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# NATURAL RESOURCES

Michael L. Parson, Governor

Carol S. Comer, Director

SEP 17 2018

Mr. Steve Courtney  
Kansas City Power & Light - St. Joseph Landfill Generating Station  
P.O. Box 418679  
Kansas City, MO 64141

RE: New Source Review Permit Amendment - Permit Number: 122010-016B  
Project Number: 2017-10-008; Installation Number: 021-0129

Dear Mr. Courtney:

On October 5, 2017, the Air Pollution Control Program received your letter requesting to amend Permit No. 122010-016 and its subsequent amendment 122010-016A. Enclosed with this letter is your amendment. The special conditions in this amendment supersede all special conditions in Permit No. 122010-016 and 122010-016A.

Two separate operations are located at this site. There is a landfill owned and operated by the City of St. Joseph (Installation ID 021-0105) and an electric generating station owned and operated by Kansas City Power & Light (KCPL) that uses the landfill gas (LFG) generated by the landfill (ID 021-0129). Both operations are considered part of the same installation for permitting purposes. In 2010, Permit No. 122010-016 was issued to KCPL for the installation of two caterpillar G3520C engines and an 1,300 scfm enclosed flare. In this permit, CO emissions were calculated to be higher than the major source level of 250 tpy. In order to keep the installation from being a major source, the permit limited CO emissions from the entire installation to less than 250 tpy. The only CO emission units permitted at the time were the two engines and the enclosed flare so these were the only equipment included in the 250 tpy CO limit. Modeling was also performed on CO since the emissions of the project were greater than 100 tpy de minimis level. In 2012, an amendment (No. 122010-016A) was issued for this permit to account for changes in the CO release parameters and the flow through the enclosed flare. This amendment also changed the CO, NO<sub>x</sub>, and VOC emission factors used for the engines to the NSPS standards instead of company specified values. This amendment restated the 250 tpy CO limit for the engines and the flare.

In 2015, a permit (No. 092015-011) was issued for the City of St. Joseph Landfill to include equipment installed between 1985 and 2011. The equipment included a wood hog grinder with engine, an air curtain burner with engine (which has been removed), a wood-fired space heater, and a waste tire processor with engine. All of these equipment emit CO, but were not included



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in the 250 tpy CO limit set in Permit No. 122010-016A. Therefore, the potential emissions of the entire installation became greater than 250 tpy and the installation became a major source. This request from your facility is to reinstate the 250 tpy CO limit for the entire installation so that the installation would be a minor source for construction permits.

During the review of this project, it was determined that a 250 tpy CO limit for the entire installation is no longer needed. KCPL only installed one of the two caterpillar G3520C engines. Under Air Pollution Control Program rules, the installation must begin construction or modification of permitted equipment within two years of the effective date of the permit. Since the installation did not construct one of the two caterpillar engines, it can no longer do so unless it applies for another construction permit. Therefore, the CO emissions of the installation should only include one (1) of the two (2) engines.

Furthermore, calculations performed for Permit No. 122010-016A showed that the installation is a major source for HAP. The toluene emissions were calculated to be 11.0 tpy, which is higher than the individual HAP major source level of 10.0 tpy. However, for Permit No. 122010-016A, the toluene emissions were calculated from mass balances using concentration data from landfill with co-disposal, taken from the 1998 version of AP-42, Section 2.4. The 2008 version of AP-42, Section 2.4, updated the emission factors based on when most of the waste is placed in a given landfill. For landfill with majority of wastes placed after 1992, the new version of AP-42 does not make a distinction in toluene concentration between co-disposal and no co-disposal landfills. Instead, only one concentration is given. The landfill submitted data showing that a majority of the wastes were placed after 1992. Therefore, the new data was used to calculate emissions and the new PTE of toluene were calculated to be below its major source level.

In Permit 122010-016A, the project was limited to less than 40 tpy of nitrogen oxides (NO<sub>x</sub>). This limit is not being eliminated. However, this limit originally applied to two engines and the enclosed flare. It is modified in this amendment to only include the one engine that was constructed and the enclosed flare. Table 1 below lists the new emissions from the KCPL project as well as from the St. Joseph Landfill.

**Table 1: Emissions Summary (tpy)**

Pollutant	Regulatory <i>De Minimis</i> Levels	PTE of KCPL Engine and Flare	Conditioned PTE of KCPL Engine and Flare	Fugitive PTE from the Landfill Without KCPL	Fugitive PTE from Landfill With KCPL	PTE of Miscellaneous Equipment from St. Joseph Landfill	Total Potential Emissions of the Entire Installation
PM	25.0	1.09	1.09	93.57	93.57	11.67	106.33
PM <sub>10</sub>	15.0	5.38	5.38	27.43	27.43	11.70	44.51
PM <sub>2.5</sub>	10.0	5.38	5.38	2.74	2.74	11.68	19.80
SO <sub>x</sub>	40.0	4.81	4.81	N/A	N/A	0.47	5.28
NO <sub>x</sub>	40.0	75.96	<40.0	N/A	N/A	22.62	62.62

VOC	40.0	22.54	22.54	43.26	5.16	2.69	45.95
NMOC	N/A	0.98	0.98	43.39	13.23	N/A	46.08
CO	100.0	125.85	125.85	N/A	N/A	29.38	155.23
GHG (mass)	N/A	82,428.68	82,428.68	45,126.9	3,141.22	1,065.70	86,635.60
GHG (CO <sub>2</sub> e)	N/A	91,035.72	91,035.72	334,444.5	23,278.48	1,071.21	335,515.71
<sup>1</sup> Toluene	10.0	0.12	0.12	4.39	1.25	0.06	4.45
Total HAPs	10.0/25.0	5.32	5.32	11.32	4.44	0.24	11.56

Note 1: Toluene is listed here individually because it is the HAP with the maximum individual potential emissions. Although total HAP is greater than 10 tpy, there is no individual HAP greater than the major source level of 10.0 tpy.

Permit No. 122010-016A allowed the construction of the LFG flare and engine, but did not require that all of the LFG from the landfill be diverted to the engines or the flare. The two equipment is used on a voluntary basis. Therefore, emissions were calculated under two separate scenarios. The first scenario assumes that there is no engine or flare. The second scenario assumes that the engine and flare are in operation. The highest values between the scenarios were used as the PTE of the entire installation for each pollutant.

### Scenario 1: No Engine or Flare

With no LFG flare and engine, there will be particulate emissions from hauling and vehicular activities and VOC, HAPs, NMOC, CO<sub>2</sub>, and CH<sub>4</sub> from the landfill surfaces. There will also be emissions from the miscellaneous equipment operated by the landfill including the wood hog grinder, a wood furnace, and a waste tire processor.

PM<sub>2.5</sub>, PM<sub>10</sub>, and PM from hauling and vehicular activities were calculated using equations in AP-42, Chapter 13.2.2, *Unpaved Roads*, (11.06). For VOC, HAPs, and NMOC, emission were calculated from mass balances using the VOC, HAPs, and NMOC content listed in AP-42, Chapter 2.4. CO<sub>2</sub> and CH<sub>4</sub> emissions were calculated using mass balances assuming that 50% of the LFG is CO<sub>2</sub> and the remaining percentage is CH<sub>4</sub>. GHG-mass emissions were calculated by summing the CO<sub>2</sub> and CH<sub>4</sub> emissions. GHG-CO<sub>2</sub>e emissions were calculated by multiplying the CO<sub>2</sub> and CH<sub>4</sub> by their respective Global Warming Potentials and summing the results.

For the miscellaneous equipment, emissions include PM<sub>2.5</sub>, PM<sub>10</sub>, PM, SO<sub>x</sub>, NO<sub>x</sub>, VOC, CO, GHG-CO<sub>2</sub>e, GHG-Mass, and HAP. The emissions from the wood hog grinder (EP10), the wood furnace (EP11), and the waste tire processor (EP12) were calculated using emission factors found in the web version of the Factor Information Retrieval System (WebFire). These were the same emission factors used for Permit No. 092015-011. Permit No. 092015-011 includes an air curtain burner, but this equipment was removed from the site and its emissions are not included.

There are two storage tanks at the site that have never been permitted. VOC and HAP emissions from the on-site fuel storage tanks were calculated using TANKs 4.09d. The fuel loading losses were calculated using emission factors obtained from the equation in AP-42, Chapter 5.2, Transportation and Marketing of Petroleum Liquids, 6/2008.

**Scenario 2: With Engine and Flare**

With the operation of the engine and flare, there will be emissions of the following sources, some of which are also included in Scenario 1.

- Combustion emissions from the KCP&L engine and the flare.
- HAPs, NMOC, VOC, and GHG emissions from the landfill sent to the engine and flare but not destroyed by these equipment.
- Fugitive NMOC, HAPs, VOC, and GHG emissions from the landfill not captured by the engine or the flare.
- Pollutants (i.e. HCl and SO<sub>2</sub>) created during the combustion of the KCP&L engine and flare.
- Particulate emissions from hauling activities of the landfill.
- Combustion and process emissions from the landfill’s miscellaneous equipment.
- Emissions from storage tanks.

Particulate emissions from hauling activities were calculated using equations in AP-42, Chapter 13.2.2, *Unpaved Roads*, (11.06).

Table 2 below lists the sources of the emission factors used to calculate emissions from the LFG engine and flare.

**Table 2: Emission Factor Sources for KCPL**

<b>From the LFG Engine</b>	
<b>Pollutant</b>	<b>Source</b>
PM <sub>2.5</sub> , PM <sub>10</sub> , and PM	AP-42, Chapter 2.4, (10/2008)
NO <sub>x</sub> , VOC, and CO	NSPS Subpart JJJJ Limits
SO <sub>x</sub>	Mass balance with sulfur concentration listed in AP-42, Chapter 2.4, (10/2008)
NMOC	Mass balance using NMOC concentration listed from site-specific testing
HAPs	Mass balances using individual HAP concentration listed in AP-42, Chapter 2.4, (10/2008)
GHG (CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O)	40 CFR 98 Table C-1 and C-2
<b>From the Enclosed Flare</b>	

PM <sub>2.5</sub> , PM <sub>10</sub> , and PM	AP-42, Chapter 2.4, (10/2008)
NO <sub>x</sub>	AP-42, Chapter 2.4, (10/2008)
VOC	Mass balance using VOC content in NMOC as listed in AP-42, Chapter 2.4, (10/2008)
NMOC	Mass balance using NMOC concentration listed from site-specific testing
HAPs	Mass balances using individual HAP concentration listed in AP-42, Chapter 2.4, (10/2008)
GHG (CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O)	40 CFR 98 Table C-1 and C-2

For calculating the HAP emissions, since the landfill has majority of its wastes from the period after 1992, the concentrations used in the calculations are the values in AP-42 for after 1992.

The control efficiency for the flare was assumed to be 97.7% while the control efficiency of the LFG engine was assumed to be 97.2%. These values were taken from AP-42, Chapter 2.4, *Municipal Solid Waste Landfills (Draft Section)*, Table 2.4-3, (10/08). The total HAPs emissions were recalculated by adding the individual HAPs emissions.

NMOC, VOC, HAPs from the landfill that were not captured by the flare or engine were calculated from mass balances using the concentrations listed in AP-42, Chapter 2.4 (10/2008) and assuming a 75% capture efficiency, as suggested in the same chapter of AP-42. GHG emissions not captured by the flare or engines were calculated assuming that 50% of the LFG is CO<sub>2</sub> and the remaining percentage being CH<sub>4</sub> and that 75% is captured. GHG-mass emissions were calculated by summing the CO<sub>2</sub> and CH<sub>4</sub> emissions. GHG-CO<sub>2</sub>e emissions were calculated by multiplying the CO<sub>2</sub> and CH<sub>4</sub> by their respective Global Warming Potentials and summing the results.

For the miscellaneous equipment, emissions were calculated using the same method described above in Scenario 1. For pollutants generated during the combustion process (i.e. HCl and SO<sub>2</sub>), emissions were calculated using the mass balance equations found in AP-42, Chapter 2.4 (10/2008).

The special conditions of this amendment replace all special conditions of Permit No. 122010-016A. 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,

Mr. Steve Courtney  
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whose contact information is: Administrative Hearing Commission, United States Post Office Building, 131 West High Street, Third Floor, P.O. Box 1557, Jefferson City, Missouri 65102, phone: 573-751-2422, fax: 573-751-5018, website: [www.ao.mo.gov/ahc](http://www.ao.mo.gov/ahc).

If you have any questions regarding this amendment, please do not hesitate to contact Chia-Wei Young, at the department's Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or at (573) 751-4817. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM



Kendall B. Hale  
Permits Section Chief

KBH:cj

Enclosures

c: Kansas City Regional Office  
PAMS File: 2017-10-008

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**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."*

Kansas City Power & Light - St. Joseph Landfill Generating Station  
Buchanan County, S13, T56N, R35W

1. **Superseding Condition**  
The conditions of this permit supersede all of the special conditions found in the previously issued construction permit 122010-016 and 122010-016A issued by the Air Pollution Control Program.
2. **Emission Limit – Nitrogen Oxides**
  - A. KCP&L Greater Missouri Operations Company – St. Joseph Landfill Generating Station shall emit less than 40.0 tons of nitrogen oxides (NO<sub>x</sub>) in any consecutive 12-month period from the 2,200 scfm enclosed flare (EP-8) and Engine 1 (EP-09A).
  - B. Attachment A, or equivalent forms, such as electronic forms, shall be used to demonstrate compliance with Special Condition 2.A. The equivalent forms shall use the same data (i.e. emission factors, throughputs, etc.) as included in Attachment A.
3. **Record Keeping and Reporting Requirements**
  - A. KCP&L Greater Missouri Operations Company – St. Joseph Landfill Generating Station 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. KCP&L Greater Missouri Operations Company – St. Joseph Landfill Generating Station shall report to the Air Pollution Control Program's Compliance/Enforcement Section, by mail at P.O. Box 176, Jefferson City, MO 65102 or by email at [AirComplianceReporting@dnr.mo.gov](mailto:AirComplianceReporting@dnr.mo.gov), no later than 10 days after the end of the month during which any record required by this permit shows an exceedance of a limitation imposed by this permit.

## Attachment A – Monthly NO<sub>x</sub> Compliance Worksheet

KCP&L Greater Missouri Operations Company - St. Joseph Landfill Generating Station  
 Buchanan County, S13, T56N, R35W  
 Project Number: 2017-10-008  
 Installation ID Number: 021-0105  
 Permit Number: 122010-016B

This sheet covers the period from \_\_\_\_\_ to \_\_\_\_\_. (Copy this sheet as needed.)  
(month, year) (month, year)

A	B	C	D	E
Month, Year	Emission Unit, Description	Operation (hours/month)	Emission Factor (lb NO <sub>x</sub> /hour)	NO <sub>x</sub> Emissions (lbs)
<i>example</i>	EP-9A Engine 1	600	2.82	1692.00
		Methane Flow Rate (MMscf / month)	Emission Factor (lb NO <sub>x</sub> / MMscf methane)	
	EP-8 Enclosed Flare	2.06	40	82.40
	SUM			<i>Example 1,774.40</i>
	EP-9A Engine 1			
	EP-8 Enclosed Flare		40	
SUM				
	EP-9A Engine 1			
	EP-8 Enclosed Flare		40	
SUM				
	EP-9A Engine 1			
	EP-8 Enclosed Flare		40	
SUM				
	EP-9A Engine 1			
	EP-8 Enclosed Flare		40	
SUM				

- A. Record the current month and year.
- B. Emission unit and description.
- C. Record each unit's hours of operation or methane flow rate for the current month, respectively.
- D. NO<sub>x</sub> emission factors. Record the highest, 3-run average, most recent value from performance testing for the engines.
- E. Calculate each unit's NO<sub>x</sub> emissions. E = C x D. Sum the individual NO<sub>x</sub> emissions for the current month, for use in Attachment B.

