Lane Regional Air Protection Agency

STANDARD AIR CONTAMINANT DISCHARGE PERMIT REVIEW REPORT

Emerald People's Utility District
Short Mountain Landfill Project
84777 Dillard Access Road
Eugene, Oregon 97405

Unassigned emissions	
Emission credits	
Source test	X
COMS	
CEMS	
Compliance schedule	
Special conditions	
Annual report	X
Semi-annual report	X
Quarterly report	

Monthly report	
Excess emissions report	
NSPS	X
NESHAP	X
NSR	
PSD	
RACT	
FCE	
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REASONS FOR PERMIT ACTION

1. The permit is a renewal for an existing Air Contaminant Discharge Permit (ACDP) which was issued on November 24, 2009 and was originally scheduled to expire on April 26, 2011.

OTHER PERMITS

2. Although no other permits are issued or required by LRAPA for this facility, the facility functions as the control device for gaseous emission from Lane County's Short Mountain Landfill. Lane County has a Title V operating permit (Permit No. 204740) with conditions and requirements for controlling landfill gas (LFG). EPUD has a contract with Lane County which predates Lane County's Title V permit. Under the terms of the contract, EPUD is responsible for installation, maintenance, and monitoring of the LFG collection system as well as the operation and maintenance of LFG internal combustion engines. Lane County is responsible for complying with all conditions of their Title V permit, however EPUD is also responsible to Lane County to carry out many of the requirements the Title V permit. EPUD reports information to Lane County required to be reported to LRAPA by conditions in Lane County's Title V permit.

ATTAINMENT STATUS

3. The facility is located in an attainment area for particulate matter ($PM_{2.5}$ and PM_{10}), carbon monoxide (CO), ozone (O_3), nitrogen oxides (NO_x), sulfur dioxide (SO_2), and lead (Pb).

4. The facility is not located within 10 kilometers of a Class I Air Quality Protection Area.

FACILITY DESCRIPTION

OVERVIEW

5. Emerald People's Utility District (EPUD) owns and operates an electrical generation facility located at 84777 Dillard Access Road in Eugene, Oregon.

   On September 26, 1989, EPUD applied to LRAPA for an ACDP for a proposed electrical generation facility to be located at Short Mountain Landfill near Goshen, Oregon. The project entails landfill-gas-to-electricity conversion through the use of internal combustion engines turning 820 kw generators.

   The Short Mountain Landfill Project uses naturally-occurring methane produced in the landfill to generate electricity. The methane is captured by a series of vertical wells drilled into the landfill and a horizontal collection system installed as the land fill fills up that are connected to a common header pipe. The header pipe delivers the landfill gas to the generation plant where it is cleaned and injected directly into the internal combustion engines. The engines burn the landfill gas to create electricity which is delivered directly to EPUD's grid.

   The first two engines, emission units 3RC 374 and 3RC 375, were installed in May of 1991, and on-line February 1992. The second set of engines, emission units 4EK 30 and 4EK 29, were added to the facility in March of 1993, and on-line November 1993. Previous plans to install up to 7 engines have been deferred due to lower than anticipated gas production by the landfill. Installation of a 5th engine, which would trigger Title V requirements for EPUD, has been indefinitely postponed.

This facility underwent a review according to LRAPA Title 38 regulations for Prevention of Significant Deterioration (PSD) and a BACT determination was prepared for the first 4 engines. The PSD action was completed in 1993 because the facility requested PSELs greater than the SER for NO_x and CO.

6. No changes have been made to the facility since the last permit renewal.

PROCESS AND CONTROL DEVICES

7. Existing air contaminant sources at the facility consist of the following:

Four (4) internal combustion engines running on captured landfill gas, with no additional emission controls. The first two engines were installed in May 1991 and the next two were installed in March 1993. The emissions unit IDs and engine ratings are as follows:

Emissions Unit ID	Description	Date Installed
3RC 374	Caterpillar 3516 4-stroke lean burn internal combustion engine operating at an engine load of 1,144 bhp and generating 820 kWh.	May 1991
3RC 375	Caterpillar 3516 4-stroke lean burn internal combustion engine operating at an engine load of 1,144 bhp and generating 820 kWh.	May 1991
4EK 30	Caterpillar 3516 4-stroke lean burn internal combustion engine operating at an engine load of 1,144 bhp and generating 820 kWh.	March 1993
4EK 29	Caterpillar 3516 4-stroke lean burn internal combustion engine operating at an engine load of 1,144 bhp and generating 820 kWh.	March 1993
LFG C and H	Landfill gas collection and handling system. Collection system is continually updated as new cells are filled and old cells are permanently capped.	Continuous

COMPLIANCE

8. During the last two permit terms, the facility was inspected and found to be in compliance with permit conditions on the following dates:

7/26/2006 9/27/2005 5/30/2003

9. During the prior permit period there were no, complaints recorded for this facility.

10. No enforcement actions have been taken against this facility since the last permit renewal.

SPECIAL CONDITIONS

11. The PSEL includes ACDP limits the facility to the maximum quantity of gas that can be combusted in the 4 engines to ensure PSEL compliance.

12. The permit incorporates elements of the landfill NSPS (40 CFR 60, Subpart Cc) applicable to EPUD. The basis for including these in EPUD's ACDP is that they represent typically achievable control technology (TACT) and they duplicate requirements in the Title V permit being issued to Lane County's Short Mountain Landfill. Elements of the NSPS over which Lane County has limited control due to EPUD's ownership of the collection and treatment system(s) are added to this ACDP.

13. The permit also incorporates recordkeeping and reporting requirements of the Landfill NSPSs Subpart Cc and WWW into this ACDP. The required records are added to document the implementation of the TACT measures required by the permit.

EMISSIONS

14. Proposed PSEL information:

Pollutant	Baseline Emission Rate (tons/yr)	Netting Basis		Plant Site Emission Limits (PSEL)		
		Previous (tons/yr)	Proposed (tons/yr)	Previous PSEL (tons/yr)	Proposed PSEL (tons/yr)	PSEL Increase (tons/yr)
PM	0	NA	NA	4.4	24	19.6
PM_{10}	0	NA	NA	4.4	14	9.6
$PM_{2.5}$	0	NA	NA	0	9	9
SO_2	0	NA	NA	2.6	39	36.4
NO_x	0	88.4	88.4	88.4	88	0
CO	0	88.4	88.4	88.4	88	0
VOC	0	NA	NA	26.4	39	12.6

a. The ACDP limits the permittee to the maximum quantity of gas that can be combusted in the 4 engines.

b. In accordance with LRAPA Title 42 the Plant Site Emission Limits (PSELs) in the permit will be set at the Generic PSEL level. Since the last permit renewal LRAPA adopted temporary $PM_{2.5}$ rules and hence the $PM_{2.5}$ Generic PSEL is added. This facility does not need a $PM_{2.5}$ baseline to meet the 9 ton/year $PM_{2.5}$ Generic PSEL and hence the baseline and/or netting basis will be evaluated at the next permit modification.

c. For detailed emission calculations see attachment to this review report.

d. The PSEL is a federally enforceable limit on the potential to emit.

SIGNIFICANT EMISSION RATE (SER) ANALYSIS

15. For each pollutant, the proposed PSEL is less than the Netting Basis plus the significant emission rate, thus no further air quality analysis is required.

16. An analysis of the proposed PSEL increases over the Netting Basis is shown in the following table.

Pollutant	SER	Requested increase over previous netting basis	Increase due to utilizing capacity that existed in the baseline period	Increase due to physical changes or changes in the method of operation
PM	25	24	NA	NA
PM_{10}	15	14	NA	NA
$PM_{2.5}$	10	9	NA	NA
SO_2	40	39	NA	NA
NO_x	40	0	NA	NA
CO	100	0	NA	NA
VOC	40	39	NA	NA

PREVENTION OF SIGNIFICANT DETERIORATION (PSD) ANALYSIS

17. During the calendar year 1989, EPUD proposed the phased construction of 7 landfill gas combustion engines. The installation of the first 4 engines was subject to PSD review for NO_x. In addition to the NO_x review the CO emissions were also reviewed by LRAPA. The interdependent relationship between the emissions of NO_x and CO was the basis for the CO review.

Review of BACT Determination

18. The BACT analysis performed in 1993 involved identifying all available control technologies, eliminating technically infeasible options, and evaluating the remaining options based on control effectiveness, energy use, environmental impacts (waste disposal), and economic impacts (including cost per ton of pollutant captured). This process accommodates consideration of possible control trade-offs such as when a technology removes air pollutants but causes pollution in another medium like water or solid waste. BACT determinations are done on a case-by-case basis to consider any unique conditions at a given facility.

19. BACT analysis/review results in an emission limit based on application of available feasible control technology. All add-on control systems were considered too expensive. The BACT determination for the 4 engines requires engine maintenance and tuning in accordance with manufacturer's recommendations as BACT for NO_x and CO for these engines.

20. In accordance with manufacturer's specifications, the NO_x emissions limit was set using an emission rate of 5.0 (lbs/hour)/unit based on an 820 kW unit. In addition to a NO_x limit, a CO limit using an emission rate of 5.0 (lbs/hour)/unit based on an 820 kW unit has also been set.

Modeling Review

21. As required, EPUD submitted an ambient air impact model for NO_x and CO. LRAPA reviewed this submittal and concluded that neither air quality standards nor PSD increments for these pollutants would be exceeded.

Pollutant	LRAPA 38-020(5)(B) Concentration	Model Results
NO_x	Annual average 14 µg/m^3	Annual average 13 µg/m^3
CO	8-hour average 575 µg/m^3	8-hour average 174.8 µg/m^3

MAJOR SOURCE APPLICABILITY

CRITERIA POLLUTANTS

22. A major source is a facility that has the potential to emit (PTE) more than 100 tons per year of any criteria pollutant. Although the facility has the capacity to emit above the Title V major source threshold levels for CO and NO_x, the permittee has elected not to obtain an LRAPA Title V Operating Permit by requesting a PSEL below the major source threshold levels. The PSEL is a federally enforceable limit on PTE.

HAZARDOUS AIR POLLUTANTS

23. A major source is a facility that has the potential to emit more than 10 tons/year of any single HAP or 25 tons/year of combined HAPs. This facility is not a major source of hazardous air pollutants. Some HAPs are formed by the combustion of landfill gas. Projected HAP totals for the facility are 7.2 tons/year for total HAPs and 3.2 tons/year maximum single HAP (Acetaldehyde). These emissions are accounted for in the VOC emissions PSEL.

ADDITIONAL REQUIREMENTS

NEW SOURCE PERFORMANCE STANDARD (NSPS) APPLICABILITY

24. 40 CFR Part 60, Subpart Cc Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills and 40 CFR Part 60, Subpart WWW Standards of Performance for Municipal Solid Waste Landfills are not applicable to the source however the gas combusted by this source is generated by a landfill that is subject to NSPS requirements. Monitoring requirements have been added to this ACDP to demonstrate compliance with the landfill NSPS requirements.

25. 40 CFR Part 60, Subpart JJJJ Standards of Performance for Stationary Spark Ignition Internal Combustion Engines is not applicable to the source because the engines were built before the compliance date July 1, 2008.

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPS) APPLICABILITY

26. The facility will be an area source of HAPs and will be subject to the area source National Emission Standard for HAPs for spark ignition reciprocating internal combustion engines (SI-RICE). The facility's compliance date for meeting the requirements of the NESHAP is October 19, 2013 [40 CFR 63.6595(a)(1)].

TYPICALLY ACHIEVABLE CONTROL TECHNOLOGY (TACT) APPLICABILITY

27. The facility is meeting the TACT/Highest and Best Rules by conducting the following activities:

a. Incorporation of elements of the landfill NSPS (40 CFR 60, Subpart Cc) applicable to EPUD. The basis for including these in EPUD's ACDP is that they represent typically achievable control technology (TACT) and they duplicate requirements in the Title V permit being issued to Lane County's Short Mountain Landfill. Elements of the NSPS over which Lane County has limited control due to EPUD's ownership of the collection and treatment system(s) are added to this ACDP.

b. Condition 7.1 incorporate recordkeeping requirements of the NSPS into this ACDP. The required records are added to document the implementation of the TACT measures required in Conditions 2.3, 4.2, and 5.1.

c. Condition 8.1 are reporting requirements included in the NSPS. These requirements are added to this ACDP to provide standardized reporting of the documentation of TACT measures contained in Conditions 2.3, 4.2, and 5.1.

SOURCE TESTING

PROPOSED TESTING

28. This section is provided so that the facility and LRAPA will know what test methods should be used to measure pollutant emissions in the event that testing is conducted for any reason. This section does not by itself require the facility to conduct any more testing than was previously included in the permit. Although the permit may not require testing because other routine monitoring is used to determine compliance, LRAPA and EPA always have the authority to require testing if deemed necessary to determine compliance with an emission limit or standard. In addition, the facility may elect to voluntarily conduct testing to confirm the compliance status. In either case, the methods to be used for testing in the event that testing is conducted are included in the permit. This is true for SIP as well as NSPS emission limits and standards.

PUBLIC NOTICE

29. The draft permit was on public notice from October 27, 2011 to November 30, 2011. No written comments were submitted during the 35-day comment period.

MTL:cmw
12/1/2011

PLANT SITE EMISSIONS DETAIL SHEET

Corrected (1996) Baseline - Calendar Year 1978

Pollutant: Particulate, VOC, SO_2

Emission Unit/Point		Operating Parameter, Rate	Emission Factor		Emissions	
			Emission Factor	Reference	lbs/day	tons/year
3RC 374	PM	LFG Combusted, 0.0 CF/yr	13.6 lb/mmCF	Caterpillar EF	0.0	0.0
	PM_{10}	LFG Combusted, 0.0 CF/yr	13.6 lb/mmCF	Caterpillar EF	0.0	0.0
	$PM_{2.5}$	LFG Combusted, 0.0 CF/yr	13.6 lb/mmCF	Caterpillar EF	0.0	0.0
	VOC	LFG Combusted, 0.0 CF/yr	81.9 lb/mmCF	Caterpillar EF	0.0	0.0
	SO_2	LFG Combusted, 0.0 CF/yr	8.1 lb/mmCF	SML Modeling	0.0	0.0
3RC 375	PM	LFG Combusted, 0.0 CF/yr	13.6 lb/mmCF	Caterpillar EF	0.0	0.0
	PM_{10}	LFG Combusted, 0.0 CF/yr	13.6 lb/mmCF	Caterpillar EF	0.0	0.0
	$PM_{2.5}$	LFG Combusted, 0.0 CF/yr	13.6 lb/mmCF	Caterpillar EF	0.0	0.0
	VOC	LFG Combusted, 0.0 CF/yr	81.9 lb/mmCF	Caterpillar EF	0.0	0.0
	SO_2	LFG Combusted, 0.0 CF/yr	8.1 lb/mmCF	SML Modeling	0.0	0.0
4EK 30	PM	LFG Combusted, 0.0 CF/yr	13.6 lb/mmCF	Caterpillar EF	0.0	0.0
	PM_{10}	LFG Combusted, 0.0 CF/yr	13.6 lb/mmCF	Caterpillar EF	0.0	0.0
	$PM_{2.5}$	LFG Combusted, 0.0 CF/yr	13.6 lb/mmCF	Caterpillar EF	0.0	0.0
	VOC	LFG Combusted, 0.0 CF/yr	81.9 lb/mmCF	Caterpillar EF	0.0	0.0
	SO_2	LFG Combusted, 0.0 CF/yr	8.1 lb/mmCF	SML Modeling	0.0	0.0
4EK 29	PM	LFG Combusted, 0.0 CF/yr	13.6 lb/mmCF	Caterpillar EF	0.0	0.0
	PM_{10}	LFG Combusted, 0.0 CF/yr	13.6 lb/mmCF	Caterpillar EF	0.0	0.0
	$PM_{2.5}$	LFG Combusted, 0.0 CF/yr	13.6 lb/mmCF	Caterpillar EF	0.0	0.0
	VOC	LFG Combusted, 0.0 CF/yr	81.9 lb/mmCF	Caterpillar EF	0.0	0.0
	SO_2	LFG Combusted, 0.0 CF/yr	8.1 lb/mmCF	SML Modeling	0.0	0.0
				TOTAL	0.0	0.0

PLANT SITE EMISSIONS DETAIL SHEET

Corrected (1996) **Adjusted** Baseline - Calendar Year 1993

Pollutant: NO_x, CO

Emission Unit/Point		Operating Parameter	Emission Factor		Emissions	
			Emission Factor	Reference	lbs/day	tons/year
3RC 374	CO	18,431 CF/hr (8,760 hr/yr)	273.5 lb/mmCF	Caterpillar EF	121 lbs/day	22.1
	NO_x	18,431 CF/hr (8,760 hr/yr)	273.5 lb/mmCF	Caterpillar EF	121 lbs/day	22.1
3RC 375	CO	18,431 CF/hr (8,760 hr/yr)	273.5 lb/mmCF	Caterpillar EF	121 lbs/day	22.1
	NO_x	18,431 CF/hr (8,760 hr/yr)	273.5 lb/mmCF	Caterpillar EF	121 lbs/day	22.1
4EK 30	CO	18,431 CF/hr (8,760 hr/yr)	273.5 lb/mmCF	Caterpillar EF	121 lbs/day	22.1
	NO_x	18,431 CF/hr (8,760 hr/yr)	273.5 lb/mmCF	Caterpillar EF	121 lbs/day	22.1
4EK 29	CO	18,431 CF/hr (8,760 hr/yr)	273.5 lb/mmCF	Caterpillar EF	121 lbs/day	22.1
	NO_x	18,431 CF/hr (8,760 hr/yr)	273.5 lb/mmCF	Caterpillar EF	121 lbs/day	22.1

PLANT SITE EMISSIONS DETAIL SHEET

Projected Emissions

Pollutant: Particulate, VOC, SO_2

Emission Unit/Point		Operating Parameter, Rate	Emission Factor		Emissions	
			Emission Factor	Reference	lbs/day	tons/year
3RC 374	PM	LFG Combusted, 18,431 CF/hr	13.6 lb/mmCF	Caterpillar EF	6.0	1.1
	PM_{10}	LFG Combusted, 18,431 CF/hr	13.6 lb/mmCF	Caterpillar EF	6.0	1.1
	$PM_{2.5}$	LFG Combusted, 18,431 CF/hr	13.6 lb/mmCF	Caterpillar EF	6.0	1.1
	VOC	LFG Combusted, 18,431 CF/hr	81.9 lb/mmCF	Caterpillar EF	36.2	6.6
	SO_2	LFG Combusted, 18,431 CF/hr	8.1 lb/mmCF	SML Modeling	3.5	0.6
3RC 375	PM	LFG Combusted, 18,431 CF/hr	13.6 lb/mmCF	Caterpillar EF	6.0	1.1
	PM_{10}	LFG Combusted, 18,431 CF/hr	13.6 lb/mmCF	Caterpillar EF	6.0	1.1
	$PM_{2.5}$	LFG Combusted, 18,431 CF/hr	13.6 lb/mmCF	Caterpillar EF	6.0	1.1
	VOC	LFG Combusted, 18,431 CF/hr	81.9 lb/mmCF	Caterpillar EF	36.2	6.6
	SO_2	LFG Combusted, 18,431 CF/hr	8.1 lb/mmCF	SML Modeling	3.5	0.6
4EK 30	PM	LFG Combusted, 18,431 CF/hr	13.6 lb/mmCF	Caterpillar EF	6.0	1.1
	PM_{10}	LFG Combusted, 18,431 CF/hr	13.6 lb/mmCF	Caterpillar EF	6.0	1.1
	$PM_{2.5}$	LFG Combusted, 18,431 CF/hr	13.6 lb/mmCF	Caterpillar EF	6.0	1.1
	VOC	LFG Combusted, 18,431 CF/hr	81.9 lb/mmCF	Caterpillar EF	36.2	6.6
	SO_2	LFG Combusted, 18,431 CF/hr	8.1 lb/mmCF	SML Modeling	3.5	0.6
4EK 29	PM	LFG Combusted, 18,431 CF/hr	13.6 lb/mmCF	Caterpillar EF	6.0	1.1
	PM_{10}	LFG Combusted, 18,431 CF/hr	13.6 lb/mmCF	Caterpillar EF	6.0	1.1
	$PM_{2.5}$	LFG Combusted, 18,431 CF/hr	13.6 lb/mmCF	Caterpillar EF	6.0	1.1
	VOC	LFG Combusted, 18,431 CF/hr	81.9 lb/mmCF	Caterpillar EF	36.2	6.6
	SO_2	LFG Combusted, 18,431 CF/hr	8.1 lb/mmCF	SML Modeling	3.5	0.6
				TOTAL PM	24.0	4.4
				PM_{10}	24.0	4.4
				$PM_{2.5}$	24.0	4.4
				VOC	144.8	26.4
				SO_2	14.1	2.6

PLANT SITE EMISSIONS DETAIL SHEET

Projected Emissions

Pollutant: NO_x, CO

Emission Unit/Point		Operating Parameter, Rate	Emission Factor		Emissions	
			Emission Factor	Reference	lbs/day	tons/year
3RC 374	CO	LFG Combusted, 18,431 CF/hr	273.5 lb/mmCF	Caterpillar EF	121 lbs/day	22.1
	NO_x	LFG Combusted, 18,431 CF/hr	273.5 lb/mmCF	Caterpillar EF	121 lbs/day	22.1
3RC 375	CO	LFG Combusted, 18,431 CF/hr	273.5 lb/mmCF	Caterpillar EF	121 lbs/day	22.1
	NO_x	LFG Combusted, 18,431 CF/hr	273.5 lb/mmCF	Caterpillar EF	121 lbs/day	22.1
4EK 30	CO	LFG Combusted, 18,431 CF/hr	273.5 lb/mmCF	Caterpillar EF	121 lbs/day	22.1
	NO_x	LFG Combusted, 18,431 CF/hr	273.5 lb/mmCF	Caterpillar EF	121 lbs/day	22.1
4EK 29	CO	LFG Combusted, 18,431 CF/hr	273.5 lb/mmCF	Caterpillar EF	121 lbs/day	22.1
	NO_x	LFG Combusted, 18,431 CF/hr	273.5 lb/mmCF	Caterpillar EF	121 lbs/day	22.1

From Short Mountain Landfill modeling, reduced sulfur compounds would be expected at the following concentrations:

Compound	Concentration (ppmv)	Number of Sulfur Atoms
CS_2	0.58	2
COS	0.49	1
Dimethyl Sulfide	7.82	1
Ethyl Mercaptan	1.25	1
H_2S	35.50	1
Methyl Mercaptan	2.49	1
Total Sulfur	48.7	

Total Gas Fired / Day = 1,769,376 ft^3/day

$$Daily\ Sulfur\ Volume = \left(\frac{48.7\ ft^3\ 'S'}{1{,}000{,}000 ft^3}\right)\left(1{,}769{,}376\ \frac{ft^3}{day}\right) = 86.2\ \frac{ft^3\ 'S'}{day}$$

$$Daily\ Sulfur\ Mass = \frac{PVM_w}{RT} = \frac{1\ atm\left(86.2\ \frac{ft^3\ 'S'}{day}\right)\left(32\frac{lb}{lb\ mole}\right)}{\left(0.7302\frac{atm\ ft^3}{lb\ mole\ \cdot R}\right)(77°F + 459)°R} = 7.05\ \frac{lb\ 'S'}{day}$$

$$Daily\ Sulfur\ Mass\ as\ SO_2 = 7.05\ \frac{lb\ 'S'}{day}\left(\frac{64\ lb\ SO_2}{32\ lb\ S}\right) = 14.1\frac{lb\ \ SO_2}{day}$$

$$Hourly\ Sulfur\ Mass\ as\ SO_2\ for\ all\ engines = \frac{14.1\ lb\ SO_2}{24\ hrs} = 0.6\ \frac{lb\ SO_2}{hr}$$

$$Hourly\ Sulfur\ Mass\ as\ SO_2\ for\ each\ engine = 0.6\ \frac{lb\ SO_2}{hr} \div 4 = 0.15\frac{lb\ SO_2}{hr}$$

$$Annual\ Sulfur\ Mass\ as\ SO_2\ for\ all\ engines = 0.6\ \frac{lb\ SO_2}{hr} \times 8760\frac{hr}{yr} = 5256\ \frac{lb\ SO_2}{yr}\ \ or\ \ 2.6\ \frac{tons}{yr}$$