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: 01 2 0 1 4 - 0 0 7 Project Number: 2012-06-017
Installation Number: 207-0062

Parent Company: Lemons Sanitary Landfill
Parent Company Address: 15250 Old Bloomfield Drive, Dexter, MO 63841
Installation Name: Lemons Sanitary Landfill
Installation Address: 15250 Old Bloomfield Drive, Dexter, MO 63841
Location Information: Stoddard County, S2/11, T25N, R10E

Application for Authority to Construct was made for:

The horizontal expansion of an existing landfill. 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.

JAN 1 5 2014
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.
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.”

Lemons Sanitary Landfill
Stoddard County, S2/11, T25N, R10E

1. Control Device Requirement - Flare
   A. Lemons Sanitary Landfill shall control emissions from the landfill expansion area using a flare as specified in the permit application.
   
   B. The flare shall be operated and maintained in accordance with the manufacturer’s specifications, a copy of which shall be kept onsite.
   
   C. Lemons Sanitary Landfill shall maintain an operating and maintenance log for the flare which shall include the following:
      1) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
      2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.

2. Record Keeping Requirements
Lemons 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.
REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (6) REVIEW

Project Number: 2012-06-017
Installation ID Number: 207-0062
Permit Number:

Lemons Sanitary Landfill Complete: June 6, 2012
15250 Old Bloomfield Drive
Dexter, MO 63841

Parent Company:
Lemons Sanitary Landfill
15250 Old Bloomfield Drive
Dexter, MO 63841

Stoddard County, S2/11, T25N, R10E

REVIEW SUMMARY

- Lemons Sanitary Landfill has applied for authority to expand its existing landfill by 6.01 million cubic meters, which corresponds to 4.847 Megagram (Mg) of wastes.

- HAP emissions are expected from the flare, but only in amounts less than their respective SMAL.

- 40 CFR 60, Subpart WWW, Standards of Performance for Municipal Solid Waste Landfills, of the New Source Performance Standards (NSPS) applies to the landfill. Lemons Sanitary Landfill will comply with 40 CFR §60.752(b)(2)(iii)(A) by routing the captured landfill gas to an open flare.

- None of the NESHAPs apply to this installation.


- A flare is being used to control the methane (CH₄) emissions from the landfill. However, this will generate CO₂ emissions.

- This review was conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060, Construction Permits Required. Potential emissions of VOC and CO of the project are above their respective de minimis levels but below their major source levels. Potential emissions of all other pollutants are at their respective de minimis levels.

- This installation is located in Stoddard 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. Results show that the ambient impact of CO from the project will be below the modeling insignificance level.

Emissions testing is not required for the equipment.

An application to amend the installation’s Part 70 Operating Permit is required within one year of permit issuance.

Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

Lemons Sanitary Landfill is a municipal solid waste landfill that opened in 1994 with a design capacity of 3.59 million cubic meters (2.90 Mg). In 1996, the design capacity was increased to 4.97 million cubic meters (4.0 Mg). The landfill gas (LFG) is being captured and exhausted through an open flare. The installation is currently a minor source for construction permits and a Part 70 installation for operating permits.

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

Table 1: Permit History

<table>
<thead>
<tr>
<th>Permit Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>052001-016</td>
<td>Installation of a flare</td>
</tr>
</tbody>
</table>

PROJECT DESCRIPTION

Lemons Sanitary Landfill has proposed to increase its waste capacity by 6.01 cubic meters (4.847 Mg). The facility’s total waste capacity after this project will be 10.98 cubic meters (8.855 Mg). The LFG generated by the expansion area will be captured and exhausted through the existing open flare.

EMISSIONS/CONTROLS EVALUATION

The amount of LFG generated by the facility was estimated using EPA software LandGEM, version 3.02. To calculate the LFG before the expansion, the known amount of waste accepted by the landfill from 1994 to 2011 was entered. Thereafter, a growth rate of 3% was used from 2011 through the year 2018. The acceptance rate of 2019, the pre-expansion closure year, was the remainder of the available capacity up to the design capacity of 4.0 Mg. To calculate the LFG after the expansion, the growth rate of
3% was used from 2011 through the year 2037. The acceptance rate of 2038, the post-expansion closure year, was the remainder of the available capacity up to the design capacity of 8.855 Mg. For the project LFG generation, only the waste acceptance rate from 2019 to 2038 was entered. Again, a 3% growth rate was assumed and the acceptance rate in 2038 was the remainder of the available capacity.

The values used in the model for the CH₄ generation potential (Lo) and CH₄ generation constant (k) were the AP-42 recommended values of 100 cubic meters per Mg and 0.04 per year, respectively. Lacking site-specific information, the non-methane organic compounds (NMOC) concentration used was 2,420 ppm (as hexane), a number EPA document AP-42, *Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources*, Fifth Edition, Chapter 2.4, *Municipal Solid Waste Landfills* (11/98) recommends for co-disposal.

The LFG generated is used to calculate pollutant emissions from the landfill. Because the landfill continually accepts wastes, the annual LFG generated by the landfill would increase every year until the closure of the landfill and therefore, the emissions of each pollutant would increase every year as well. The potential emissions are from the year with the highest emissions.

According to AP-42, Chapter 2.4, the LFG is composed of approximately 55 percent CH₄ and 45 percent CO₂. There are also trace amounts of NMOC. The CH₄ and NMOC will be combusted by the flare into CO₂ and water. Incomplete combustion would lead to some CO emissions. The capture efficiency of the collection system is by default 75%, according to AP-42, Chapter 2.4. The flare is also designed to control NMOC at 99.2%, non-halogenated compounds at 98.0% and halogenated compounds at 99.7%. AP-42 does not give a default combustion efficiency for CH₄. However, in calculating CO₂ emissions from the flare, it was assumed conservatively that the combustion efficiency is 100%. When determining CH₄ emissions, then it is assumed that the combustion efficiency is 98%, in accordance with AP-42, Chapter 13.5, *Industrial Flares*, (9/91).

The total CO₂ emissions include emissions from the CO₂ component of the LFG and additional CO₂ formed during the combustion of the CH₄ and NMOC. CO₂ emissions from the LFG were calculated using EPA software LandGEM 3.02. CO₂ emissions from the combustion of CH₄ were calculated using equation (6) from AP-42, Chapter 2.4. CO₂ emissions from the combustion of NMOC were calculated assuming that the emissions are 1% of the total CO₂ emissions, in accordance with AP-42, Chapter 2.4.

The VOC emissions were calculated by assuming that all of NMOC are VOCs and applying the 75% capture and 99.2% flare efficiency. Controlled HAP emissions were calculated using uncontrolled HAP emissions from LandGEM 3.02 and applying a 75% capture and either a 99.2% device efficiency for HAP that are also VOCs or a 99.7% device efficiency for halogenated HAPs. PM₂.₅, PM₁₀, PM, NOₓ, SOₓ, and CO emissions were calculated using emission factors from AP-42, Chapter 2.4. The CO emissions are greater than the de minimis level and therefore, modeling was performed. Results from the modeling analysis are given in the section titled “Ambient Air Quality Impact Analysis”
The following table provides an emissions summary for this project. Existing actual emissions were taken from the installation's 2012 EIQ. For an existing minor source that is not a named installation, PSD review for GHG emissions is required if both the GHG mass emissions are greater than 250 tpy and the GHG CO$_2$e emissions are greater than 100,000 tpy. These do not include fugitive emissions. For this project, the total CO$_2$e emissions from the expansion area is 101,404.98 tpy, but the CO$_2$e emissions without fugitives is only 41,978.06 tpy. Therefore, PSD permitting for GHG is not required for this project.

### Table 2: Emissions Summary (tons per year)

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Regulatory De Minimis Levels</th>
<th>Installation PTE Before Expansion</th>
<th>Existing Actual Emissions (2012 EIQ)</th>
<th>$^1$PTE of the Expansion</th>
<th>Installation PTE After Expansion</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM</td>
<td>25.0</td>
<td>3.02</td>
<td>N/D</td>
<td>4.17</td>
<td>5.62</td>
</tr>
<tr>
<td>PM$_{10}$</td>
<td>15.0</td>
<td>3.02</td>
<td>10.59</td>
<td>4.17</td>
<td>5.62</td>
</tr>
<tr>
<td>PM$_{2.5}$</td>
<td>10.0</td>
<td>3.02</td>
<td>2.72</td>
<td>4.17</td>
<td>5.62</td>
</tr>
<tr>
<td>SOx</td>
<td>40.0</td>
<td>2.45</td>
<td>1.52</td>
<td>3.39</td>
<td>4.56</td>
</tr>
<tr>
<td>NOx</td>
<td>40.0</td>
<td>7.11</td>
<td>4.35</td>
<td>9.82</td>
<td>13.22</td>
</tr>
<tr>
<td>VOC</td>
<td>40.0</td>
<td>44.81</td>
<td>2.81</td>
<td>61.88</td>
<td>83.31</td>
</tr>
<tr>
<td>CO</td>
<td>100.0</td>
<td>133.34</td>
<td>81.57</td>
<td>184.18</td>
<td>247.81</td>
</tr>
<tr>
<td>H$_2$S</td>
<td>10.0</td>
<td>0.26</td>
<td>N/D</td>
<td>0.36</td>
<td>0.48</td>
</tr>
<tr>
<td>Total GHG (CO$_2$e)</td>
<td>$^2$100,000</td>
<td>73,394.81</td>
<td>N/D</td>
<td>$^3$101,404.98</td>
<td>136,515.0</td>
</tr>
<tr>
<td>GHG (CO$_2$e) Without Fugitives</td>
<td>$^2$100,000</td>
<td>30,378.87</td>
<td>N/D</td>
<td>$^3$41,978.06</td>
<td>56,504.8</td>
</tr>
<tr>
<td>Total GHG (mass)</td>
<td>$^2$250.0</td>
<td>34,161.82</td>
<td>N/D</td>
<td>47,206.98</td>
<td>63,541.0</td>
</tr>
<tr>
<td>GHG (Mass) Without Fugitives</td>
<td>$^2$250.0</td>
<td>28,158.29</td>
<td>N/D</td>
<td>38,910.24</td>
<td>52,374.5</td>
</tr>
<tr>
<td>HAPs</td>
<td>10.0/25.0</td>
<td>4.64</td>
<td>1.09</td>
<td>6.41</td>
<td>9.25</td>
</tr>
</tbody>
</table>

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

Note 1: PTE of the expansion includes only emissions from the area of expansion.

Note 2: PSD review required only if both the GHG (CO$_2$e) emissions are greater than 100,000 tpy and the GHG (Mass) emissions are greater than 250.0 tpy.

Note 3: Total GHG emissions are greater than 100,000 tpy but without fugitive emissions, the GHG emissions would be less than 100,000 tpy. Therefore, PSD review is not required.

### 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 VOC and CO are greater than their respective de minimis levels, but less than their major source levels. Potential Emissions of all other pollutants are less than their respective de minimis levels.
APPLICABLE REQUIREMENTS

Lemons 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. 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
  - Standards of Performance for Municipal Solid Waste Landfills, 40 CFR Part 60, Subpart WWW
- MACT Regulations, 10 CSR 10-6.075
- Restriction of Emission of Sulfur Compounds, 10 CSR 10-6.260

AMBIENT AIR QUALITY IMPACT ANALYSIS

Ambient air quality modeling was performed to determine the ambient impact of CO, which is emitted from the incomplete combustion of the flare. Table 3 below gives the parameters of the flare used in the modeling analysis. Modeling was performed using the EPA AERSCREEN Software. The flare heat release rate was calculated by multiplying the amount of CH₄ by its higher heating value. The radiative heat loss used is the default value recommended by AERSCREEN.

Table 3: Modeling Parameters

<table>
<thead>
<tr>
<th>Height (m)</th>
<th>Flare Heat Release Rate (Kcal/s)</th>
<th>Radiative Heat Loss Fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.96</td>
<td>5,307</td>
<td>0.55</td>
</tr>
</tbody>
</table>
For projects that require modeling, the equipment of the project is modeled first and compared to the insignificance level for that pollutant. If the results show that the impact from the project is greater than the insignificance level, then the equipment from the entire installation would be modeled and the results compared to the NAAQS. For this project, results show that the ambient impacts of CO would be less than the significance levels. Therefore, no installation-wide modeling is required.

Table 4: AAQIA Modeling Results (in µg/m³)

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Modeled Impact</th>
<th>Significance Level</th>
<th>Time Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>121.2</td>
<td>500</td>
<td>8-hour</td>
</tr>
<tr>
<td>CO</td>
<td>134.6</td>
<td>2,000</td>
<td>1-hour</td>
</tr>
</tbody>
</table>

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 with special conditions.

Chia-Wei Young
New Source Review Unit

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated June 1, 2012, received June 6, 2012, designating Lemons Sanitary Landfill as the owner and operator of the installation.

APPENDIX A

Abbreviations and Acronyms

% ............ percent
°F ............ 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
CO₂ .......... carbon dioxide
CO₂e ....... 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/m³ ...... 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
NOₓ .......... nitrogen oxides
NSPS ...... New Source Performance Standards
NSR ...... New Source Review
PM .......... particulate matter
PM₂·₅ ...... particulate matter less than 2.5 microns in aerodynamic diameter
PM₁₀ ...... 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
SOₓ .......... sulfur oxides
SO₂ .......... sulfur dioxide
tph .......... tons per hour
tpy .......... tons per year
VMT .......... vehicle miles traveled
VOC .......... Volatile Organic Compound
Mr. Tim Trost  
Vice President  
Lemons Sanitary Landfill  
1540 Landfill Road  
Desoto, IL 62924  

RE: New Source Review Permit - Project Number: 2012-06-017  

Dear Mr. Trost:  

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 Chia-Wei Young 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:cyl  

Enclosures  

PAMS File: 2012-06-017  

Permit Number: