT Regulations, 10 CSR 10-6.075*
 - *National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, 40 CFR Part 63, Subpart ZZZZ*

- *Restriction of Emission of Sulfur Compounds, 10 CSR 10-6.260*

AMBIENT AIR QUALITY IMPACT ANALYSIS

Ambient Air Quality Impact Analysis was performed to determine the ambient impact of CO because potential emissions are above the *de minimis* level. Results show that the ambient impact of CO will be in compliance with the NAAQS. The results given below in Table 3 are based on the distance of maximum impact. Modeling was performed using AERSCREEN.

Table 3: CO Ambient Air Quality Impact Analysis ($\mu\text{g}/\text{m}^3$)

Pollutant	Modeled Impact	NAAQS	Time Period
CO	692.36	40,000	1-hour
	623.18	10,000	8-hour

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 June 23, 2015, received June 25, 2015, designating City of Columbia Sanitary Landfill as the owner and operator of the installation.

APPENDIX A

Abbreviations and Acronyms

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

Ms. Cynthia Mitchell
Solid Waste Utility Manager
City of Columbia Sanitary Landfill
P.O. Box 6015
Columbia, MO 65205-6015

RE: New Source Review Permit - Project Number: 2015-06-070

Dear Ms. Mitchell:

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. Also, note the special conditions, if any, on the accompanying pages. 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 thirty 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, Truman State Office Building, P.O. Box 1557, Jefferson City, www.oa.mo.gov/ahc. If you have questions regarding this, contact Chia-Wei Young, Department of Natural Resources' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Susan Heckenkamp
New Source Review Unit Chief

SH:cyl

Enclosures

c: Northeast Regional Office
PAMS File: 2015-06-070
Permit Number: