PERMIT BOOK

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: 112012-013 Project Number: 2012-08-050
Installation Number:159-0055

Parent Company: Waste Corporation of Missouri, Inc.

Parent Company Address: 2120 West Bennett, Springfield, MO 65807

Installation Name: Central Missouri Landfill

Installation Address: 24461 Oak Grove Lane, Sedalia, MO 65302

Location Information: Pettis County, S36, T46N, R22W

Application for Authority to Construct was made for:
A 7,500,000 cubic yard horizontal expansion and a 1,600 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.

NOV 26 2012

EFFECTIVE DATE

Kyra L Moore

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: 2012-08-050
Installation ID Number: 159-0055
Permit Number:

Central Missouri Landfill
24461 Oak Grove Lane
Sedalia, MO 65302

Complete: August 20, 2012

Parent Company:
Waste Corporation of Missouri, Inc.
2120 West Bennett
Springfield, MO 65807

Pettis County, S36, T46N, R22W

REVIEW SUMMARY

- Central Missouri Landfill has applied for authority to construct a horizontal expansion and a 1,600 SCFM candlestick flare.

- Insignificant amounts of 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.

- 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 NESHAPs apply to this installation. 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, VOC, and methane (CH_4) emissions collected from the landfill, but a source of PM_{10}, $PM_{2.5}$, CO, SO_X, NO_X, CO_2, nitrous oxide (N_2O), 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 Pettis 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 is 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

The Central Missouri Landfill (CML) is a municipal solid waste landfill owned and operated by Waste Corporation of Missouri, Inc. The landfill is located in Pettis County, Missouri, near Sedalia about ¼ mile north of US Highway 50, accessed by Oak Grove lane. CML has been in operation since 1972 and consists of the following disposal areas: Landfill 1 is a 3-acre Pre Subtitle D area closed in 1982; Landfill 2 is a 2-acre Pre Subtitle D area closed in 1988; Landfill 3 is a 10-acre Pre Subtitle D area closed in 1998; Areas 1-4 are 16.2 acres open, intermittently active Subtitle D area; Horizontal Expansion is an active 45-acre Subtitle D area; and North Horizontal Expansion is a 5.5-acre Subtitle D area.

Landfills 1 through 3, located at the southwest corner of the facility, and Areas 1-4, located at the northwest corner of the facility have operated under two solid waste disposal area operating permits number 115906 and 115908. After the approval of the horizontal expansion in 2004, the total design capacity of the CML was 5.80 million Mg. This is over 2.5 million Mg and the facility is subject to a Part 70 Operating permit. The Part 70 Operating permit OP2006-084, was issued, on November 22, 2006 for landfills 1 through 3, areas 1-4, and the Horizontal Expansion. It is a Minor Source for Construction permits.

The following New Source Review permits have been issued to CML from the Air Pollution Control Program.

Table 1: Permit History

Permit Number	Description
102004-007	Landfill Expansion
112010-009	Landfill Expansion

PROJECT DESCRIPTION

CML submitted a construction permit application, project number 2012-08-050, for a 1,600 SCFM flare while an application for the 7,500,000 cubic yard horizontal expansion was being reviewed by the Solid Waste Program. It was determined that the flare and expansion should be considered one project. Also, as part of this project CML is excavating Landfill 1 and Landfill 2 and placing them in 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 PM_{10}, SO_2, NOx, and CO.

The primary constituents of landfill gas are approximately 55 percent CH_4 and 45 percent CO_2. Typically, landfill gas also contains a small amount of NMOC. This NMOC fraction often contains various organic HAP, GHG, VOC, and other compounds associated with stratospheric ozone depletion.

Maximum emissions from the flare were based upon the maximum design rate of the flare, 1,600 scfm.

Based on the flowrate of methane, through the flare the emissions of $PM_{10,}$ 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, PM_{10}, 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 10, May 3, 2012, 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.

Landfill gas production from the expansion was based on a certain number of assumptions. Annual 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 in 2010 was used to calculate the acceptance rates from 2011 to 2030 using a growth rate of 3% annually, projected from the 2010 acceptance. The maximum capacity of the expansion was predicted to be reached in 2030. The acceptance rate for 2030 was the remainder of available capacity up to the design capacity of 4.1 million megagrams. The values used in the expansion model for the methane generation potential (L_o) 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 using LandGEM Version 3.02 that a maximum landfill gas generation rate from the expansion of 2,749 average standard cubic feet per minute (SCFM) would be reached in the year 2033. With a collection efficiency of 75 percent, this would correspond to a flow rate of approximately 2,062 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 1,134 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.

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 potential emissions of the application represent the potential emissions of the landfill after the expansion, considering the flare, and fugitive emissions. The potential emissions of the application towards PSD represent only the potential fugitive emissions of the landfill after the expansion, considering the flare.

Table 2: Emissions Summary (tons per year)

Pollutant	Regulatory *De Minimis* Levels	Existing Potential Emissions	Existing Actual Emissions (2011 EIQ)	Potential Emissions of the Application	Potential Emissions of the Application towards PSD
PM	25.0	N/D	N/A	0.98	0.98
$PM_{2.5}$	10.0	N/D	1.35	3.93	3.93
PM_{10}	15.0	17.87	13.54	3.93	3.93
SOx	40.0	N/A	0	3.23	3.23
NOx	40.0	N/A	0	9.25	9.25
VOC	40.0	68.77	2.74	83.26	1.51
CO	100.0	6.85	0.57	173.45	173.45
Combined HAPs	10.0/25.0	57.40	0.23	10.44	10.44
NMOC	50.0	732.02	N/A	97.95	1.78
CO_2	N/A	N/D	N/A	35,998.56	0
Methane	N/A	N/D	N/A	3662.90	1.65
N_2O	N/A	N/D	N/A	0.33	0.33
GHG mass basis	[1] 100/250	N/D	N/A	60,923.05	1.98
CO_2e	[1] 75,000/100,000	N/D	N/A	134,281.55	135.44

N/A = Not Applicable; N/D = Not Determined
[1] Significance level

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

Central Missouri 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
- *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 ($\mu g/m^3$)	Significant Impact Level ($\mu g/m^3$)	[1]NAAQS ($\mu g/m^3$)	Time Period
CO	82.03	N/A	40,000	1 hour
CO	73.83	575	10,000	8 hour

[1] National Ambient Air Quality Standard
N/A = Not Applicable

Table 4: AERSCREEN Input Parameters

Equipment Description	Stack Height (ft)	[1] Heat Released (calories/second)	Emission Rate (lb/hr)	Dispersion Coefficient
1,600 scfm candlestick flare	30	4,281,611	39.6	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.

_____ _____

Janelle Lewis Date
New Source Review Unit

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated August 20, 2012, received August 20, 2012, designating Waste Corporation of Missouri, Inc. as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- 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.

APPENDIX A

Abbreviations and Acronyms

% ..... percent

ºF ..... degrees Fahrenheit

acfm ..... actual cubic feet per minute

BACT ..... Best Available Control Technology

BMPs ..... Best Management Practices

Btu..... British thermal unit

CAM ..... Compliance Assurance Monitoring

CAS..... Chemical Abstracts Service

CEMS ..... Continuous Emission Monitor System

CFR ..... Code of Federal Regulations

CO ..... carbon monoxide

CO_2..... carbon dioxide

CO_2e..... carbon dioxide equivalent

COMS..... Continuous Opacity Monitoring System

CSR..... Code of State Regulations

dscf ..... dry standard cubic feet

EIQ ..... Emission Inventory Questionnaire

EP..... Emission Point

EPA ..... Environmental Protection Agency

EU..... Emission Unit

fps ..... feet per second

ft ..... feet

GACT ..... Generally Available Control Technology

GHG ..... Greenhouse Gas

gpm..... gallons per minute

gr..... grains

GWP..... Global Warming Potential

HAP..... Hazardous Air Pollutant

hr..... hour

hp ..... horsepower

lb ..... pound

lbs/hr..... pounds per hour

MACT ..... Maximum Achievable Control Technology

µg/m^3..... micrograms per cubic meter

m/s ..... meters per second

Mgal ..... 1,000 gallons

MW ..... megawatt

MHDR..... maximum hourly design rate

MMBtu.... Million British thermal units

MMCF..... million cubic feet

MSDS ..... Material Safety Data Sheet

NAAQS... National Ambient Air Quality Standards

NESHAPs ..... National Emissions Standards for Hazardous Air Pollutants

NO_x..... nitrogen oxides

NSPS..... New Source Performance Standards

NSR..... New Source Review

PM ..... particulate matter

$PM_{2.5}$..... particulate matter less than 2.5 microns in aerodynamic diameter

PM_{10}..... particulate matter less than 10 microns in aerodynamic diameter

ppm ..... parts per million

PSD ..... Prevention of Significant Deterioration

PTE..... potential to emit

RACT..... Reasonable Available Control Technology

RAL ..... Risk Assessment Level

SCC..... Source Classification Code

scfm ..... standard cubic feet per minute

SIC..... Standard Industrial Classification

SIP..... State Implementation Plan

SMAL ..... Screening Model Action Levels

SO_x..... sulfur oxides

SO_2..... sulfur dioxide

tph ..... tons per hour

tpy ..... tons per year

VMT..... vehicle miles traveled

VOC..... Volatile Organic Compound

Mr. Derrick Standley
Regional Engineering, Compliance, and Govt. Affairs
Central Missouri Landfill
24461 Oak Grove Lane
Sedalia, MO 65302

RE: New Source Review Permit - Project Number: 2012-08-050

Dear Mr. Standley:

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 have any questions regarding this permit, please do not hesitate to contact Janelle Lewis, 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:ljl

Enclosures

c: Kansas City Regional Office
PAMS File: 2012-08-050

Permit Number: