Public Notice

DEQ Requests Comments on Knott Landfill's Proposed Air Quality Permit

DEQ invites the public to submit written comments on the conditions of Deschutes County Dept. of Solid Waste, Knott Landfill's proposed air quality permit, known officially as an Oregon Title V Operating Permit.

Summary

The proposed permit is a renewal for an existing facility. A Minor Permit Modification is also being included in this renewal process. The current permit was issued on Aug. 10, 2011 and scheduled to expire on Aug. 1, 2016. A complete and timely renewal application was submitted by the permittee, so the existing permit will remain in effect until this renewal is issued.

How do I participate?

To submit your comments for the public record, send them by mail, fax or email:

Nancy Swofford, Permit Coordinator
DEQ Eastern Region – Bend Office
475 NE Bellevue Dr., Suite 110
Bend, OR 97701
Fax: 541-388-8283
Email: Nancy Swofford

Written comments are due by 5 p.m. **Monday, Dec. 19, 2016**

About the facility

This is a renewal of an Oregon Title V Operating Permit for Deschutes County Dept. of Solid Waste, Knott Landfill Recycling and Transfer Facility located at 61050 SE 27th Street in Bend.

Knott Landfill has been actively accepting municipal solid waste since 1972 and is currently permitted by DEQ as a municipal solid waste (MSW) disposal facility (Solid Waste Permit 6). The total area of the facility is 205 acres, which includes both the County's waste management operations (landfill, transfer station, hazardous waste collection and administrative offices). The facility includes recycling and composting facilities operated by Deschutes Recycling, LLC.

What air pollutants would the permit regulate?

This permit regulates emissions of the pollutants listed in the table at the end of this document.

How does DEQ determine permit requirements?

DEQ evaluates types and amounts of pollutants at the facility's location, and determines permit requirements according to state and federal regulations.

How does DEQ monitor compliance with the permit requirements?

This permit would require the facility to monitor pollutants using federally-approved monitoring practices and standards.

Formulas to calculate emissions are contained in the permit. The permittee is required to calculate facility-wide emissions and submit an emissions report semi-annually. Onsite inspections will be conducted to assure compliance with emission limitations.

What happens after the public comment period ends?

DEQ will consider and provide responses to all comments received at the close of the comment period. The Department will hold a public hearing if requested by 10 or more individuals or one person representing a group of 10 or more individuals. DEQ may modify provisions in the proposed permit, but the permit writers can only modify conditions of the permit in accordance with the rules and statutes under the authority of DEQ. Participation in the rulemaking or the legislative process is the only way to change the rules or statutes. Ultimately, if a facility meets all legal requirements, DEQ will issue the facility's air quality permit.

After the public comment period, a proposed permit will be sent to EPA for a 45 day review period. DEQ may request and EPA may agree to an expedited review of 5 days if there were no substantive or adverse comments during the comment period. If EPA has no objections, anyone may petition EPA within 60 days after the expiration of EPA's 45-day review period. A petition may be based only on objections already raised during the public comment period, unless the person submitting the petition can demonstrate it was impossible or impractical to do so, or that new information is now available to justify a new objection.

State of Oregon
Department of Environmental Quality

Eastern Region
Air Quality Program
475 NE Bellevue Dr., #110
Bend, OR 97701
Phone: 541-388-6146
866-863-6668
Fax: 541-388-8283
Contact: Walt West,
Permit Writer

www.oregon.gov/DEQ

Search for "Knott", Air Permit, Air Quality, Bend"

DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.

DEQ provides documents electronically whenever possible in order to conserve resources and reduce costs.

If you received a hard copy of this notice, please consider receiving updates via email instead. Send your request to: subscriptions@deq.state.or.us

Please include your full name and mailing address so that we can remove you from our print mailing list.

Date Issued: 11/13/16
By: Nancy Swofford
Permit Number: 09-0040

Where can I get more information?

Find out more and view the draft documents online at DEQ's "Active Public Notices" page, or contact Nancy Swofford, Permit Coordinator:

Phone: 541-633-2021 or 866-863-6668
Fax: 541-388-8283
Email: Nancy Swofford

View the draft permit and related documents in person at the Deschutes Public Library at 601 NW Wall Street in Bend or at the DEQ office in Bend. For a review appointment, call Nancy Swofford at 541-633-2021.

Accessibility information

Documents can be provided upon request in an alternate format for individuals with disabilities or in a language other than English for people with limited English skills. To request a document in another format or language, call DEQ in Portland at 503-229-5696, or toll-free in Oregon at 1-800-452-4011, ext. 5696; or email deqinfo@deq.state.or.us.

Emissions Limits

Criteria Pollutants: Table 1 below presents maximum allowable emissions of criteria pollutants for the facility. The current emission limit reflects maximum emissions the facility can emit under the existing permit. The proposed emission limit reflects maximum emissions the facility would be able to emit under the proposed permit. Typically, a facility's actual emissions are less than maximum limits established in a permit; however, actual emissions can increase up to the permitted limit.

Table 1

Criteria Pollutant	Current Limit (tons/yr)	Proposed Limit (tons/yr)
Particulate matter	31	25
Small particulate matter	14	14
Fine particulate matter	NA	9
Carbon monoxide	99	99
Nitrogen oxides	39	39
Sulfur dioxide	39	39
Volatile organic compounds	39	39
NMOC	49	49
Greenhouse Gas	NA	84684

For more information about criteria pollutants, go to EPA's "Criteria Air Pollutants" page.

Hazardous Air Pollutants: Knott Landfill is not a major source of hazardous air pollutants; however EPA has determined that businesses similar to this facility, as a group, emit enough hazardous air pollutants to warrant regulation. This source is subject to the National Emission Standard for Hazardous Air Pollutants: 40 CFR Part 63, Subpart ZZZZ (Reciprocating Internal Combustion Engine (RICE)) because of a small emergency engine generator. Table 2 summarizes the hazardous air pollutants that trigger the NESHAP. More detailed information can be found in the review report.

Table 2

Hazardous Air Pollutants	Potential Emissions (tons/yr)
Toluene	.0458
Xylenes	.0165
Dichloromethane	.009
Formaldehyde	.009
Various Other HAPs	.0407
Total HAPs from Flare:	0.121
Uncontrolled HAP Fugitive Emissions	
Total HAPs from Landfill Gases	5.393
Total HAPs from Petroleum Contaminated Soils	1.88
Total Annual HAPs	**7.39**

For more information about hazardous air pollutants, go to:
Health Effects Notebook for Hazardous Air Pollutants

State of Oregon
Department of
Environmental
Quality

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
OREGON TITLE V OPERATING PERMIT

Eastern Region
475 NE Bellevue Dr, Suite 110
Bend, OR 97701
Telephone: 541-388-6146

Issued in accordance with provisions of ORS 468A.040
and based on land use compatibility findings included in the permit record.

ISSUED TO:

Deschutes County Dept. of Solid Waste
61050 SE 27th Street
Bend, OR 97702

PLANT SITE LOCATION:

Knott Landfill
61050 SE 27th Street
Bend, OR 97702

INFORMATION RELIED UPON:

Application Numbers: 28252 & 28794
Received: 06/29/2015 & 10/3/2016

LAND USE COMPATIBILITY STATEMENT:

Issued by: Deschutes County
Dated: 06/06/1995 and 12/01/2004

ISSUED BY THE DEPARTMENT OF ENVIRONMENTAL QUALITY

Mark W. Bailey, Eastern Region Air Quality Manager

Date

Nature of Business	SIC	NAICS
Municipal Solid Waste Landfill	4953	562212

RESPONSIBLE OFFICIAL

Title: Director of Solid Waste

FACILITY CONTACT PERSON

Name: Timm Schimke
Title: Director of Solid Waste
Phone: (541) 317-3163

TABLE OF CONTENTS

LIST OF ABBREVIATIONS THAT MAY BE USED IN THIS PERMIT

Act	Federal Clean Air Act	NO_x	Nitrogen Oxides
ASTM	American Society of Testing and Materials	O_2	Oxygen
Btu	British thermal unit	OAR	Oregon Administrative Rules
CFR	Code of Federal Regulations	ODEQ	Oregon Department of Environmental Quality
CO	Carbon Monoxide	ORS	Oregon Revised Statutes
CO_2e	Carbon Dioxide Equivalent	O&M	Operation and Maintenance
CPMS	Continuous Parameter Monitoring System	Pb	Lead
DEQ	Department of Environmental Quality	PCD	Pollution Control Device
dscf	dry standard cubic feet	PM	Particulate Matter
EF	Emission Factor	PM_{10}	Particulate Matter less than 10 microns in size
EPA	US Environmental Protection Agency	$PM_{2.5}$	Particulate Matter less than 2.5 microns in size
EU	Emissions Unit	ppm	parts per million
FCAA	Federal Clean Air Act	PSEL	Plant Site Emission Limit
FSA	Fuel Sampling and Analysis	psia	pounds per square inch, actual
GHG	Greenhouse Gas	SERP	Source Emissions Reduction Plan
gr/dscf	grain per dry standard cubic feet (1 pound = 7000 grains)	SO_2	Sulfur Dioxide
HAP	Hazardous Air Pollutant as defined by OAR 340-244-0040	ST	Source Test
HCFC	Halogenated Chloro-Fluoro-Carbons	VE	Visible Emissions
ID	Identification Number or Label	VMT	Vehicle Miles Traveled
I&M	Inspection and Maintenance	VOC	Volatile Organic Compounds
NA	Not Applicable		

PERMITTED ACTIVITIES

1. Until such time as this permit expires or is modified or revoked, the permittee is allowed to discharge air contaminants from those processes and activities directly related to or associated with air contaminant source(s) in accordance with the requirements, limitations and conditions of this permit. [OAR 340-218-0010 and 340-218-0120(2)]

2. All conditions in this permit are federally enforceable, meaning that they are enforceable by DEQ, EPA and citizens under the Clean Air Act, except Conditions 6, 7, 8, 9, 10, 11, 12, G5 and G9 (OAR 340-248-0005 through 340-248-0180) are only enforceable by the state. [OAR 340-218-0060]

EMISSIONS UNIT (EU) AND POLLUTION CONTROL DEVICE (PCD) IDENTIFICATION

3. The emissions units regulated by this permit are the following: [OAR 340-218-0040(3)]

Table 1. EU and PCD Identification:

Emission Unit Description	EU ID	Pollution Control Device Description	PCD ID
Landfill Gas	LFG-01	Flare	FLR-02 or FLR-01
Flare (Auxiliary)	FLR-01	None	NA
Flare (Primary)	FLR-02	None	NA
Compost Piles	COM-01	None	NA
Petroleum Contaminated Soil	PCS-01	None	NA
Material Handling	MH-01	Water	NA
Unpaved Roads	UPR-01	Dust suppressant and water	NA
Paved Roads	PRD-01	Sweeping and water	NA

3.a. The flares are considered a control device for non-methane organic compound (NMOC) emissions from the landfill, but it is a separate emissions unit for all other pollutants.

EMISSION LIMITS AND STANDARDS, TESTING, MONITORING AND RECORDKEEPING REQUIREMENTS

The following tables and conditions contain the applicable requirements along with testing, monitoring and recordkeeping requirements for the emissions units to which those requirements apply.

Facility-Wide Requirements

Table 2. Facility Wide Emission Limits and Standards

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Monitoring Condition
OAR 340-208-0210(2)	4	Fugitive Emissions	Minimize	5
OAR 340-208-0300	6	Nuisance	No Nuisance	8
OAR 340-208-0450	7	PM >250μm	No Fallout	8
OAR 340-248-0280(10)	9 - 11	Asbestos	Safe Management	12
40 CFR Part 68	13	Risk Management	Risk Management Plan	13

Visible and Fugitive Particulate Emissions

4. Applicable Requirement: The permittee must not allow or permit any materials to be handled, transported or stored; or a building, its appurtenances, or a road to be used, constructed, altered, repaired or demolished; or any equipment to be operated, without taking reasonable precautions to prevent particulate matter from becoming airborne. [OAR 340-208-0210(2)]

   4.a. Such reasonable precautions must include, but not be limited to the following:
      4.a.i. Use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads or the clearing of land;
      4.a.ii. Application of water, or other suitable chemicals on unpaved roads, materials stockpiles and other surfaces which can create airborne dusts;
      4.a.iii. Full or partial enclosure of materials stockpiles in cases where application of water or chemicals are not sufficient to prevent particulate matter from becoming airborne;
      4.a.iv. Installation and use of hoods, fans and fabric filters to enclose and vent the handling of dusty materials;
      4.a.v. Adequate containment during sandblasting or other similar operations;
      4.a.vi. Covering, at all times when in motion, open bodied trucks transporting materials likely to become airborne; and
      4.a.vii. Prompt removal from paved streets of earth or other material that does or may become airborne.
   4.b. Upon request by DEQ, the permittee must develop a fugitive emission control plan for approval by DEQ if the above precautions are not adequate, and implement the plan whenever fugitive emissions leave the property for more than 18 seconds in a six-minute period.

5. Monitoring Requirement: At least once each week for a minimum period of 30 minutes, the permittee must visually survey the plant for any sources of excess fugitive emissions. For the purpose of this survey, excess fugitive emissions are considered to be any visible emissions that leave the plant site boundaries for more than 18 seconds in a six-minute period. The person conducting the observation must follow the procedures of EPA Method 22. If sources of visible emissions are identified, the permittee must: [OAR 340-208-0300]

   5.a. Immediately take corrective action to minimize the fugitive emissions, including but not limited to those actions identified in Condition 4; or
   5.b. Develop a DEQ approved fugitive emission control plan upon request by DEQ and implement the plan whenever fugitive emissions leave the property for more than 18 seconds in a six-minute period. [OAR 340-218-0050(3)(a)]
   5.c. Recordkeeping: The permittee must maintain records of the fugitive emissions surveys, corrective actions (if necessary), and/or the results of any EPA Method 22 tests.

Nuisance Conditions

6. Applicable Requirement: The permittee must not cause or allow air contaminants from any source to cause a nuisance. Nuisance conditions will be verified by DEQ personnel. [OAR 340-208-0300] This condition is enforceable only by the State.

7. Applicable Requirement: The permittee must not cause or permit the deposition of any particulate matter larger than 250 microns in size at sufficient duration or quantity, as to create an observable deposition upon the real property of another person. [OAR 340-208-0450] This condition is enforceable only by the State.

8. Monitoring Requirement: The permittee must maintain a log of each nuisance complaint received by the permittee during the operation of the facility. Documentation must include date of contact, time of

observed nuisance condition, description of nuisance condition, location of receptor, status of plant operation during the observed period, and time of response to complainant. A plant representative must immediately investigate the condition following the receipt of the nuisance complaint and a plant representative must provide a response to the complainant within 24 hours, if possible. This condition is enforceable only by the state. [OAR 340-218-0050(3)(a)]

Asbestos

9. Applicable Requirement: For all asbestos-containing waste material received, the permittee must:

9.a. Ensure that off-loading of asbestos-containing waste material is done under the direction and supervision of the landfill operator or their authorized agent and accomplished in a manner that prevents the leak-tight transfer containers from rupturing and prevents visible emissions to the air. [OAR 340-248-0280(10)(a)(A)] If visible emissions are observed, the permittee must immediately take measures to suppress emissions. Such measures include but are not limited to wetting the source of emissions or covering the source of emissions with soil.

9.b. Ensure that off-loading of asbestos-containing waste material occurs at the immediate location where the waste is to be buried and restrict public access to the off-loading area until waste is covered. [OAR 340-248-00280(10)(a)(B)]

9.c. Immediately notify the Department by telephone, followed by a written report the following working day, of the presence of improperly enclosed or uncovered waste. Submit a copy of the signed asbestos waste shipment record along with the report. [OAR 340-248-0280(10)(a)(D)]

9.d. Send a copy of the signed asbestos waste shipment record to the asbestos waste generator as soon as possible, but no longer than 30 days after receipt of the waste. [OAR 340-248-0280(10)(a)(E)]

9.e. Upon discovering a discrepancy between the quantity of waste designated on the asbestos waste shipment records and the quantity actually received, attempt to reconcile the discrepancy with the asbestos waste generator. If the discrepancy cannot be reconciled, the permittee must report the discrepancy and reconciliation attempts in writing to the Department within the 15th day after receiving the waste. A copy of the asbestos waste shipment record with the Department assigned asbestos project number shall be submitted with this report. [OAR 340-248-0280(10)(a)(F)]

9.f. Select the asbestos waste burial site in an area of minimal work activity that is not subject to future excavation. [OAR 340-248-0280(10)(a)(G)]

9.g. Cover all asbestos-containing waste material deposited at the disposal site with at least 12 inches of soil or six inches of soil plus 12 inches of other waste before compacting equipment runs over it, but no later than the end of the operating day. [OAR 340-248-0280(10)(a)(H)]

10. Applicable Requirement: Excavation or disturbance of asbestos-containing waste material, that has been deposited at a waste disposal site and is covered, shall be considered an asbestos abatement project. The notification for any such project shall be submitted as specified in OAR 340-248-0260 with some exceptions as detailed by rule. [OAR 340-248-0280(10)(c)]

11. Applicable Requirement: Upon closure of an active asbestos-containing waste disposal site each owner or operator shall comply with all provisions for an inactive asbestos-containing waste disposal site. [OAR 340-248-0280(10)(d)]

12. Monitoring and Recordkeeping Requirements: The permittee must maintain the following records for asbestos:

12.a. Shipment records for at least two years and ensure that all information requested on the Department form regarding waste disposal has been supplied. [OAR 340-248-0280(10)(a)(C)]

12.b. Records of the location, depth and area, and quantity in cubic yards of asbestos-containing waste material within the disposal site on a map or diagram of the disposal area until site closure. [OAR 340-248-0280(10)(b)] Copies of these records indicating locations and quantities shall be submitted to the Department upon closure. [OAR 340-248-0280(10)(d)(B)]

Accidental Release Prevention

13. Applicable Requirement: Should this stationary source become subject to the accidental release prevention regulations in 40 CFR Part 68, then the permittee must submit a risk management plan (RMP) by the date specified in 40 CFR 68.10 and comply with the plan and all other applicable Part 68 requirements. [40 CFR Part 68]

Emergency Generator – NSPS (40 CFR Part 60, Subpart IIII)

14. 40 CFR Part 60 Subpart IIII, NSPS requirements are applicable to the emergency stationary Compression Ignition (CI) Internal Combustion Engine (ICE): [40 CFR 60.4205]

    14.a. The permittee must comply with fuel, metering, labeling, operating limits and recordkeeping requirements for the emergency generator. The emergency generator must comply with the emission standards for new non-road CI engines in 40 CFR 60.4202(a), for all pollutants, for the same model year and maximum engine power for their 2007 model year and later emergency stationary CI ICE. [40 CFR 60.4205(b)]

    14.b. The permittee must comply with the emergency engine generator standards set forth in 40 CFR 60.4205 over the entire life of the engine. [40 CFR 60.4206]

    14.c. The permittee must meet the requirements of 40 CFR 80.510(b) for non-road diesel fuel. [40 CFR 60.4207(b)]

    14.d. The permittee must install a non-resettable hour meter on the engine. [40 CFR 60.4209(a)]

    14.e. The permittee must operate and maintain the CI internal combustion engines and control devices according to the manufacturer's written instructions or procedures developed by the permittee that are approved by the engine manufacturer. The permittee may only change those settings that are permitted by the engine manufacturer. [40 CFR 60.4211(f)]

        14.e.i. There is no time limit on the use of emergency engine in emergency situations. [40 CFR 60.4211(f)(1)]

        14.e.ii. The permittee must operate the emergency engine for the purpose of maintenance checks and readiness testing, provided that the tests are recommended by the manufacturer, the vendor, or the insurance company associated with the engine. Required maintenance and testing of such units is limited to 50 hours per year. [40 CFR 60.4211(f)(2)]

        14.e.iii. The permittee is prohibited from using its emergency engine for any non-emergency use including, but not limited to peak shaving, demand response operation, and/or generation of income from the sale of power. To perform such activity the permittee must first obtain a modified permit or a separate permit for power generation that appropriately addresses and allows this activity.

Table 3. Landfill Gas (LFG-01) Requirements

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Monitoring Condition
40 CFR 60.752	15	NMOC	Capture and Control Once NMOC Exceeds 50 Megagrams/Year	16

New Source Performance Standards

15. Applicable Requirements: The permittee must either comply with 40 CFR 60.752(b)(2) or calculate an NMOC emission rate for the landfill using the procedures specified in Condition 16. The NMOC emission rate must be recalculated annually, except as provided in Condition 42.b. If the calculated NMOC emission rate is less than 50 megagrams per year, the permittee must:

15.a. Submit an annual emission report to the Department, except as provided for in Condition 42.b; and

15.b. Recalculate the NMOC emission rate annually using the procedures specified in Condition 16 until such time as the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, or the landfill is closed.

15.b.i. If the NMOC emission rate upon recalculation is equal to or greater than 50 megagrams per year, the permittee must install a collection and control system in accordance with 40 CFR 60.752(b)(2).

15.b.ii. If the landfill is permanently closed, a closure notification must be submitted to the Department as provided in 40 CFR 60.757(d)

16. Testing and Monitoring Requirement: The permittee must calculate the NMOC emission rate using the equation provided below. The values to be used in the equation are 0.05 per year for k, 170 cubic meters per megagram for L_o, and a site specific value determined in accordance with permit Condition 16.b for C_{NMOC}. For landfills located in geographical areas with a thirty year annual average precipitation of less than 25 inches, as measured at the nearest representative official meteorological site, the k value that may be used is 0.02 per year. [40 CFR 60.754(a)(1)]

16.a. To calculate the NMOC emission rate, use the following equation: [40 CFR 60.754(a)(1)(i)]

$$M_{NMOC} = \sum_{i=1}^{n} 2kL_o M_i \left(e^{-kt_i}\right)\left(C_{NMOC}\right)\left(3.6x10^{-9}\right)$$

Where:

M_{NMOC}	=	Total NMOC emission rate from the landfill, megagrams per year
k	=	Methane generation rate constant, $year^{-1}$ (0.02 or 0.05 $year^{-1}$ – see above)
L_o	=	Methane generation potential, cubic meters per megagram solid waste (170 m^3/Mg)
M_i	=	Mass of solid waste in the i^{th} section, megagrams (see Condition 16.e)
t_i	=	Age of the i^{th} section, years
C_{NMOC}	=	Concentration of NMOC, parts per million by volume as hexane (590 ppm or value determine in accordance with Condition 16.b)
$3.6x10^{-9}$	=	Conversion factor

16.b. *Tier 2*. The permittee must determine the NMOC concentration using the following sampling procedure. The permittee must install at least two sample probes per hectare of landfill surface that has retained waste for at least 2 years. If the landfill is larger than 25 hectares in area, only 50 samples are required. The sample probes should be located to avoid known areas of nondegradable solid waste. The permittee must collect and analyze one sample of landfill gas from each probe to determine the NMOC concentration using Method 25C or Method 18 of Appendix A of 40 CFR Part 60. If using Method 18, the minimum list of compounds to be tested must be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42). If composite sampling is used, equal volumes must be taken from each sample probe. If more than the required number of samples are collected, all samples must be used in the analysis. The permittee must divide the NMOC concentration from Method 25C by six to convert from C_{NMOC} as carbon to C_{NMOC} as hexane. If the landfill has an active or passive gas removal system in place, Method 25 or 25C samples may be collected from these systems instead of surface probes provided the removal system can be shown to provide sampling as representative as the two sampling probe per hectare requirement. For active collection systems, samples may be collected from the common header pipe before the gas moving or condensate removal equipment. For these systems, a minimum of three samples must be collected from the header pipe. [40 CFR 60.754(a)(3)]

16.b.i. The Tier 2 analysis must be performed once during the permit term by October 27, 2018. The permittee must submit a source test plan to the Department at least 15 days prior to the date of the tests. The test plan must be prepared in accordance with the Department's Source Sampling Manual and address any planned variations or alternatives to the prescribed test methods, such as the procedures to be used for collecting a single composite sample. The permittee should be aware that if significant variations are requested, it may require more than 30 days for the Department to grant approval and may require EPA approval in addition to Department approval. [OAR 340-212-0120(3)]

16.b.ii. The permittee must recalculate the NMOC mass emission rate using the equation provided in Condition 16.a and using the average NMOC concentration (C_{NMOC}) from the collected samples instead of the default value in the equation provided in Condition 16.a.

16.b.iii. If the resulting mass emission rate calculated using the site-specific NMOC concentration is equal to or greater than 50 megagrams per year, then the permittee must either comply with 40 CFR §60.752(b)(2) or determine the site-specific methane generation rate constant (k) and recalculate the NMOC emission rate using the site-specific methane generation rate using the procedure specified in Condition 16.c.

16.b.iv. If the resulting NMOC mass emission rate is less than 50 megagrams per year, the permittee must submit a periodic estimate of the emission rate report as provided in Condition 42 and retest the site-specific NMOC concentration within 5 years using the methods specified in this Condition.

16.c. *Tier 3*. The site-specific methane generation rate constant must be determined using the procedure provided in Method 2E of Appendix A of 40 CFR Part 60. The permittee must estimate the NMOC mass emission rate using the equation in Condition 16.a and using the site-specific methane generation rate constant (k), and the site-specific NMOC concentration (C_{NMOC}) as determined in Condition 16.b instead of the default values provided in Condition 16.a. The permittee must compare the resulting NMOC mass emission rate to the standard of 50 megagrams per year. [40 CFR 60.754(a)(4)]

16.c.i. If the NMOC mass emission rate as calculated using the site-specific methane generation rate (k) and concentration of NMOC (C_{NMOC}) is equal to or greater than 50 megagrams per year, the permittee must comply with 40 CFR 60.752(b)(2).

16.c.ii. If the NMOC mass emission rate is less than 50 megagrams per year, then the permittee must submit a periodic emission rate report as provided in Condition 42 and shall recalculate the NMOC mass emission rate annually, as provided in Condition 42 using the equation in Condition 16.a and using the site-specific methane generation rate constant (k) and NMOC concentration (C_{NMOC}) obtained in Condition 16.b. The calculation of the methane generation rate constant is performed only once, and the value obtained from this test must be used in all subsequent annual NMOC emission rate calculations.

16.d. The permittee may use other methods to determine the NMOC concentration or a site-specific k as an alternative to the methods required in Conditions 16.b and 16.c if the method has been approved by the EPA. [40 CFR 60.754(a)(5)] **[Note: The authority to approve alternative methods has not been delegated to the Department in accordance with 40 CFR 60.750(b)]**

16.e. The mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value for M_i if documentation of the nature and amount of such wastes is maintained. [40 CFR 60.754(a)(1)(i)]

Emissions Units FLR-01 and FLR-02

Table 4. Summary of Requirements for the Flares (FLR-01 & FLR-02)

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Monitoring Condition
OAR 340-208-0110(4)	17	Visible Emissions	20% Opacity	17
OAR 340-228-0210(2)(b)(B)	18	PM	0.14 gr/dscf	18 & 20
ACDP 09-0040, Condition 2.1	19	Operation and Maintenance	See Condition 19	20

17. Applicable Requirement: Visible emissions from the flare must not exceed 20% opacity for any six minute block average using EPA Method 9. [OAR 340-208-0110(4)]

18. Applicable Requirement: Particulate matter emissions must not exceed 0.14 gr/dscf as measured by Oregon Method 5. [OAR 340-226-0210(2)(b)(B)]

19. Applicable Requirement: The permittee must operate the primary flare (FLR-02) and backup flare (FLR-01) in accordance with good combustion practices and perform routine maintenance to maintain maximum destruction efficiency. Operation and maintenance activities are to include but not be limited to: [ACDP 09-0040, Condition 2.1]

    19.a. The temperature sensing system for determining a flame-out event is to be operating whenever the flare is in use and the igniter system is to be activated at a temperature no less than 200^{o} F.
    19.b. The flame arrestor filter must be cleaned as specified within the landfill gas (LFG) extraction system Operations and Maintenance Manual (O&M). At a minimum, the flame arrestor filter will be cleaned annually. Maintenance activities are to be recorded as per Condition 21.i.
    19.c. Maintenance to the mechanical flow measuring device at the inlet to the flare must be conducted in such a manner to assure accurate LFG flow measurements. Maintenance activities are to be recorded as per Condition 21.j.

20. Monitoring Requirements: The permittee must monitor the operation and maintenance of the LFG extraction system as follows: [ACDP 09-0040, Condition 4.1]

    20.a. At a minimum, the permittee must monitor the flow rate of the LFG at the inlet to the blower serving the flare once for every ten (10) days the LFG extraction system is in operation. LFG flow rate records must be maintained and reported as per Conditions 21.c and 38.b.v.C.
    20.b. At a minimum, the permittee must continuously monitor the exit temperature of the flare when the LFG extraction system is in operation. The temperature must be recorded as per Condition 21.d.
    20.c. At a minimum, the permittee must monitor the LFG composition once for every ten (10) days the LFG extraction system is in operation. The composition analysis must include methane (CH_4) concentration and the measurement records must be maintained and reported as per Conditions 21.e. and 38.b.v.D
    20.d. At a minimum, the permittee must monitor the operating parameters of the flame arrestor for determining the condition of the flame arrestor once for every ten (10) days the LFG extraction system is in operation. The flame arrestor parameters are to be recorded as per Condition 21.f.
    20.e. At a minimum, the permittee must monitor the hours of flare operation every ten (10) calendar days. The hours of flare operation are to be recorded and reported as per Conditions 21.g. and 38.b.v.F.
    20.f. At a minimum, the permittee must visually inspect all working components of the flare serving the LFG extraction system for signs of incomplete combustion (i.e. flame color, smoke, excessive soot build up, etc.) once for every ten (10) days the LFG extraction system is in operation. If

incomplete combustion is suspected, corrective action is to be performed immediately. Findings are to be recorded as per Condition 21.h.

21. Recordkeeping: The permittee must maintain the following records related to the operation and maintenance of the facility and associated air contaminant control devices: [ACDP 09-0040, Condition 6.1]

21.a. All operating parameters to be reported to the Department annually as required by Condition 38.b.v.
21.b. The permittee must record the cumulative amount of MSW within Knott Landfill at the conclusion of every calendar month.
21.c. The permittee must record the LFG flow rate at the inlet to the blower serving the flare at least once every ten (10) days the LFG extraction system is in operation.
21.d. The permittee must record the exit temperature of the flare at least once daily the LFG extraction system is in operation. Records must be kept within a logbook.
21.e. The permittee must record the LFG composition (CH_4 concentration) at the inlet to the blower serving the flare at least once every ten (10) days the LFG extraction system is in operation. Records must be kept within a logbook.
21.f. The permittee must record the operating parameters of the flame arrestor at least once every ten (10) days the LFG extraction system is in operation. Records must be kept within a logbook.
21.g. The permittee must record the hours of flare operation at least once every ten (10) calendar days. Records must be kept within a logbook.
21.h. The permittee must record the results of each visual inspection for determining incomplete combustion from the flare as specified by Condition 20.f**.** Records must be kept within a logbook.
21.i. The permittee must record all maintenance performed on the blower, flame arrestor and flare within a logbook. Entries are to be recorded immediately preceding the activity.
21.j. The permittee must record all maintenance and calibration activities performed on the flow measurement devices, thermocouples, igniter system and portable gas analyzing equipment. Entries are to be recorded within a logbook immediately preceding the activity.

Insignificant Activities Requirements

22. DEQ acknowledges that insignificant emissions units (IEUs) identified by rule as either categorically insignificant activities or aggregate insignificant emissions as defined in OAR 340-200-0020 exist at facilities required to obtain an Oregon Title V Operating Permit. IEUs must comply with all applicable requirements. In general, the requirements that could apply to IEUs are incorporated as follows:

22.a. OAR 340-208-0110(4) (20% opacity for non-fugitive sources)
22.b. OAR 340-226-0210(2)(b)(B) (0.14 gr/dscf for non-fugitive, non-fuel burning equipment)
22.c. OAR 340-226-0310 (process weight limit for non-fugitive, non-fuel burning process equipment)
22.d. OAR 340-228-0210(b)(B) (0.14 gr/dscf corrected to 12% CO_2 for fuel burning equipment)
22.e. The permittee must not allow gasoline to be handled in a manner that would result in vapor releases to the atmosphere for extended periods of time. Measures to be taken include, but are not limited to the following: [40 CFR 63.11116(a), (b), (d) and OAR 340-244-0240]
  22.e.i. Minimize gasoline spills;
  22.e.ii. Clean up spills as expeditiously as practicable;
  22.e.iii. Cover all open gasoline containers and all gasoline storage tank fill-pipes with a gasketed seal when not in use;
  22.e.iv. Minimize gasoline sent to open waste collection systems that collect and transport gasoline to reclamation and recycling devices, such as oil/water separators.
  22.e.v. The permittee is not required to submit the notifications or reports as specified in 40 CFR 63.11124 and 63.11126, or Subpart A. The permit must have records available within 24 hours of a request by DEQ to document gasoline throughput.

22.e.vi. Portable gasoline containers that meet the requirements of 40 CFR Part 59, Subpart F, are considered acceptable for compliance with Condition 22.e.iii.

22.f. In addition to the measures specified in Condition 22.e, the permittee must take the following measures to minimize vapor releases: [OAR 340-244-0240, state only enforceable]

22.f.i. Do not top off or overfill vehicle tanks. If a person can confirm that a vehicle tank is not full after the nozzle clicks off (such as by checking the vehicle's fuel tank gauge), the person may continue to dispense fuel using best judgment and caution to prevent a spill;

22.f.ii. Post a sign at the gasoline dispensing facility (GDF) instructing a person filling up a motor vehicle to not top off the vehicle tank;

22.f.iii. Ensure that cargo tanks unloading at the GDF comply with Conditions 22.e.i through 22.e.iii, 22.f.i and 22.f.ii.

22.f.iv. The permittee must only load gasoline into storage tanks at the facility by utilizing submerged filling, as defined in OAR 340-244-0030. The submerged fill pipe must be no more than 12 inches from the bottom of the storage tank.

Unless otherwise specified in this permit or an applicable requirement, DEQ is not requiring any testing, monitoring, recordkeeping or reporting for the applicable emissions limits and standards that apply to IEUs. However, if testing were performed for compliance purposes, the permittee would be required to use the test methods identified in and perform the testing in accordance with DEQ's Source Sampling Manual.

PLANT SITE EMISSION LIMITS

23. The permittee must not cause or allow plant site emissions to exceed the following limits for any 12 consecutive calendar month period: [OAR 340-222-0035 through OAR 340-222-0041]

Pollutant	Plant Site Emission Limit (tons/yr)
PM	25
PM_{10}	14
$PM_{2.5}$	9
SO_2	39
NO_x	39
CO	99
VOC	39
NMOC	49
GHG (CO_2e)	84,684

24. Monitoring Requirement: The permittee must determine pollutant emissions, except for GHG, from the landfill using the formulas provided below. Emissions must be calculated each month for the previous 12-month period. Records must be maintained and reported as per Condition 38.b. [OAR 340-222-0080]

24.a. The permittee must determine the fugitive uncontrolled NMOC and VOC monthly and 12-month consecutive rolling emissions from the landfill (LFG-01) by subtracting the combusted NMOC by the flare from the uncontrolled emissions from the landfill using the following formula:

E_{NMOC} = Uncontrolled NMOC – Combusted NMOC by the Flare

Where:

Uncontrolled NMOC = $[\sum 2kL_oM_i(e^{-kti})(C_{NMOC}/1{,}000{,}000)(3.6x10^{-9})$ x 1.1023]

Combusted NMOC by the Flare = $[(Q_{LFG})(C_{NMOC}/)(MW_{Hexane}/K)$ x 60 x H x (1 ton/2,000 lb)]

E_{VOC} = E_{NMOC} x 0.997

Where:

E_{NMOC}	=	Non-methane organic compound emissions from the landfill (tons/yr)
E_{VOC}	=	Volatile organic compound emissions from the landfill (tons/yr)
L_o	=	Methane generation potential
	=	170 m^3 CH_4/Mg waste
k	=	Methane generation rate constant
	=	0.02/yr
K	=	Molar volume at standard conditions
	=	359.05 dscf/lb-mole
M	=	Waste acceptance rate (Mg/yr)
t_i	=	Age of landfill from the 1st year through current year
C_{NMOC}	=	NMOC concentration
	=	313 ppm (as Hexane) or as measured in Condition 16.b.
1.1023	=	Constant for converting megagrams to tons
Q_{LFG}	=	Average flow rate of the landfill gas captured and combusted in the Flare (scfm)
MW_{Hexane}	=	Molecular weight of hexane
	=	86.18 lb/lb-mole
H	=	Flare operating time (hours/year)
0.6	=	Ratio of VOC to NMOC based on speciated emission estimates from AP-42 Table 2.4-2

24.b. The permittee must determine PM, PM_{10}, $PM_{2.5}$, NO_x and CO monthly and 12-month consecutive rolling emissions from the Flare using the following formula and emission factors:

E_x = EF_x x $(Q_{CH4}/1{,}000{,}000)$ x 60 x H x (1 ton/2,000 lb)

Where:

E_x	=	Pollutant x emissions (tons/year);
EF_x	=	Pollutant x emission factor (lb/MMscf CH_4);
	=	15 for PM
	=	15 for PM_{10}
	=	15 for $PM_{2.5}$
	=	39 for NO_x
	=	46 for CO
Q_{CH4}	=	Average CH_4 flow rate to the flare (scfm);
H	=	Flare operating time (hours/year)

24.c. The permittee must determine SO_2 emissions from the Flare using the following formula. Emissions must be calculated each month for the previous 12-month period. Records must be maintained and reported as per Condition 21.

$$E_{SO2} = (C_S/10^6)(2 \times MW_S/K)(Q_{LFG}) \times 60 \times H \times (1 \text{ ton}/2{,}000 \text{ lb})$$

Where:

E_{SO2}	=	SO_2 emissions (tons/year);
C_S	=	Total reduced sulfur concentration in landfill gas (ppm)
	=	47 ppm
MW_S	=	Molecular weight of Sulfur
	=	32 lb/lb-mole
K	=	Molar volume at standard conditions t
	=	359.05 dscf/lb-mole
Q_{LFG}	=	Average flow rate of the landfill gas captured and combusted in the flare (scfm)
H	=	Flare operating time (hours)

24.d. The permittee must determine VOC and NMOC monthly and 12-month consecutive rolling emissions from the Flare using the following formula and emission factors:

$$E_x = (C_x/10^6)(MW_x/K)(Q_{LFG}) \times 60 \times H \times (1 - CE)(1 \text{ ton}/2{,}000 \text{ lb})$$

Where:

E_x	=	Pollutant x emissions (tons/year);
C_x	=	Pollutant x concentration in landfill gas (ppm)
	=	312 for VOC
	=	313 for NMOC
MW_x	=	Pollutant x molecular weight (lb/lb-mole) (74 for VOC and 86.18 for NMOC)
K	=	Molar volume at standard conditions
	=	359.05 dscf/lb-mole
Q_{LFG}	=	Average flow rate of the landfill gas captured and combusted in the flare (scfm)
H	=	Flare operating time (hours)
CE	=	Destruction efficiency/100
	=	0.977

24.e. The permittee must determine VOC monthly and 12-month consecutive rolling emissions from the use of petroleum contaminated soil (PCS) using the following formula and emission factors:

$$E_{VOC} = M_{PCS} \times EF_{VOC} \times 1 \text{ ton}/2{,}000 \text{ lb}$$

Where:

E_{VOC}	=	VOC emissions (tons/yr)
M_{PCS}	=	PCS material received (tons/yr);
EF_{VOC}	=	VOC emission factor (lb/ton of PCS)
	=	0.25

24.f. The permittee must determine VOC monthly and 12-month consecutive rolling emissions from the compost piles using the following formula and emission factors:

$$E_{VOC} = M_{CP} \times EF_{VOC} \times 1 \text{ ton}/2{,}000 \text{ lb}$$

Where:

E_{VOC}	=	VOC emissions (tons/yr)
M_{CP}	=	Compost material throughput (tons/yr);
EF_{VOC}	=	VOC emission factor (lb/ton of compost material)
	=	1.78

24.g. The permittee must determine fugitive PM, PM_{10}, $PM_{2.5}$ monthly and 12-month consecutive rolling emissions from the landfill activities using the following formula and emission factors:

$E_x = W \times EF_x \times 1 \text{ ton}/2{,}000 \text{ lb}$

Where:

E_x = Pollutant x emissions (tons/yr)
W = Waste received (tons/yr);
EF_x = Pollutant x emission factor (lb/ton of waste)
= 0.21 for PM
= 0.06 for PM_{10}
= 0.01 for $PM_{2.5}$

24.h. Total monthly and 12-month consecutive rolling emissions from the landfill operations for each 12-month period are the sum of the emissions calculated in Conditions 24.a through 24.g for each pollutant.

24.i. The emissions factors listed in this Condition are not enforceable limits unless otherwise specified in this permit. Compliance with PSELs must only be determined by the calculations contained in this Condition. Documentation of the emission factors used in this Condition is provided in the emission detail sheets attached to the permit review report.

EMISSION FEES

25. Emission fees will be based on the Plant Site Emission Limits, unless permittee elects to report actual emissions for one or more permitted processes/pollutants. [OAR 340-220-0090]

GENERAL TESTING REQUIREMENTS

26. Unless otherwise specified in this permit, the permittee must conduct all testing in accordance with DEQ's Source Sampling Manual. [OAR 340-212-0120]

26.a. Unless otherwise specified by a state or federal regulation, the permittee must submit a source test plan to DEQ at least 30 days prior to the date of the test. The test plan must be prepared in accordance with the Source Sampling Manual and address any planned variations or alternatives to prescribed test methods. Permittee should be aware, if significant variations are requested; it may require more than 30 days for DEQ to grant approval and may require EPA approval in addition to approval by DEQ.

26.b. Only regular operating staff may adjust the processes or emission control device parameters during a compliance source test and within two (2) hours prior to the tests. Any operating adjustments made during a compliance source test, which are a result of consultation during the tests with source testing personnel, equipment vendors, or consultants, may render the source test invalid.

26.c. Unless otherwise specified by permit condition or DEQ approved source test plan, all compliance source tests must be performed as follows:

26.c.i. At least 90% of the design capacity for new or modified equipment;

26.c.ii. At least 90% of the maximum operating rate for existing equipment; or

26.c.iii. At 90 to 110% of the normal maximum operating rate for existing equipment. For purposes of this permit, the normal maximum operating rate is defined as the 90th percentile of the average hourly operating rates during a 12 month period immediately preceding the source test. Data supporting the normal maximum operating rate must be included with the source test report.

26.d. Each source test must consist of at least three (3) test runs and the emissions results must be reported as the arithmetic average of all valid test runs. If for reasons beyond the control of the permittee a test run is invalid, DEQ may accept two (2) test runs for demonstrating compliance with the emission limit or standard.

26.e. Source test reports prepared in accordance with DEQ's Source Sampling Manual must be submitted to DEQ within 60 days of completing any required source test, unless a different time period is approved in the source test plan submitted prior to the source test.

GENERAL MONITORING AND RECORDKEEPING REQUIREMENTS

General Monitoring Requirements

27. The permittee must not knowingly render inaccurate any required monitoring device or method. [OAR 340-218-0050(3)(a)(E)]

28. The permittee must use the same methods to determine compliance as those used to determine actual emissions for fee purposes and can be no less rigorous than the requirements of OAR 340-218-0080. [OAR 340-218-0050(3)(a)(F)]

29. The permittee must comply with the monitoring requirements on the date of permit issuance unless otherwise specified in the permit or an applicable requirement. [OAR 340-218-0050(3)(a)(G)]

General Recordkeeping Requirements

30. The permittee must maintain the following general records of testing and monitoring required by this permit: [OAR 340-218-0050(3)(b)(A)]

30.a. The date, place as defined in the permit, and time of sampling or measurements;
30.b. The date(s) analyses were performed;
30.c. The company or entity that performed the analyses;
30.d. The analytical techniques or methods used;
30.e. The results of such analyses;
30.f. The operating conditions as existing at the time of sampling or measurement; and
30.g. The records of quality assurance for continuous monitoring systems (including but not limited to quality control activities, audits, calibration drift checks).

31. Unless otherwise specified by permit condition, the permittee must make every effort to maintain 100 percent of the records required by the permit. If information is not obtained or recorded for legitimate reasons (e.g., the monitor or data acquisition system malfunctions due to a power outage), the missing record(s) will not be considered a permit deviation provided the amount of data lost does not exceed 10% of the averaging periods in a reporting period or 10% of the total operating hours in a reporting period, if no averaging time is specified. Upon discovering a required record is missing, the permittee must document the reason for the missing record. In addition, any missing record that can be recovered from other available information will not be considered a missing record. [OAR 340-214-0110, 340-214-0114, and 340-218-0050(3)(b)]

32. The permittee must comply with the recordkeeping requirements on the date of permit issuance unless otherwise specified in the permit or an applicable requirement. [OAR 340-218-0050(3)(b)(C)]

33. Unless otherwise specified, the permittee must retain records of all required monitoring data and support information for a period of at least five (5) years from the date of the monitoring sample, measurement, report or application. Support information includes all calibration and maintenance records and all original strip-chart recordings (or other original data) for continuous monitoring instrumentation, and copies of all

reports required by the permit. All existing records required by the previous Air Contaminant Discharge Permit or Oregon Title V Operating Permit must also be retained for five (5) years from the date of the monitoring sample, measurement, report or application. [OAR 340-218-0050(b)(B)]

REPORTING REQUIREMENTS

General Reporting Requirements

34. Excess Emissions Reporting: The permittee must report all excess emissions as follows: [OAR 340-214-0300 through 340-214-0360]

34.a. Immediately (within 1 hour of the event) notify DEQ of an excess emission event by phone, email or facsimile; and

34.b. Within 15 days of the excess emissions event, submit a written report that contains the following information: [OAR 340-214-0340(1)]

34.b.i. The date and time of the beginning of the excess emissions event and the duration or best estimate of the time until return to normal operation;

34.b.ii. The date and time the permittee notified DEQ of the event;

34.b.iii. The equipment involved;

34.b.iv. Whether the event occurred during planned startup, planned shutdown, scheduled maintenance, or as a result of a breakdown, malfunction or emergency;

34.b.v. Steps taken to mitigate emissions and corrective action taken, including whether the approved procedures for a planned startup, shutdown or maintenance activity were followed;

34.b.vi. The magnitude and duration of each occurrence of excess emissions during the course of an event and the increase over normal rates or concentrations as determined by continuous monitoring or best estimate (supported by operating data and calculations);

34.b.vii. The final resolution of the cause of the excess emissions; and

34.b.viii. Where applicable, evidence supporting any claim that emissions in excess of technology-based limits were due to any emergency pursuant to OAR 340-214-0360.

34.c. In the event of any excess emissions which are of a nature that could endanger public health and occur during non-business hours, weekends or holidays, the permittee must immediately notify DEQ by calling the Oregon Emergency Response System (OERS). The current number is 1-800-452-0311.

34.d. If startups, shutdowns or scheduled maintenance may result in excess emissions, the permittee must submit startup, shutdown or scheduled maintenance procedures used to minimize excess emissions to DEQ for prior authorization, as required in OAR 340-214-0310 and 340-214-0320. New or modified procedures must be received by DEQ in writing at least 72 hours prior to the first occurrence of the excess emission event. The permittee must abide by the approved procedures and have a copy available at all times.

34.e. The permittee must notify DEQ of planned startup/shutdown or scheduled maintenance events.

34.f. The permittee must continue to maintain a log of all excess emissions in accordance with OAR 340-214-0340(3). However, the permittee is not required to submit the detailed log with the semi-annual and annual monitoring reports. The permittee is only required to submit a brief summary listing the date, time and the affected emissions units for each excess emission that occurred during the reporting period. [OAR 340-218-0050(3)(c)]

35. Permit Deviations Reporting: The permittee must promptly report deviations from permit requirements that do not cause excess emissions, including those attributable to upset conditions, as defined in the permit, the probable cause of such deviations, and any corrective actions or preventive measures taken. "Prompt" means within 15 days of the deviation. Deviations that cause excess emissions, as specified in OAR 340-214-0300 through 340-214-0360 must be reported in accordance with Condition 34.

36. All required reports must be certified by a responsible official consistent with OAR 340-218-0040(5). [OAR 340-218-0050(3)(c)(D)]

37. Reporting requirements must commence on the date of permit issuance unless otherwise specified in the permit. [OAR 340-218-0050(3)(c)(E)]

Addresses of regulatory agencies are the following, unless otherwise instructed:

DEQ – Eastern Region 475 NE Bellevue Dr., #110 Bend, OR 97701 541-388-6146	DEQ – Air Quality Division 700 NE Multnomah St., #600 Portland, OR 97204 503-229-5359	Clean Air Act Compliance Manager US EPA Region 10, MS: OCE-101 1200 Sixth Avenue, Suite 900 Seattle, WA 98101

Semi-Annual and Annual Reports

38. The permittee must submit three (3) copies of reports of any required monitoring at least every 6 months, completed on forms approved by the Department. Six month periods are January 1 to June 30, and July 1 to December 31. One copy of the report must be submitted to the EPA and two copies to the DEQ regional office. All instances of deviations from permit requirements must be clearly identified in such reports: [OAR 340-218-0050(3)(c)(A) and 340-218-0080(6)(d)]

38.a. The first semi-annual report is due on **July 30** and must include the semi-annual compliance certification, OAR 340-218-0080.

38.b. The annual report is due on **February 15** and must include the following:

38.b.i. The emission fee report; [OAR 340-220-0100]

38.b.ii. A summary of the excess emissions upset log; [OAR 340-214-0340]

38.b.iii. The second semi-annual compliance certification; [OAR 340-218-0080]

38.b.iv. Greenhouse gas emissions report in accordance with OAR 340-215-0030; and

38.b.v. Other annual reporting requirements: [ACDP 09-0040, Condition 7.2]

38.b.v.A. The annual emissions, calculated monthly for each 12-consecutive calendar month period.

38.b.v.B. The cumulative amount of MSW within Knott Landfill as of December 31.

38.b.v.C. The average LFG flow rate at the inlet to the blower serving the flare, calculated monthly for each 12-consecutive calendar month period.

38.b.v.D. The average concentration of CH_4 at the inlet to the blower serving the flare, calculated monthly for each 12-consecutive calendar month period.

38.b.v.E. The total volume of CH_4 (actual cubic feet) at the inlet to the blower serving the flare, calculated monthly on a calendar year basis.

38.b.v.F. The total hours of flare operation, calculated monthly for each 12-consecutive calendar month period.

38.b.v.G. Annual Greenhouse gas (GHG) emissions as calculated according to Condition 40.

39. The semi-annual compliance certification must include the following (provided that the identification of applicable information may cross-reference the permit or previous reports, as applicable): [OAR 340-218-0080(6)(c)]

39.a. The identification of each term or condition of the permit that is the basis of the certification;

39.b. The identification of the method(s) or other means used by the permittee for determining the compliance status with each term and condition during the certification period, and whether such methods or other means provide continuous or intermittent data. Such methods and other means

must include, at a minimum, the methods and means required under OAR 340-218-0050(3). *Note: Certification of compliance with the monitoring conditions in the permit is sufficient to meet this requirement, except when the permittee must certify compliance with new applicable requirements that are incorporated by reference into the permit. When certifying compliance with new applicable requirements that are not yet in the permit, the permittee must provide the information required by this condition.* If necessary, the permittee must identify any other material information that must be included in the certification to comply with section 113(c)(2) of the FCAA, which prohibits knowingly making a false certification or omitting material information;

39.c. The status of compliance with terms and conditions of the permit for the period covered by the certification, including whether compliance during the period was continuous or intermittent. The certification must be based on the method or means designated in Condition 39.b of this rule. The certification must identify each deviation and take it into account in the compliance certification. The certification must also identify as possible exceptions to compliance any periods during which compliance is required and in which an excursion or exceedance, as defined under OAR 340-200-0020, occurred; and

39.d. Such other facts as DEQ may require to determine the compliance status of the source.

40. Greenhouse Gas Registration and Reporting: If the calendar year emission rate of greenhouse gases (CO_2e) is greater than or equal to 2,756 tons (2,500 metric tons), the permittee must register and report its greenhouse gas emissions with DEQ in accordance with OAR 340-215. The greenhouse gas report must be certified by the responsible official consistent with OAR 340-218-0040(5).

41. Notwithstanding any other provision contained in any applicable requirement, the permittee may use monitoring as required under OAR 340-218-0050(3) and incorporated into the permit, in addition to any specified compliance methods, for the purpose of submitting compliance certifications. [OAR 340-218-0080(6)(e)]

NSPS Reporting Requirements

42. The permittee must submit an NMOC emission rate report to the Department annually, except as provided in Condition 42.b. [40 CFR 60.757(b)]

42.a. The NMOC emission rate report must contain an annual or 5-year estimate of the NMOC emission rate calculated using the formula and procedures in Condition 16. [40 CFR 60.757(b)(1)]

42.b. If the estimated NMOC emission rate as reported in the annual report to the Department is less than 50 megagrams per year in each of the next five years, the permittee may elect to submit an estimate of the NMOC emission rate for the next 5-year period in lieu of the annual report. This estimate must include the current amount of solid waste-in-place and the estimated waste acceptance rate for each year of the 5 years for which an NMOC emission rate is estimated. All data and calculations upon which this estimate is based must be provided to the Department. This estimate must be revised at least once every 5 years. If the actual waste acceptance rate exceeds the estimated waste acceptance rate in any year reported in the 5-year estimate, a revised 5-year estimate must be submitted to the Department. The revised estimate must cover the 5-year period beginning with the year in which the actual waste acceptance rate exceeded the estimated waste acceptance rate. [40 CFR 60.757(b)(1)(ii)]

42.c. The NMOC emission rate report must include all the data, calculations, sample reports and measurements used to estimate the annual or 5-year emissions. [40 CFR 60.757(b)(2)]

42.d. Unless the actual acceptance rate for any year exceeds the estimated acceptance rate provided in the report submitted on October 31, 2013, the next NMOC emission rate report is due as required by Condition 16.b.i and submitted with the following year's annual report required by Condition 38. [40 CFR 60.19(d) and (f)]

42.e. The permittee must submit a closure report to the Department within 30 days of waste acceptance cessation. The Department may request additional information as may be necessary to verify that permanent closure has taken place in accordance with the requirements of 40 CFR 258.60. If a closure report has been submitted to the Department, no additional wastes may be placed into the landfill without filing a notification of modification as described in 40 CFR 60.7(a)(4). [40 CFR 60.757(d)]

GENERAL CONDITIONS

G1. General Provision

Terms not otherwise defined in this permit have the meaning assigned to such terms in the referenced regulation.

G2. Reference Materials

Where referenced in this permit, the versions of the following materials are effective as of the dates noted unless otherwise specified in this permit:

a. Source Sampling Manual; April 16, 2015 - State Implementation Plan Volume 3, Appendix A4;
b. Continuous Monitoring Manual; April 16, 2015 - State Implementation Plan Volume 3, Appendix A6; and
c. All state and federal regulations as in effect on the date of issuance of this permit.

G3. Applicable Requirements [OAR 340-218-0010(3)(b)]

Oregon Title V Operating Permits do not replace requirements in Air Contaminant Discharge Permits (ACDP) issued to the source even if the ACDP(s) have expired. For a source operating under a Title V permit, requirements established in an earlier ACDP remain in effect notwithstanding expiration of the ACDP or Title V permit, unless a provision expires by its terms or unless a provision is modified or terminated following the procedures used to establish the requirement initially. Source specific requirements, including, but not limited to TACT, RACT, BACT, and LAER requirements, established in an ACDP must be incorporated into the Oregon Title V Operating Permit and any revisions to those requirements must follow the procedures used to establish the requirement initially.

G4. Compliance [OAR 340-218-0040(3)(n)(C), 340-218-0050(6), and 340-218-0080(4)]

a. The permittee must comply with all conditions of this permit. Any permit condition noncompliance constitutes a violation of the Federal Clean Air Act and/or state rules and is grounds for enforcement action; for permit termination, revocation and re-issuance, or modification; or for denial of a permit renewal application. Any noncompliance with a permit condition specifically designated as enforceable only by the state constitutes a violation of state rules only and is grounds for enforcement action; for permit termination, revocation and re-issuance, or modification; or for denial of a permit renewal application.
b. Any schedule of compliance for applicable requirements with which the source is not in compliance at the time of permit issuance is supplemental to, and does not sanction noncompliance with the applicable requirements on which it is based.
c. For applicable requirements that will become effective during the permit term, the source must meet such requirements on a timely basis unless a more detailed schedule is expressly required by the applicable requirement.

G5. Masking Emissions

The permittee must not install or use any device or other means designed to mask the emission of an air contaminant that causes or is likely to cause detriment to health, safety, or welfare of any person or otherwise violate any other regulation or requirement. [OAR 340-208-0400] This condition is enforceable only by the State.

G6. Credible Evidence

Notwithstanding any other provisions contained in any applicable requirement, any credible evidence may be used for the purpose of establishing whether a person has violated or is in violation of any such applicable requirements. [OAR 340-214-0120]

G7. Certification [OAR 340-214-0110, 340-218-0040(5), 340-218-0050(3)(c)(D), and 340-218-0080(2)]

Any document submitted to DEQ or EPA pursuant to this permit must contain certification by a responsible official of truth, accuracy and completeness. All certifications must state that based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and, complete. The permittee must promptly, upon discovery, report to DEQ a material error or omission in these records, reports, plans, or other documents.

G8. Open Burning [OAR Chapter 340, Division 264]

The permittee is prohibited from conducting open burning, except as may be allowed by OAR 340-264-0020 through 340-264-0200.

G9. Asbestos [40 CFR Part 61, Subpart M (federally enforceable), OAR Chapter 340-248-0005 through 340-248-0180 (state-only enforceable) and 340-248-0205 through 340-248-0280]

The permittee must comply with OAR Chapter 340, Division 248, and 40 CFR Part 61, Subpart M when conducting any renovation or demolition activities at the facility.

G10. Stratospheric Ozone and Climate Protection [40 CFR 82 Subpart F, OAR 340-260-0040]

The permittee must comply with the standards for recycling and emissions reduction pursuant to 40 CFR Part 82, Subpart F, Recycling and Emissions Reduction.

G11. Permit Shield [OAR 340-218-0110]

a. Compliance with the conditions of the permit is deemed compliance with any applicable requirements as of the date of permit issuance provided that:
   i. Such applicable requirements are included and are specifically identified in the permit, or
   ii. DEQ, in acting on the permit application or revision, determines in writing that other requirements specifically identified are not applicable to the source, and the permit includes the determination or a concise summary thereof.

b. Nothing in this rule or in any federal operating permit alters or affects the following:
   i. The provisions of ORS 468.115 (enforcement in cases of emergency) and ORS 468.035 (function of department);
   ii. The liability of an owner or operator of a source for any violation of applicable requirements prior to or at the time of permit issuance;
   iii. The applicable requirements of the national acid rain program, consistent with section 408(a) of the FCAA; or
   iv. The ability of DEQ to obtain information from a source pursuant to ORS 468.095 (investigatory authority, entry on premises, status of records).

c. Sources are not shielded from applicable requirements that are enacted during the permit term, unless such applicable requirements are incorporated into the permit by administrative amendment, as provided in OAR 340-218-0150(1)(h), significant permit modification, or reopening for cause by DEQ.

G12. Inspection and Entry [OAR 340-218-0080(3)]

Upon presentation of credentials and other documents as may be required by law, the permittee must allow DEQ, or an authorized representative (including an authorized contractor acting as a representative of the EPA Administrator), to perform the following:

a. Enter upon the permittee's premises where an Oregon Title V Operating Permit program source is located or emissions-related activity is conducted, or where records must be kept under the conditions of the permit;
b. Have access to and copy, at reasonable times, any records that must be kept under conditions of the permit;
c. Inspect, at reasonable times, any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit; and
d. As authorized by the FCAA or state rules, sample or monitor, at reasonable times, substances or parameters, for the purposes of assuring compliance with the permit or applicable requirements.

G13. Fee Payment [OAR 340-220-0010, and 340-220-0030 through 340-220-0190]

The permittee must pay an annual base fee and an annual emission fee for particulates, sulfur dioxide, nitrogen oxides, and volatile organic compounds. The permittee must submit payment to the Department of Environmental Quality, Financial Services, 811 SW 6th Ave., Portland, OR 97204, within 30 days of date DEQ mails the fee invoice or August 1 of the year following the calendar year for which emission fees are paid, whichever is later. Disputes must be submitted in writing to DEQ. Payment must be made regardless of the dispute. User-based fees will be charged for specific activities (e.g., computer modeling review, ambient monitoring review, etc.) requested by the permittee.

G14. Off-Permit Changes to the Source [OAR 340-218-0140(2)]

a. The permittee must monitor for, and record, any off-permit change to the source that:
   i. Is not addressed or prohibited by the permit;
   ii. Is not a Title I modification;
   iii. Is not subject to any requirements under Title IV of the FCAA;
   iv. Meets all applicable requirements;
   v. Does not violate any existing permit term or condition; and
   vi. May result in emissions of regulated air pollutants subject to an applicable requirement but not otherwise regulated under this permit or may result in insignificant changes as defined in OAR 340-200-0020.
b. A contemporaneous notification, if required under OAR 340-218-0140(2)(b), must be submitted to DEQ and the EPA.
c. The permittee must keep a record describing off-permit changes made at the facility that result in emissions of a regulated air pollutant subject to an applicable requirement, but not otherwise regulated under the permit, and the emissions resulting from those off-permit changes.
d. The permit shield of Condition G11 does not extend to off-permit changes.

G15. Section 502(b)(10) Changes to the Source [OAR 340-218-0140(3)]

a. The permittee must monitor for, and record, any section 502(b)(10) change to the source, which is defined as a change that would contravene an express permit term but would not:

i. Violate an applicable requirement;
ii. Contravene a federally enforceable permit term or condition that is a monitoring, recordkeeping, reporting, or compliance certification requirement; or
iii. Be a Title I modification.

b. A minimum 7-day advance notification must be submitted to DEQ and the EPA in accordance with OAR 340-218-0140(3)(b).
c. The permit shield of Condition G11 does not extend to section 502(b)(10) changes.

G16. Administrative Amendment [OAR 340-218-0150]

Administrative amendments to this permit must be requested and granted in accordance with OAR 340-218-0150. The permittee must promptly submit an application for the following types of administrative amendments upon becoming aware of the need for one, but no later than 60 days of such event:

a. Legal change of the registered name of the company with the Corporations Division of the State of Oregon, or
b. Sale or exchange of the activity or facility.

G17. Minor Permit Modification [OAR 340-218-0170]

The permittee must submit an application for a minor permit modification in accordance with OAR 340-218-0170.

G18. Significant Permit Modification [OAR 340-218-0180]

The permittee must submit an application for a significant permit modification in accordance with OAR 340-218-0180

G19. Staying Permit Conditions [OAR 340-218-0050(6)(c)]

Notwithstanding Conditions G16 and G17, the filing of a request by the permittee for a permit modification, revocation and re-issuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

G20. Construction/Operation Modification [OAR 340-218-0190]

The permittee must obtain approval from DEQ prior to construction or modification of any stationary source or air pollution control equipment in accordance with OAR 340-210-0200 through OAR 340-210-0250.

G21. New Source Review Modification [OAR 340-224-0010]

The permittee may not begin construction of a major source or a major modification of any stationary source without having received an Air Contaminant Discharge Permit (ACDP) from DEQ and having satisfied the requirements of OAR 340, Division 224.

G22. Need to Halt or Reduce Activity Not a Defense [OAR 340-218-0050(6)(b)]

The need to halt or reduce activity will not be a defense. It will not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

G23. Duty to Provide Information [OAR 340-218-0050(6)(e) and OAR 340-214-0110]

The permittee must furnish to DEQ, within a reasonable time, any information that DEQ may request in writing to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit, or to determine compliance with the permit. Upon request, the permittee must also furnish to DEQ copies of records required to be retained by the permit or, for information claimed to be confidential, the permittee may furnish such records to DEQ along with a claim of confidentiality.

G24. Reopening for Cause [OAR 340-218-0050(6)(c) and 340-218-0200]

a. The permit may be modified, revoked, reopened and reissued, or terminated for cause as determined by DEQ.
b. A permit must be reopened and revised under any of the circumstances listed in OAR 340-218-0200(1)(a).
c. Proceedings to reopen and reissue a permit must follow the same procedures as apply to initial permit issuance and affect only those parts of the permit for which cause to reopen exists.

G25. Severability Clause [OAR 340-218-0050(5)]

Upon any administrative or judicial challenge, all the emission limits, specific and general conditions, monitoring, recordkeeping, and reporting requirements of this permit, except those being challenged, remain valid and must be complied with.

G26. Permit Renewal and Expiration [OAR 340-218-0040(1)(a)(D) and 340-218-0130]

a. This permit expires at the end of its term, unless a timely and complete renewal application is submitted as described below. Permit expiration terminates the permittee's right to operate.
b. Applications for renewal must be submitted at least 12 months before the expiration of this permit, unless DEQ requests an earlier submittal. If more than 12 months is required to process a permit renewal application, DEQ must provide no less than six (6) months for the owner or operator to prepare an application.
c. Provided the permittee submits a timely and complete renewal application, this permit will remain in effect until final action has been taken on the renewal application to issue or deny the permit.

G27. Permit Transference [OAR 340-218-0150(1)(d)]

The permit is not transferable to any person except as provided in OAR 340-218-0150(1)(d).

G28. Property Rights [OAR 340-200-0020 and 340-218-0050(6)(d)]

The permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations, except as provided in OAR 340-218-0110.

G29. Permit Availability [OAR 340-200-0020 and 340-218-0120(2)]

The permittee must have available at facility at all times a copy of the Oregon Title V Operating Permit and must provide a copy of the permit to DEQ or an authorized representative upon request.

ALL INQUIRIES SHOULD BE DIRECTED TO:
Eastern Region-Bend Office
475 NE Bellevue Dr., Suite 110
Bend, OR 97701
541-388-6146

State of Oregon Department of Environmental Quality

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
OREGON TITLE V OPERATING PERMIT
REVIEW REPORT

Eastern Region
475 NE Bellevue Dr., Suite 110
Bend, OR 97701

Source Information:

SIC	4953	NAICS	562212

Compliance and Emissions Monitoring Requirements:

Unassigned emissions	No	CEMS	No
Emission credits	No	PEMS	No
Compliance schedule	No	Ambient monitoring	No
Source test [date(s)]	10/27/18		
COMS	No		

Reporting Requirements

Annual report (due date)	2/15	Monthly report (due dates)	No
Emission fee report (due date)	2/15	Excess emissions report	Within 1 hour
SACC (due date)	2/15 and 7/30	Other reports (type)	NSPS NMOC report – 2/15
Quarterly report (due dates)	No		

Air Programs

NSPS (list subparts)	WWW, IIII	Title V	Yes
NESHAP (list subparts)	ZZZZ	ACDP (SIP)	Incorporated
CAM	No	Major HAP source	No
Regional Haze (RH)	No	Federal major source	No
Synthetic Minor (SM)	No	NSR	No
Part 68 Risk Management	No	PSD	No
CFC	No	Acid Rain	No
RACT	No		
TACT	No		

TABLE OF CONTENTS

LIST OF ABBREVIATIONS USED IN THIS REVIEW REPORT

AQMA	Air Quality Management Area
ASTM	American Society of Testing and Materials
BDT	Bone Dry Ton
CEMS	Continuous Emissions Monitoring System
CFR	Code of Federal Regulations
CH_4	Methane (greenhouse gas)
CMS	Continuous Monitoring System
CO	Carbon Monoxide
CO_2e	Carbon Dioxide Equivalent
COMS	Continuous Opacity Monitoring System
DEQ	Oregon Department of Environmental Quality
dscf	dry standard cubic feet
EF	Emission Factor
EPA	United States Environmental Protection Agency
EU	Emissions Unit
FCAA	Federal Clean Air Act
GHG	Greenhouse Gas
gr/dscf	grains per dry standard cubic feet
HAP	Hazardous Air Pollutant
ID	Identification Code
I&M	Inspection and Maintenance
MB	Material Balance
Mlb	1000 Pounds
MM	Million
N_2O	Nitrous Oxide (greenhouse gas)
NA	Not Applicable
NESHAP	National Emission Standard for Hazardous Air Pollutants
NO_x	Oxides of Nitrogen
NSPS	New Source Performance Standard
NSR	New Source Review
O_2	Oxygen
OAR	Oregon Administrative Rules
ORS	Oregon Revised Statutes
O&M	Operation and Maintenance
Pb	Lead
PCD	Pollution Control Device
PEMS	Predictive Emissions Monitoring System
PM	Particulate Matter
PM_{10}	Particulate Matter less than 10 microns in size
$PM_{2.5}$	Particulate Matter less than 2.5 microns in size
PSD	Prevention of Significant Deterioration
PSEL	Plant Site Emission Limit
SO_2	Sulfur Dioxide
ST	Source Test
VE	Visible Emissions
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound

INTRODUCTION

1. This is a renewal of the Oregon Title V Operating Permit issued to the Deschutes County Dept. of Solid Waste which operates the Knott Landfill Recycling and Transfer Facility. The permit was issued on August 10, 2011 and is scheduled to expire on August 1, 2016. A timely and complete application (Application Number 28252) was submitted to the Department on June 29, 2015, so the current permit remains in effect until the permit renewal is issued.

2. In accordance with OAR 340-218-0120(1)(f), this review report is intended to provide the legal and factual basis for the draft permit conditions. In most cases, the legal basis for a permit condition is included in the permit by citing the applicable regulation. In addition, the factual basis for the requirement may be the same as the legal basis. However, when the regulation is not specific and only provides general requirements, this review report is used to provide a more thorough explanation of the factual basis for the draft permit conditions.

3. On October 3, 2016, DEQ received an application (Application Number 28794) to modify the Oregon Title V Operating Permit No. 09-0040-TV-01. The minor permit modification is being included during the permitting renewal process. The modification includes replacing the existing flare with a capacity of 750 standard cubic feet per minute (scfm) with a new larger flare capable of burning up to 2000 scfm. The increased flare capacity will allow the permittee to extract, control and burn more landfill gases. The larger flare will provide increases in control capacity to minimize fugitive odors, volatile organic compounds (VOCs), and non-methane organic compound (NMOC) emissions that would otherwise be emitted as fugitive gases. The new flare is sized and designed to control all existing and future landfill gases for the life of the landfill. The permittee has requested to maintain the existing 750 scfm flare for backup purposes.

4. The following modifications were approved for the facility during the last permit term:

Date	Permit Revision or Notification	Brief Explanation
08/25/2011	NC Type 1	Purchase and use new Caterpillar 836 compactor
01/02/2013	NC Type 2	Upgrade the landfill gas collection system and increase flare capacity to 750 cfm
01/24/2013	NC Type 1	Landfill gas extraction well installation
05/25/2015	NC Type 1	Extraction for cell 6 cleanout, sump riser and recirculation manifold.

5. The following changes are being made in this permit:

New Permit Condition Number	Old Permit Condition Number	Description of Change	Reason for Change
1 - 2	1 - 2	No Changes	NA
3	3	Updated Emission units in Table 1	Removed Stirling Engine emission unit option from permit
Table 2	Table	Updated facility wide emission limits and standards	OAR revisions
4 - 5	4 - 6	Updated fugitive particulate emissions requirements and monitoring	Title V program revisions
6 - 13	7 - 14	No Changes	NA
14	--	Added NSPS requirements for emergency engine generator set	Title V program and rule adoption
15 - 16	15 -16	No Changes	NA

New Permit Condition Number	Old Permit Condition Number	Description of Change	Reason for Change
17 - 18	17	Updated grain loading emission requirements	Title V program and OAR revisions
19 - 21	18 – 20	No Changes	NA
22	22	Insignificant activity requirements updated	Title V program and OAR revisions
23	23	Updated PSELs to include $PM_{2.5}$ and GHG	Title V program and OAR revisions
24	24	Clarified calculation requirement	No substantial change
25	25	Updated emission fees	Title V program revisions
26 - 37	26 - 37	No Changes	NA
38	38	Added GHG reporting to annual report requirements	Title V program and OAR revisions
39	39	No Changes	NA
40	--	GHG reporting requirements	Title V program and OAR revisions
41 - 42	40 - 41	No Changes	NA
G1 – G29	G1 – G29	No Changes	NA

PERMITTEE IDENTIFICATION

6. Deschutes County Dept. of Solid Waste operates Knott Landfill Recycling and Transfer Facility (KLF) located at 61050 SE 27th Street in Bend, Oregon.

FACILITY DESCRIPTION

7. KLF has been actively accepting municipal solid waste since 1972 and is currently permitted by DEQ as a municipal solid waste (MSW) disposal facility (Solid Waste Permit 6). The total area of the facility is 205 acres, which includes the County's waste management operations (landfill, transfer station, hazardous waste collection and administrative offices). The facility also includes recycling and composting facilities operated by Deschutes Recycling, LLC.

   The *Site Development Plan for Knott Landfill and Recycle Center, Deschutes County, Oregon* (URS, July 31, 2003) includes an eventual increase in the facility disposal capacity to 5,070,000 tons (approximately 4.6 million megagrams (Mg)). The development and operation identified in the 2003 *Site Development Plan*, including increased capacity to above the New Source Performance Standard (NSPS) Subpart WWW threshold of 2.5 million Mg, was incorporated in Permit Addendum 4 to Solid Waste Permit No. 6 on April 3, 2008.

   The KLF has been required to comply with New Source Performance Standards (NSPS) 40 CFR Part 60 Subpart WWW Standards of performance for Municipal Solid Waste Landfills. KLF was to comply with either 40 CFR 60.752(b)(2) or calculate an annual emission rate for the non-methane organic compounds (NMOC) to demonstrate compliance with the 50 Megagram per year (Mg/yr) limit for the landfill over each of the next five years. KLF performed an initial Tier II NMOC sampling, analysis and calculation in 2008 and again in October 2013. The 2013 results showed a peak NMOC generation rate was estimated to range from 15.7 Mg/yr in 2012 to 19.8 Mg/yr in 2017, were well below the 50 Mg/yr limit.

   Deschutes County submitted a Notification of Initial Design Capacity Report to DEQ in October 2013, as required under OAR 340-238-0100 and 40 CFR 60.752(a). Deschutes County elected to recalculate the non-methane organic compound (NMOC) emission rate using a Tier 2 sampling and analysis procedure as

provided in 40 CFR 60.754(a)(3). The Tier 2 sampling showed the NMOC emission rate to be substantially lower than that calculated using EPA default methods. The site-specific NMOC concentration (C_{NMOC}) was found to be 313 ppmv (as hexane), resulting in an expected NMOC emission rate of 25.5 Mg/yr in year 2021. The application includes the specific waste disposal rate summary for the facility, including projected annual rates through year 2021. The calculated Tier 2 NMOC emission rates are provided in Appendix A (Emissions Detail Sheets).

For the purposes of compliance with OAR 340-238-0100, the peak NMOC generation using equation 1 exclusively is estimated to be at 16.6 Mg/yr in 2015 to 24.3 Mg/yr in 2021. The peak NMOC generation rate using both equations 1 and 2 is estimated to be 17.6 Mg/yr in 2015 and 25.5 Mg/yr in 2021. Based on these findings, Deschutes County proposed that the facility update the NMOC generation report in five years (or as necessary), per 40 CFR 60.757(b)(1)(ii), based on updated forecast of waste rates, and an update of the NMOC concentration for the landfill, if the new waste areas are applicable for testing. Equation 1 is for landfills with a known waste acceptance rate for each year (40 CFR 60.754(a)(1)(i)) and Equation 2 is used when the waste acceptance rate is unknown (40 CFR 60.754(a)(1)(ii)).

8. **MSW Collection and Recycling Operations**

Approximately 135 acres of the 205 acre site is zoned for landfilling; the landfilling area is described in detail in the 2003 *Site Development Plan*. The additional 70 acres of non-landfill use comprises the North Development Area (NDA), which contains the office and pay booth, scales, administrative buildings, public areas for receiving and recycling (including an area for household hazardous waste collection), white goods area (for scrap metal and tires), and several storm water detention ponds. The roadways within the NDA are all paved.

KLF accepts solid waste from residential, commercial and industrial sources in Deschutes County. The solid waste that is accepted is defined in Oregon Revised Statutes (ORS) 459.05. The Recycle Center accepts and handles a variety of source separated recyclable materials. Hazardous waste is accepted at the facility, including asbestos containing materials (ACM) and household hazardous waste. Recycle and hazardous waste materials are shipped off-site to appropriate recycle contractors. Petroleum contaminated soil (PCS) accepted at the landfill is used as daily cover soil. Clean woody construction and demolition materials (C&D) and yard debris are stored and ground for hog fuel and compost, respectively. Typically, the hog fuel is shipped off-site immediately following grinding. The ground yard debris is placed in windrows, processed into compost and eventually sold.

Delivery of solid waste is by private and commercial vehicles ("Public"), refuse collection trucks ("Franchise"), and the County's onsite transfer trailers ("Transfer"). The NDA includes a waste receiving/transfer station. The transfer station accommodates private and commercial vehicles, limiting access to the active working face of the landfill to large commercial vehicles, franchise and transfer trucks.

9. **Fugitive Landfill Emissions**

Several areas within KLF have fugitive emissions, including the landfill gas, storage piles, material handling processes, and unpaved and paved roads. Heavy equipment used in the landfilling process includes the following:

- 2 landfill compactors (Cat 836H)
- 2 wheeled tractor-scrapers (Cat 623G)
- 2 track-type bulldozers (Cat D7HR)
- 3 wheel loaders (Cat 966H and 950H)
- 1 road grader (Cat 12G)
- 1 integrated tool carrier wheel loader (Cat 930H)
- 1 utility truck (Bobcat)
- 1 mini-excavator (Bobcat)

- 1 water tanker truck (International)
- 2 trucks (Freightliner)
- 2 semi-truck tractors (International)

Although the PCS and compost are expected to produce emissions of volatile organic compounds (VOC), they are not expected to have emissions of fugitive dust due to their high moisture content.

10. **Landfill Gas Collection System**

The County installed a landfill gas (LFG) collection system in 2001 to control off-site migration of LFG. The system consists of approximately 32 extraction points (extraction wells, leachate recirculation lines, clean-out lines, etc.) connected to a flare/blower unit via a header piping system. LFG is extracted from portions of the Phase 1-B area and Cells 1-46 by pulling LFG under vacuum from the extraction points through a header system to a skid mounted flare unit, where it is flared off. An industrial blower is used to pull LFG from the landfill. The blower exhausts through the flare unit where the LFG is combusted. The new blower design capacity will be to 2,000 standard cubic feet per minute (scfm). A continuous flow meter will be used to measure landfill gas to the flare on a minute average. The flare unit will be a 30-foot tall stack equipped with a flame shroud. The flame temperature is to be continuously monitored using a high-temperature thermocouple. In the event the flame is extinguished, a spark igniter is used to re-light the flame. No supplementary fuel is required. Should the methane content in the primary extraction wells drop, secondary wells will be tapped to provide additional methane. The extraction of the secondary wells will not require an increase in the blower design capacity.

11. **Landfill Gas-to-Energy System**

The County had planned to install a 43 kilowatt (kW) Stirling Engine that would have been fueled with landfill gas. The installation of the Stirling Engine in no longer being considered by Deschutes County and has been removed as an operating scenario in the Title V operating permit.

12. **Emergency Engine Generator Set**

The facility has one diesel emergency engine generator set, which is used in the event of a power failure. The emergency engine generator is Generac (SN #2092577) 389 hp, 250 KW generator that was manufactured and installed in 2007. It operates for about 30 minutes each week in non-emergency mode for readiness testing purposes.

EMISSIONS UNIT AND POLLUTION CONTROL DEVICE IDENTIFICATION

13. The emissions units at this facility are the following:

Emissions Unit (EU)	EU ID	EU Description	Pollutants Emitted	Pollution Controls
Landfill Gas	LFG-01	Landfill gas (LFG) is generated from the decomposition of solid waste placed in the landfill.	NMOC, VOC, HAPs, PM, PM_{10}, $PM_{2.5}$, NO_x, CO, & SO_2	Partial LFG collection system with flare (FLR-02)
Flares	FLR-01	Auxiliary flare that burns LFG collected from the landfill. Flare capacity is 750 scfm.		None
	FLR-02	Primary flare that burns LFG collected from the landfill. Flare capacity is 2,000 scfm.		None
Compost Piles	COM-01	Windrows of yard debris are turned approximately 1-2 times per month.	VOC	None

Emissions Unit (EU)	EU ID	EU Description	Pollutants Emitted	Pollution Controls
Petroleum Contaminated Soil	PCS-01	PCS is used as daily cover material for the landfill. PCS is used as received and not stored on site.	VOC	None
Material Handling	MH-01	Excavation, storage, recovery and deposition of cover soil (H-1); Excavation, storage, recovery and deposition of aggregate (H-2); Grading (H-3); Dirt pushing and bulldozing (H-4).	PM	Water
Unpaved Roads	UPR-01	Fugitive dust from vehicle traffic on unpaved areas of the landfill.	PM	Magnesium Chloride and Water
Paved Roads	PRD-01	Fugitive dust from vehicle traffic on paved roads.	PM	Sweeping and Road Washing

14. Categorically insignificant activities include the following

- Constituents of a chemical mixture present at less than 1% by weight of any chemical or compound regulated under OAR Chapter 340, Divisions 200 through 268, excluding Divisions 248 and 262, or less than 0.1% by weight of any carcinogen listed in the U.S. Department of Health and Human Service's Annual Report on Carcinogens when usage of the chemical mixture is less than 100,000 pounds/year
- Evaporative and tail pipe emissions from on-site motor vehicle operation
- Distillate oil, kerosene and gasoline fuel burning equipment rated at less than or equal to 0.4 million Btu/hr
- Natural gas and propane burning equipment rated at less than or equal to 2.0 million Btu/hr
- Office activities
- Janitorial activities
- Personal care activities
- Groundskeeping activities including, but not limited to building painting and road and parking lot maintenance
- Maintenance and repair shop
- Automotive repair shops or storage garages
- Air cooling or ventilating equipment not designed to remove air contaminants generated by or released from associated equipment
- Refrigeration systems with less than 50 pounds of charge of ozone depleting substances regulated under Title VI, including pressure tanks used in refrigeration systems but excluding any combustion equipment associated with such systems
- Temporary construction activities
- Accidental fires
- Air vents from air compressors
- Fire suppression
- Routine maintenance, repair and replacement such as anticipated activities most often associated with and performed during regularly scheduled equipment outages to maintain a plant and its equipment in good operating condition, including but not limited to steam cleaning, abrasive use and woodworking
- Electric motors
- Storage tanks, reservoirs, transfer and lubricating equipment used for ASTM grade distillate or residual fuels, lubricants and hydraulic fluids
- On-site storage tanks not subject to any New Source Performance Standards (NSPS), including underground storage tanks (UST), storing gasoline or diesel used exclusively for fueling of the facility's fleet of vehicles
- Natural gas, propane and liquefied petroleum gas (LPG) storage tanks and transfer equipment

- Pressurized tanks containing gaseous compounds
- Storm water settling basins
- Health, safety and emergency response activities
- Emergency generators and pumps used only during loss of primary equipment or utility service due to circumstances beyond the reasonable control of the owner or operator, or to address a power emergency as determined by the Department
- Combustion source flame safety purging on startup

EMISSION LIMITS AND STANDARDS, TESTING, MONITORING AND RECORDKEEPING

Based on the information provided in the permit application, DEQ has determined that the following requirements apply to the facility. The monitoring and recordkeeping for each requirement is discussed for each requirement/emissions unit.

Oregon Administrative Rules (OAR) – State only enforceable (not included in SIP)

15. OAR 340-208-0300 prohibits nuisances and 340-208-0450 prohibits the deposition of particulate matter larger than 250 microns in size upon another person's property.

    15.a. Testing Requirements: These standards do not have emission limits so the permit does not include any testing requirements or compliance test methods.
    15.b. Monitoring requirements: Monitoring for these standards consists of maintaining a complaint log and resolving complaints.

16. OAR 340-215-0030 requires greenhouse gas emission reports annually.

Oregon Administrative Rules (OAR) – federally enforceable (included in SIP)

17. OAR 340-208-0110(2) limits visible emissions to 20% opacity. OAR 340-208-0210(1) requires the permittee to take reasonable precautions to minimize fugitive emissions. These standards apply to the entire facility.

    17.a. Testing Requirements: OAR 340-208-0210(1) includes precautionary measures that should prevent excessive visible emissions. Therefore, the permit does not require any testing.
    17.b. Monitoring Requirements: The permittee is required to visually inspect the facility at least once a week to verify that the landfill activities are not causing excess fugitive emissions. Excess fugitive emissions are defined as any visible emissions leaving the facility boundary.

18. OAR 340-222-0041 requires Plant Site Emission Limits for permitted sources. See Section 33 of this review report for a discussion of those limits and associated monitoring.

19. OAR 340-226-0130, highest and best practicable treatment and control, applies to the flare. The operation and maintenance requirements that were established for the flare in the Simple Air Contaminant Discharge Permit are incorporated into the Title V permit.

20. OAR 340-228-0210(2)(b)(B), particulate matter emission limit of 0.14 gr/dscf, applies to the flare. The operation and maintenance requirements identified in Section 19 assure compliance with this limit.

ACDP requirements: (e.g., source specific RACT, BACT, LAER, TACT, highest and best determinations)

21. ACDP Conditions 2.1, 4.1, 6.1 and 7.2 established operation and maintenance requirements, monitoring, recordkeeping and reporting for the flare. These requirements are incorporated into the Title V permit unchanged.

Federal Requirements:

22. New Source Performance Standards in OAR 340-238-0100 applies to the landfill.

23. This facility is subject to NSPS, Subpart WWW – Standards of Performance for Municipal Solid Waste Landfills. The permittee is required to:

    23.a. Submit annual reports of the NMOC emission rate using the calculations and procedures of 40 CFR 60.754(a).
    23.b. Send the collected gas to an open flare (FLR-01 or FLR-02) that has been designed and operated in accordance with 40 CFR 60.18.
    23.c. 40 CFR 60.752((b) requires a landfill gas capture and control system, unless the NMOC emission rate is less than 50 megagrams per year. Currently, the NMOC emission rate from the Knott Landfill is less than 50 megagrams per year, so a capture and control system as specified in the NSPS is not required.

24. This facility is not subject to NSPS, 40 CFR Part 60, Subpart JJJJ – Standards of Performance for Spark Ignition Internal Combustion Engines because there are no proposed SI ICE proposed to be operated at the facility.

25. This facility is subject to NSPS, 40 CFR Part 60, Subpart IIII – Standards of Performance for an emergency stationary Compression Ignition (CI) Internal Combustion Engine (ICE) rated at 250 kW (389 hp) and installed in 2007.

26. The existing 250 kW emergency engine generator set is also subject to 40 CFR Part 63, Subpart ZZZZ, Reciprocating Internal Combustion Engine (RICE) requirements. Compliance with NSPS, Subpart IIII satisfies the compliance requirements of 40 CFR Part 63, Subpart ZZZZ.

27. 40 CFR Part 63, subpart AAAA applies to landfills larger than 2.5 million Mg and NMOC emissions greater than 50 Mg/yr. Knott Landfill is larger than 2.5 million Mg, but the NMOC emissions are less than 50 Mg/yr, so the NESHAP does not apply. The landfill is also not a major source of hazardous air pollutants (HAP).

28. The federal compliance assurance monitoring (CAM) regulations in OAR 340-212-0200 and 40 CFR Part 64 are not applicable to the Knott Landfill because pre-controlled emissions of LFG <100 tpy and there are no other controlled emissions units.

29. The federal Accidental Release Prevention requirements in 40 CFR Part 68 are not applicable because the regulated substances are not used at the facility in the quantities specified by the regulations.

30. The federal Acid Rain requirements in 40 CFR Parts 72, 74 and 75 are not applicable because Knott Landfill is not an “affected facility”.

31. The federal Greenhouse Gas Reporting requirements in 40 CFR Part 98 is applicable to the Knott Landfill.

32. As identified earlier in this Review Report, this facility has insignificant emissions units (IEUs) that include categorically insignificant activities and aggregate insignificant emissions, as defined in OAR 340-200-0020. For the most part, the standards that apply to IEUs are for opacity (20% limit) and particulate matter (0.14 gr/dscf limit). The Department does not consider it likely that IEUs could exceed an applicable emissions limit or standard because IEUs are generally equipment or activities that do not have any emission controls (e.g., small natural gas fired space heaters) and do not typically have visible emissions. Since there are no controls, no visible emissions, and the emissions are less than one ton per year, the Department does not believe that monitoring, recordkeeping or reporting is necessary for assuring compliance with the standards.

PLANT SITE EMISSION LIMITS

33. Provided below is a summary of the baseline emission rates, netting basis, plant site emission limits and emissions capacity.

Pollutant	Baseline Emission Rate (tons/yr)	Netting Basis		Plant Site Emission Limit (PSEL)		
		Previous (tons/yr)	Proposed (tons/yr)	Previous PSEL (tons/yr)	Proposed PSEL (tons/yr)	PSEL Increase (tons/yr)
PM	0	0	0	31	25	-6
PM_{10}	0	0	0	14	14	0
$PM_{2.5}$	0	NA	0	NA	9	NA
CO	0	0	0	99	99	0
NO_x	0	0	0	39	39	0
SO_2	0	0	0	39	39	0
VOC	0	0	0	39	39	0
NMOC	0	0	0	49	49	0
GHG (CO_2e)	58,124	NA	58,124	NA	84,684	NA

33.a. The baseline emission rate and the netting basis are zero because this facility was constructed after the baseline period of 1977-1978 for all pollutants other than GHG, and 2001-2010 for GHG. In addition, the source is not subject to New Source Review (NSR) for Prevention of Significant Deterioration (PSD) under OAR 340-224-0070.

33.b. For GHG, the baseline period was determined as January 2010 through December 2010. The baseline emission rate includes the calculated emissions from landfill gas losses and combustion in the flare during the baseline period. The calculation of the baseline can be reviewed in the Emissions Detail Sheets of this review report. [Definition of *baseline emission rate* in OAR 340-200-0020]

33.c. The emission basis developed with emission factors for the GHG baseline emission rate, existing netting basis, and PSELs are provided in the Emissions Detail Sheets of this review report.

33.d. The difference between the PSEL and the netting basis for GHG is not due to any physical change. The netting basis is equal to the baseline emission rate and the PSEL is based on the capacity of the emission units.

33.e. The proposed PSEL for PM_{10}, $PM_{2.5}$, CO, NO_x, SO_2, VOC and NMOC are equal to the Generic PSEL in accordance with OAR 340-222-0040(1).

33.f. The proposed PSEL for PM is being lowered but remains greater than the Generic PSELs. A source specific PSEL for PM is being set equal to the potential to emit in accordance with OAR 340-222-0041(2).

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

SIGNIFICANT EMISSION RATE

34. The PSELs for PM_{10}, $PM_{2.5}$, CO, NO_x, SO_2, VOC and NMOC are not greater than the netting basis by more than the significant emission rate. The increase in GHG emissions over the netting basis is less than the significant emission rate. The PSEL for PM has been lowered by 6 tons from the previous PSEL but remains one ton more than the significant emission rate. An Air Quality Analysis is not required for PM since there is not a state or National Ambient Air Quality Standard promulgated for this pollutant. Thus, no further air quality analysis is required.

HAZARDOUS AIR POLLUTANTS

35. A major source is a facility that has the potential to emit 10 tons/yr or more of any single HAP or 25 tons/yr or more of combined HAPs. This source is not a major source of hazardous air pollutants. According to the Emissions Detail Sheets, the estimated maximum potential to emit of combined HAPs is 7.4 tons per year.

GENERAL BACKGROUND INFORMATION

36. Knott Landfill Recycling and Transfer Facility is currently regulated by a Solid Waste Permit with the Department.

37. This source is located in an area that is in attainment for all pollutants.

38. This source is located within 100 kilometers (62 miles) of the following Class I air quality protection areas: Mt. Jefferson, Mt. Washington, Three Sisters Wilderness Area and Diamond Peak.

COMPLIANCE HISTORY

39. The facility was inspected on the following dates during the last permit term:

Inspection Date	Results of Inspection	Department Actions
03/01/2016	Inspection - In Compliance	No Action Necessary
06/25/2014		
05/31/2012		

Enforcement Date	Enforcement Action	Department Actions
09/20/2013	Warning Letter WL-BND-2013-0128	Excess Emission reported late. Corrective actions taken to ensure compliance with future reporting.
03/19/2012	Warning Letter WL-BND-2012-0024	Deviations in semi-annual report. Corrective actions taken to ensure compliance with future monitoring and reporting requirements.
10/28/2016	Warning Letter WL-BND-2016-1991	Exceeding the 12-month rolling PSEL for PM. Monthly PM emission calculations to be corrected in the renewed permit.

SOURCE TEST RESULTS

The permittee conducted testing to determine the average NMOC concentration of the landfill gas. Testing was conducted in accordance with the procedures in 40 CFR 60.754. The average NMOC concentration (C_{NMOC}) was found to be 313 ppmv (as hexane). The permit includes a requirement to conduct the NMOC testing again by October 27, 2018.

PUBLIC NOTICE

40. This permit will be placed on public notice from **Nov. 13, 2016** to **Dec. 19, 2016**. Comments may be submitted in writing during the comment period. DEQ will hold a public hearing if requested by 10 or more individuals or one person representing a group of 10 or more individuals. After the comment period and hearing, if requested, DEQ will review the comments and modify the permit as may be appropriate. A proposed permit will be sent to EPA for a 45 day review period. DEQ may request and EPA may agree to an expedited review of 5 days if there were no substantive or adverse comments during the comment period.

If EPA does not object in writing, any person may petition the EPA within 60 days after the expiration of EPA's 45-day review period to make such objection. Any such petition must be based only on objections to the permit that were raised with reasonable specificity during the public comment period provided for in OAR 340-218-0210, unless the petitioner demonstrates it was impracticable to raise such objections within such period, or unless the grounds for such objection arose after such period.

APPENDIX A - EMISSIONS DETAIL SHEETS

Uncontrolled Landfill Gas (40 CFR 60.754(1))

$$M_{NMOC} = \sum 2kLoM_i(e^{-kt_i})(C_{NMOC})(3.6x10^{-9}) \quad \text{(eq. 40 CFR 60.754(a)(1)(i))}$$

Where:

Lo = Methane generation potential: 170 m/Mg
k = Methane generation rate: 0.02 $year^{-1}$
M = waste acceptance rate (Mg/yr):
I = year (1 through 31)
t = age of landfill
C_{NMOC} = NMOC concentration: 313 ppmv (as Hexane)

Year	Acceptance Rates		Age of Layer	Total M_{NMOC}	Total M_{NMOC}	VOC	HAPs	H_2S
	tpy	Mg/yr	Years	Mg/yr	tpy			
1972 to 1983			38	1.39	1.5	1.5	0.6	0.09
1984	33447	30342	37	1.50	1.7	1.6	0.6	0.10
1985	35826	32501	36	1.62	1.8	1.8	0.7	0.11
1986	36175	32817	35	1.7	1.9	1.9	0.7	0.11
1987	36665	33262	34	1.87	2.1	2.1	0.8	0.12
1988	40929	37130	33	2.02	2.2	2.2	0.9	0.13
1989	45969	41702	32	2.19	2.4	2.4	0.9	0.14
1990	53115	48185	31	2.39	2.6	2.6	1.0	0.16
1991	46091	41813	30	2.56	2.8	2.8	1.1	0.17
1992	54182	49153	29	2.77	3.1	3.0	1.2	0.18
1993	68570	62205	28	3.05	3.4	3.3	1.3	0.20
1994	68394	62046	27	3.32	3.7	3.7	1.4	0.22
1995	75887	68843	26	3.64	4.0	4.0	1.6	0.24
1996	78379	71104	25	3.97	4.4	4.4	1.7	0.26
1997	95746	86859	24	4.38	4.8	4.8	1.9	0.28
1998	104200	94528	23	4.84	5.3	5.3	2.1	0.31
1999	113132	102631	22	5.34	5.9	5.9	2.3	0.35
2000	113331	102812	21	5.86	6.5	6.4	2.5	0.38
2001	115022	104346	20	6.40	7.1	7.0	2.7	0.42
2002	135531	122951	19	7.04	7.8	7.7	3.0	0.46
2003	143745	130403	18	7.74	8.5	8.5	3.3	0.50
2004	162012	146974	17	8.54	9.4	9.4	3.7	0.56
2005	168336	152711	16	9.39	10.4	10.3	4.0	0.61
2006	186574	169256	15	10.35	11.4	11.4	4.4	0.67
2007	172295	156303	14	11.26	12.4	12.4	4.8	0.73
2008	141714	128560	13	12.02	13.2	13.2	5.2	0.78
2009	116697	105865	12	12.65	13.9	13.9	5.4	0.82
2010	114309	103699	11	13.29	14.7	14.6	5.7	0.86
2011	110509	100252	10	13.92	15.3	15.3	6.0	0.91
2012	112860	102384	9	14.58	16.1	16.0	6.2	0.95
2013	119265	108195	8	15.28	16.8	16.8	6.6	0.99
2014	130618	118494	7	16.07	17.7	17.7	6.9	1.05
2015	144983	131526	6	16.96	18.7	18.6	7.3	1.10
2016	156454	141932	5	17.95	19.8	19.7	7.7	1.17
2017	168970	153287	4	19.03	21.0	20.9	8.2	1.24
2018	182488	165549	3	20.23	22.3	22.2	8.7	1.32
2019	197087	178793	2	21.54	23.7	23.7	9.2	1.40
2020	212854	193097	1	22.99	25.3	25.3	9.9	1.50
2021	229882	208545	0	24.59	27.1	27.0	10.5	1.60

Landfill Gas Emissions with Flare (tons per year)

Facility Operations	NMOC	VOC(1)	HAPs	H_2S
	(tons/yr)			
2021 Total Potential LFG emissions generated (tpy):	27.108	27.027	10.545	1.599
LFG Collection and Flare Loading Rates(2) (tpy):	19.743	19.683	5.273	0.798
Flare emissions (tpy):	0.454	0.453	0.121	0.018
LFG remaining uncontrolled/fugitive emissions (tpy):	7.819	7.796	5.393	0.820

(1) VOCs emissions are estimated to be 99.7% of NMOC, AP-42 Table 2.4-1 Municipal Solid Waste Landfills.
(2) The potential to emit for the pollutants listed above are minimized when combusting the maximum volume of landfill gas at the flare. Conversely, the potential to emit is at the highest when combusting landfill gas at lower flow rates at the flare. The above emissions were calculated to determine the maximum annual potential to emit for these pollutants. Therefore, the lowest operating flow rate of 1000 scfm was used at the flare to determine the potential to emit. See operating scenarios for the flare emission calculations for additional information.

Flare Emissions (AP-42, Section 2.4)

There are two operating scenarios that were used in calculating the maximum potential emissions at the flare and the landfill. These operating scenarios are discussed below:

The first operating scenario is when the flare operates at the lowest operating flow rate of 1000 scfm. Volatile organic compounds (VOCs) and non-methane organic compounds (NMOCs) are emitted at higher fugitive levels when lower landfill gases are collected, controlled and burned at the flare. Therefore, the lowest flare flow rate of 1000 scfm was used to calculate the maximum potential emissions for VOC and NMOC.

The second operating scenario is when the flare operates at the highest operating flow rate of 2000 scfm. The pollutants: NO_x, CO, SO_2, PM, PM_{10} and $PM_{2.5}$ are emitted at their maximum potential levels when the highest operating volume of extracted landfill gases collected, controlled and burned at the flare. Therefore, the highest flare flow rate of 2000 scfm was used to calculate the maximum potential emission for these criteria pollutants.

The following two equations were used in calculating flare emissions for the operating scenarios:

$$E_x = (EF_x /1{,}000{,}000)* Q_{CH4} * 60* H *(1 \text{ ton}/2{,}000 \text{ lb})$$

or

$$E_x = (Cx/1{,}000{,}000 * MW_x / K) * Q_{LFG} * 60* H * (1 - CE) * (1 \text{ ton}/2{,}000 \text{ lb})$$

Where:

E_x = Emission rate for pollutant x (ton/year)
Q_{CH4} = Methane flow rate (scfm)
Q_{LFG} = Flare gas flow rate (scfm)
H = Operating hours (hrs/yr)
EF_x = Emission factor for pollutant x (lb/MMscf CH_4)
C_x = Concentration of pollutant x in LFG (ppmvd)
MW_x = Molecular weight of pollutant x
K = Molar volume at standard conditions (359.05 dscf/lb-mole)
CE = Control efficiency (percent)

Operating Scenario One:

Throughputs:

Maximum LFG flow rate to flare: 1000 scfm
Methane fraction in LFG: 51 percent (AP-42, Section 2.4.4.1 draft 10/08 and LandGEM)
Methane flow rate: 510 scfm
Annual Operation: 8760 hours per year
Flare Control efficiency: 97.7 percent (AP-42, Section 2.4, Table 2.4-3 draft 10/08)

Potential to Emit at Operating Scenario One:

Pollutant	EF	C_x	MW_x	Flare (FLR-02)		Notes:
				Loading	Emissions	
	lb/MMscf CH_4	ppmvd		tons/yr		
VOC	---	312	---	19.68	0.45	AP42 Table 2.4-1 VOCs are 99.7% of NMOC
NMOC	---	313	86.19	19.74	0.45	10/2013 source testing report (40 CFR 60.754(a)(3))
HAPs	---	---	---	5.27	0.12	Speciated flare loading and emission estimates from AP-42, Table 2.4-1 draft 10/08 (see AP-42 table below)
H_2S	---	32	34.08	0.80	0.02	

Operating Scenario Two:

Throughputs:

Maximum LFG flow rate to flare: 2000 scfm
Methane fraction in LFG: 51 percent (AP-42, Section 2.4.4.1 draft 10/08 and LandGEM)
Methane flow rate: 1020 scfm
Annual Operation: 8760 hours per year
Flare Control efficiency: 97.7 percent (AP-42, Section 2.4, Table 2.4-3 draft 10/08)

Potential to Emit at Operating Scenario Two:

Pollutant	EF	C_x	MW_x	Flare (FLR-02) Emissions	Notes:
	lb/MMscf CH_4	ppmvd		tons/yr	
PM	15	---	---	4.02	(AP-42, Section 2.4, Table 2.4-4 draft 10/08)
PM_{10}	15	---	---	4.02	
$PM_{2.5}$	15	---	---	4.02	
NO_x	39	---	---	10.45	
CO	46	---	---	12.33	
SO_2	---	47	64	4.40	AP-42 default sulfur concentration

For calculating the individual and speciated hazardous air pollutants the following throughputs were used:

Throughputs:

Maximum LFG flow rate to flare: 1000 scfm
Methane fraction in LFG: 51 percent (AP-42, Section 2.4.4.1 draft 10/08 and LandGEM)
Methane flow rate: 510 scfm
Annual Operation: 8760 hours per year
Flare Control efficiency: 97.7 percent (AP-42, Section 2.4, Table 2.4-3 draft 10/08)

Flare - Individual HAPs & Speciated NMOC Flare Loading and Emissions (AP-42, Table 2.4-1 draft 10/08)

Compounds	HAP	C_x (ppmvd)	Molecular Weight	Flare Loading	Flare Emissions
				(lb/yr)	
NMOC (as hexane)		131 [a]	86.18	39486.74	908.19
VOC		[b]	NA	39368.28	905.47
1,1,1-Trichloroethane	X	2.43E-01	133.4	47.45	1.09
1,1,2,2-Tetrachloroethane	X	5.35E-01	167.85	131.45	3.02
1,1,2,3,4,4-Hexachloro-1,3-butadiene (Hexachlorobutadiene)	X	3.49E-03	260.76	1.33	0.03
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)		6.72E-02	187.37	18.43	0.42
1,1,2-Trichloroethane	X	1.58E-01	133.4	30.85	0.71
1,1-Dichloroethane	X	2.08E+00	98.96	301.32	6.93
1,1-Dichloroethene (1,1-Dichloroethylene)	X	1.60E-01	96.94	22.71	0.52
1,2,3-Trimethylbenzene		3.59E-01	120.19	63.16	1.45
1,2,4-Trichlorobenzene	X	5.51E-03	181.45	1.46	0.03
1,2,4-Trimethylbenzene		1.37E+00	120.19	241.04	5.54
1,2-Dibromoethane (Ethylenedibromide)	X	8.00E-04	187.86	0.22	0.01
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)		1.06E-01	170.92	26.52	0.61
1,2-Dichloroethane (Ethylenedichloride)	X	1.59E-01	98.96	23.03	0.53
1,2-Dichloroethene		1.14E+01	96.94	1617.74	37.21
1,2-Dichloropropane	X	5.20E-02	12.99	0.99	0.02
1,2-Diethylbenzene		1.99E-02	134.22	3.91	0.09
1,3,5-Trimethylbenzene		6.23E-01	120.19	109.61	2.52
1,3-Butadiene (Vinyl ethylene)	X	1.66E-01	54.09	13.14	0.30
1,3-Diethylbenzene		6.55E-02	134.22	12.87	0.30
1,4-Diethylbenzene		2.62E-01	134.22	51.48	1.18
1,4-Dioxane (1,4-Diethylenedioxide)	X	8.29E-03	8.11	9.8E-02	2.3E-03
1-Butene / 2-Methylbutene		1.22E+00	70.13	125.25	2.88
1-Butene / 2-Methylpropene		1.10E+00	56.11	90.35	2.08
1-Ethyl-4-methylbenzene (4-Ethyltoluene)		9.89E-01	120.19	174.01	4.00
1-Ethyl-4-methylbenzene (4-Ethyltoluene) + 1,3,5-Trimethylbenzene		5.79E-01	120.19	101.87	2.34
1-Heptene		6.25E-01	98.19	89.84	2.07
1-Hexene / 2-Methyl-1-pentene		8.88E-02	84.16	10.94	0.25
1-Methylcyclohexene		2.27E-02	96.17	3.20	0.07
1-Methylcyclopentene		2.52E-02	82.14	3.03	0.07
1-Pentene		2.20E-01	70.13	22.59	0.52
1-Propanethiol (n-Propyl mercaptan)		1.25E-01	76.16	13.94	0.32
2,2,3-Trimethylbutane		9.19E-03	100.2	1.35	0.03
2,2,4-Trimethylpentane	X	6.14E-01	114.23	102.67	2.36
2,2,5-Trimethylhexane		1.56E-01	128.26	29.29	0.67
2,2-Dimethylbutane		1.56E-01	86.18	19.68	0.45
2,2-Dimethylpentane		6.08E-02	100.2	8.92	0.21
2,2-Dimethylpropane		2.74E-02	72.15	2.89	0.07

Compounds	HAP	C_x (ppmvd)	Molecular Weight	Flare Loading	Flare Emissions
				(lb/yr)	
2,3,4-Trimethylpentane		3.12E-01	114.23	52.17	1.20
2,3-Dimethylbutane		1.67E-01	86.18	21.07	0.48
2,3-Dimethylpentane		3.10E-01	100.2	45.47	1.05
2,4-Dimethylhexane		2.22E-01	114.23	37.12	0.85
2,4-Dimethylpentane		1.00E-01	100.2	14.67	0.34
2,5-Dimethylhexane		1.66E-01	114.23	27.76	0.64
2,5-Dimethylthiophene		6.44E-02	112.19	10.58	0.24
2-Butanone (Methyl ethyl ketone)	X	4.01E+00	72.11	423.29	9.74
2-Ethyl-1-butene		1.77E-02	84.16	2.18	0.05
2-Ethylthiophene		6.29E-02	112.19	10.33	0.24
2-Ethyltoluene		3.23E-01	120.19	56.83	1.31
2-Hexanone (Methyl butyl ketone)		6.13E-01	100.16	89.88	2.07
2-Methyl-1-butene		1.79E-01	70.13	18.38	0.42
2-Methyl-1-propanethiol (Isobutylmercaptan)		1.70E-01	90.19	22.44	0.52
2-Methyl-2-butene		3.03E-01	70.13	31.11	0.72
2-Methyl-2-propanethiol (tert-Butylmercaptan)		3.25E-01	90.19	42.91	0.99
2-Methylbutane		2.26E+00	72.15	238.70	5.49
2-Methylheptane		7.16E-01	114.23	119.73	2.75
2-Methylhexane		8.16E-01	100.2	119.69	2.75
2-Methylpentane		6.88E-01	86.18	86.80	2.00
2-Propanol (Isopropyl alcohol)		1.80E+00	60.1	158.36	3.64
3,6-Dimethyloctane		7.85E-01	142.28	163.50	3.76
3-Ethyltoluene		7.80E-01	120.19	137.23	3.16
3-Methyl-1-pentene		6.99E-03	84.16	0.86	0.02
3-Methylheptane		7.63E-01	114.23	127.59	2.93
3-Methylhexane		1.13E+00	100.2	165.75	3.81
3-Methylpentane		7.40E-01	86.18	93.36	2.15
3-Methylthiophene		9.25E-02	98.17	13.29	0.31
4-Methyl-1-pentene		2.33E-02	84.16	2.87	0.07
4-Methyl-2-pentanone (MIBK)	X	8.83E-01	100.16	129.47	2.98
4-Methylheptane		2.49E-01	114.23	41.64	0.96
Acetaldehyde	X	7.74E-02	44.05	4.99	0.11
Acetone		6.70E+00	58.08	569.64	13.10
Acetonitrile		5.56E-01	41.05	33.41	0.77
Acrylonitrile	X	BDL	53.06	0.00	0.00
Benzene	X	2.40E+00	78.11	274.42	6.31
Benzyl chloride	X	1.81E-02	126.58	3.35	0.08
Bromodichloromethane		8.78E-03	163.83	2.11	0.05
Bromomethane (Methyl bromide)	X	2.10E-02	94.94	2.92	0.07
Butane		6.22E+00	58.12	529.20	12.17
Carbon disulfide	X	1.47E-01	76.14	16.38	0.38
Carbon monoxide		2.44E+01	28.01	1000.47	23.01
Carbon tetrachloride	X	7.98E-03	153.82	1.80	0.04
Carbon tetrafluoride (Freon 14)		1.51E-01	88	19.45	0.45
Carbonyl sulfide (Carbonoxysulfide)	X	1.22E-01	60.08	10.73	0.25
Chlorobenzene	X	4.84E-01	112.56	79.75	1.83
Chlorodifluoromethane (Freon 22)		7.96E-01	86.47	100.76	2.32
Chloroethane (Ethyl chloride)	X	3.95E+00	64.51	373.01	8.58
Chloromethane (Methyl chloride)	X	2.44E-01	50.49	18.03	0.41

Compounds	HAP	C_x (ppmvd)	Molecular Weight	Flare Loading	Flare Emissions
				(lb/yr)	
cis-1,2-Dichloroethene		1.24E+00	96.94	175.96	4.05
cis-1,2-Dimethylcyclohexane		8.10E-02	112.21	13.31	0.31
cis-1,3-Dichloropropene		3.03E-03	110.97	0.49	0.01
cis-1,3-Dimethylcyclohexane		5.01E-01	112.21	82.29	1.89
cis-1,4-Dimethylcyclohexane/trans-1,3-Dimethylcyclohexane		2.48E-01	112.21	40.74	0.94
cis-2-Butene		1.05E-01	56.11	8.62	0.20
cis-2-Heptene		2.45E-02	98.19	3.52	0.08
cis-2-Hexene		1.72E-02	84.16	2.12	0.05
cis-2-Octene		2.20E-01	112.21	36.14	0.83
cis-2-Pentene		4.79E-02	70.13	4.92	0.11
cis-3-Methyl-2-pentene		1.79E-02	84.16	2.21	0.05
Cyclohexane		1.01E+00	84.16	124.43	2.86
Cyclohexene		1.84E-02	82.14	2.21	0.05
Cyclopentane		2.21E-02	70.13	2.27	0.05
Cyclopentene		1.21E-02	68.12	1.21	0.03
Decane		3.80E+00	142.28	791.46	18.20
Dibromochloromethane		1.51E-02	208.28	4.60	0.11
Dibromomethane (Methylenedibromide)		8.35E-04	173.84	0.21	0.00
Dichlorobenzene	X	9.40E-01	147	202.28	4.65
Dichlorodifluoromethane (Freon 12)		1.18E+00	120.91	208.85	4.80
Dichloromethane (Methylenechloride)	X	6.15E+00	84.93	764.60	17.59
Diethyl sulfide		8.62E-02	90.19	11.38	0.26
Dimethyl disulfide		1.37E-01	94.2	18.89	0.43
Dimethyl sulfide		5.66E+00	62.14	514.86	11.84
Dodecane (n-Dodecane)		2.21E-01	170.33	55.10	1.27
Ethane		9.05E+00	30.07	398.37	9.16
Ethanol		2.30E-01	46.07	15.51	0.36
Ethyl acetate		1.88E+00	88.11	242.48	5.58
Ethyl mercaptan (Ethanediol)		1.98E-01	62.14	18.01	0.41
Ethyl methyl sulfide		3.67E-02	76.16	4.09	0.09
Ethylbenzene	X	4.86E+00	106.17	755.33	17.37
Formaldehyde	X	1.17E-02	30.03	0.51	0.01
Heptane		1.34E+00	100.2	196.55	4.52
Hexane	X	3.10E+00	86.18	391.08	8.99
Hydrogen sulfide		3.20E+01	34.08	1596.43	36.72
Indane (2,3-Dihydroindene)		6.66E-02	34.08	3.32	0.08
Isobutane (2-Methylpropane)		8.16E+00	58.12	694.25	15.97
Isobutylbenzene		4.07E-02	134.22	8.00	0.18
Isoprene (2-Methyl-1,3-butadiene)		1.65E-02	68.12	1.65	0.04
Isopropyl mercaptan		1.75E-01	76.16	19.51	0.45
Isopropylbenzene (Cumene)	X	4.30E-01	120.19	75.65	1.74
Mercury (total)	X	1.22E-04	200.59	3.6E-02	8.2E-04
Mercury (elemental)	X	7.70E-05	200.59	2.3E-02	5.2E-04
Mercury (monomethyl)	X	3.84E-07	216.63	1.2E-04	2.8E-06
Mercury (dimethyl)	X	2.53E-06	258.71	9.6E-04	2.2E-05
Methanethiol (Methyl mercaptan)		1.37E+00	48.11	96.48	2.22
Methyl tert-butyl ether (MTBE)	X	1.18E-01	88.15	15.23	0.35
Methylcyclohexane		1.29E+00	98.19	185.42	4.26
Methylcyclopentane		6.50E-01	84.16	80.08	1.84

Compounds	HAP	C_x (ppmvd)	Molecular Weight	Flare Loading	Flare Emissions
				(lb/yr)	
Naphthalene	X	1.07E-01	128.17	20.08	0.46
n-Butylbenzene		6.80E-02	134.22	13.36	0.31
Nonane		2.37E+00	128.26	444.98	10.23
n-Propylbenzene (Propylbenzene)		4.13E-01	120.19	72.66	1.67
Octane		1.08E+00	114.23	180.59	4.15
p-Cymene(1-Methyl-4-lsopropylbenzene)		3.58E+00	134.22	703.40	16.18
Pentane		4.46E+00	72.15	471.06	10.83
Propane		1.55E+01	44.1	1000.62	23.01
Propene		3.32E+00	42.08	204.51	4.70
Propyne		3.80E-02	40.06	2.23	0.05
sec-Butylbenzene		6.75E-02	134.22	13.26	0.31
Styrene (Vinylbenzene)	X	4.11E-01	104.15	62.66	1.44
Tetrachloroethylene (Perchloroethylene)	X	2.03E+00	165.83	492.79	11.33
Tetrahydrofuran (Diethylene oxide)		9.69E-01	72.11	102.29	2.35
Thiophene		3.49E-01	84.14	42.99	0.99
Toluene (Methyl benzene)	X	2.95E+01	92.14	3978.97	91.52
trans-1,2-Dichloroethene		2.87E-02	96.94	4.07	0.09
trans-1,2-Dimethylcyclohexane		4.04E-01	112.21	66.36	1.53
trans-1,3-Dichloropropene		9.43E-03	110.97	1.53	0.04
trans-1,4-Dimethylcyclohexane		2.05E-01	112.21	33.67	0.77
trans-2-Butene		1.04E-01	56.11	8.54	0.20
trans-2-Heptene		2.50E-03	98.19	0.36	0.01
trans-2-Hexene		2.06E-02	84.16	2.54	0.06
trans-2-Octene		2.41E-01	112.21	39.59	0.91
trans-2-Pentene		3.47E-02	70.13	3.56	0.08
trans-3-Methyl-2-pentene		1.55E-02	84.16	1.91	0.04
Tribromomethane (Bromoform)	X	1.24E-02	252.73	4.59	0.11
Trichloroethylene (Trichloroethene)	X	8.28E-01	131.39	159.25	3.66
Trichlorofluoromethane (Freon 11)		2.48E-01	137.37	49.87	1.15
Trichloromethane (Chloroform)	X	7.08E-02	119.38	12.37	0.28
Undecane		1.67E+00	156.31	382.12	8.79
Vinyl acetate	X	2.48E-01	86.09	31.25	0.72
Vinyl chloride (Chloroethene)	X	1.42E+00	62.5	129.92	2.99
Xylenes (o-, m-, p-, mixtures)	X	9.23E+00	106.17	1434.51	32.99
Total Hazardous Air Pollutants [c] (HAPs) (tons/yr) using AP-42 Table 2.4-1				5.27	0.121
Total NMOC [a] (tons/yr)				19.74	0.454
Total VOC [b] (tons/yr)				19.68	0.453
Total H_2S [d] (ton/yr)		32	34.08	0.80	0.02

NOTE: This is not an all-inclusive list of potential LFG constituents, only those for which test data were available at multiple sites (AP-42 Section 2.4).

a – The measured NMOC at 313 ppmvd is used based on the October 2013 source testing results per the tier 2 sampling and analysis procedures provided in 40 CFR 60.754(a)(3).

b - Total VOC is calculated as 99.7% of the actual NMOC, based on AP-42 Table 2.4-1 Municipal Solid Waste Landfills.

c - The HAPs Loading Rate to the flare is calculated to be 38.9% based on the total speciated flare loading rate for HAPs and the Total NMOC Loading Rate (ton/yr) - sum of speciated compounds.

d - The H_2S Loading Rate to the flare is calculated to be 5.9% based on the H_2S flare loading rate and the Total NMOC Loading Rate (ton/yr) - sum of speciated compounds.

Compost Pile Emissions

Volatile Organic Compounds (VOCs)

$$E = EF \times M/2000$$

Where:

E = VOC emissions (tpy)
EF = VOC emission factor
1.78 lb/ton of material (SCAQMD, table 2-3 Windrow Emission Factors in the Technical Assessment for Proposed Rule1133, March, 2002 and Final Staff Report for Proposed Rule 1133, 1133.1, and 1133.2, January 2003)
M = material throughput (tons/yr)
23,000 cubic yards in 2008
1,000 lb/cubic yard
16,787 tons in 2016
1.34 growth factor
22,495future projected ton/yr

Emissions (E) = 20.0 tons/yr of VOC

Petroleum Contaminated Soil (PCS) Emissions

Volatile Organic Compounds (VOCs) and Hazardous Air Pollutants (HAPs)

$$E = EF \times M/2000$$

Where:

E = VOC and HAP emissions (tpy)
EF = VOC/HAP emission factor
0.25 lb/ton of material (factor in Columbia Ridge Landfill estimate based on sample 2008 PCS disposal documentation at Knot Landfill. Assume all VOCs are HAPs.
M = material throughput (tons/yr)
15,000 tons per year

Emissions (E) = 1.88 tons/yr of HAPs/VOCs

Material Handling Emissions

Cover soil (H-1) and aggregate (H-2) PM, PM_{10}, and $PM_{2.5}$

AP-42, Section 13.2.4

$$E = k * 0.0032 * [(U/5)^{1.3}/(M/2)^{1.4}]$$ EQ:

Where:

EF = emission factor (lb/VMT)
k = aerodynamic particle size multiplier (AP-42, section 13.2.4)
0.74 cover soil and aggregate for PM
0.35 cover soil and aggregate for PM_{10}
0.053 cover soil and aggregate for $PM_{2.5}$
U = mean wind speed (6.4 mph)
M = material moisture content (%)
4.8% for cover soil (H-1)
0.7% for aggregate (H-2)

Emission Factors derived from Equation in AP-42, Section 13.2.4:

Material	PM	PM_{10}	$PM_{2.5}$
	(pounds/ton)		
H-1 Cover Soil	0.0009582	0.0004532	$6.86x10^{-5}$
H-2 Aggregate	0.0141925	0.0067127	0.0010165

Facility Operations:

Operational Information	H-1	H-2	H-1&2
Number of Processes	4	4	
MSW (tons/yr)	189912	189912	
Ration agg/soil	1	0.08	
Soil/MSW (yd^3/ton)	0.9445	0.9445	
Material (yd^3/yr)	179372	14350	
Density (lb/yd^3)	1854	1854	
Throughput (tons/yr)	166278	13302	
Control (5)	69	0	
PM emissions (tpy)	0.10	0.38	0.48
PM_{10} emissions (tpy)	0.05	0.18	0.23
$PM_{2.5}$ emissions (tpy)	0.007	0.027	0.034

Grading Processes (H-3) PM, PM_{10} and $PM_{2.5}$
AP-42, Section 11.9.2

$E_{TSP} = 0.040 * S^{2.5}$ Table 11.9-1 Grading
$E_{PM15} = 0.051 * S^2$
$E_{PM10} = 0.6 * E_{PM15}$
$E_{PM2.5} = 0.031 * E_{PM15}$

Where: S = 7.1 mph mean wind speed (mph)

Emission Factors derived from Equations in AP-42, Section 11.9.2:

Pollutant	Emission Factor (lb/VMT)
PM	5.4
PM_{10}	1.5
$PM_{2.5}$	0.08

Facility Operations:

Equipment hours (hours/year)	13,500 hours
Usage factor (%)	0.4 %
Throughput (VMT/yr)	383.4 VMT/yr
Control (%) *	61 %

* watering - SCAQMD Table XI-A; construction activities (4/07)

Total Potential Emissions:

Pollutant	Grading Processes H-3
PM	0.40
PM_{10}	0.12
$PM_{2.5}$	0.01

Miscellaneous Handling Processes (H-4) PM, PM_{10}, and $PM_{2.5}$
SCAQMD, CDEQA Handbook Table A9-9-F, Dirt Pushing or Bulldozing Operations

$$EF = 0.45 * 2.2046 * (G^{1.5}/H^{1.4})$$

Where:
EF emission factor (lb/hr)
G = 7.5% Silt Content (%)
H = 12% moisture Content (%)

Emission Factors (Ratio of PM/PM10 = 2.11 (AP-42, section 13.2.4 k ratio)):

Pollutant	Emission Factor (lb/hour)
PM	1.33
PM_{10}	0.63
$PM_{2.5}$	0.088

Facility Operations:

Equipment hours (hours/year)	13500 hours
Usage factor (%)	50
Throughput (hours/yr)	6750 hrs/yr
Control (%) *	61 %

* watering - SCAQMD Table XI-A; construction activities (4/07)

Emissions:

Pollutant	Grading Processes H-3 (tons/yr)
PM	1.75
PM_{10}	0.83
$PM_{2.5}$	0.12

Unpaved Road Emission Calculations
AP-42, Section 13.2.2

$$EF = k * (s/12)^a * (W/3)^b * (365-p)/365$$ EQs: (1.a.) and (2) combined

Where:
EF =emission factor (lb/VMT)
k = empirical constant (AP-42, table 13.2.2-2, industrial roads)
s = surface material silt content (%) (AP-42, table 13.2.2-1, MSW disposal routes, mean value)
a = empirical constant (AP-42, table 13.2.2-2, industrial roads)
b = silt empirical constant (AP-42, table 13.2.2-2, industrial roads)

Pollutant	Empirical Constant Values			
	k	s	a	b
PM	4.9	6.4	0.7	0.45
PM_{10}	1.5		0.9	
$PM_{2.5}$	0.15		0.9	

W = mean vehicle weight:

Type	Vehicle Type and Weight			
	Public	Franchise	Transfer	Various
	Mean Vehicle Weight (tons)			
Loaded	4.25	23.44	37.22	24.56
Unloaded	3.7	15.8	24	10

P = Number of days with =>0.01 inch of precipitation: 78.3 days
(monthly mean and extremes, Bend 1971-2000, http://www.ocs.orst.edulpub_ftp/climate_data/mme2/mme0694.html)

Emission Factors derived from Equations in AP-42, Section 13.2.2.

Pollutant	Vehicle Type			
	Public	Franchise	Transfer	Various
	(Pounds/Vehicle Miles Traveled)			
PM	2.81	5.77	7.05	5.45
PM_{10}	0.76	1.56	1.90	1.47
$PM_{2.5}$	0.08	0.16	0.19	0.15

Facility Operations:

Operational Information	Vehicle Type			
	Public	Franchise	Transfer	Various
Distance (miles/trip or mph)	0	1	1	15
2008 trips/year or hours/year	77897	16583	2202	13500
Growth factor or usage factor	1.34	1.34	1.34	14
Throughput (VMT/yr)	0	22221	2951	28350
Control 1 (dust suppressant)	84	84	84	84
Control 2 (water)	55	55	55	55

Unpaved Road Emissions

Pollutant	Public	Franchise	Transfer	Various	Total
	(tons/year)				
PM	0.00	4.62	0.75	5.56	10.93
PM_{10}	0.00	1.25	0.20	1.50	2.95
$PM_{2.5}$	0.00	0.12	0.02	0.15	0.30

Paved Road Emission Calculations

AP-42, Section 13.2.1 (January 2011)

$$EF = [k\ (sL)^{0.91} * (W)^{1.02}](1-P/4N) \qquad EQ\ (2)$$

Where:

EF =emission factor (lb/VMT)
k = particle size multiplier
0.011 PM (AP-42, Table 13.2.1-1)
0.0022 PM10 (AP-42, Table 13.2.1-1)
0.00054 PM2.5 (AP-42, Table 13.2.1-1)

sL = silt loading (g/m^3): 1.36 g/m^3 (engineering estimate, low range AP-42, Table 13.2.1-3)

W = mean vehicle weight (see unpaved road worksheet)
3.975 tons, public vehicles
19.62 tons, franchise vehicles
30.61 tons, transfer vehicles

P = Number of days with =>0.01 inch of precipitation: 78.3 days
N = one year averaging period of 365 days

Emission Factors Derived from EQ 2. (lb/VMT):

Pollutant	Vehicle Type		
	Public	Franchise	Transfer
	(Pounds/Vehicle Miles Traveled)		
PM	0.056	0.2868	0.451
PM_{10}	0.011	0.057	0.090
$PM_{2.5}$	0.003	0.014	0.022

Facility Operations:

Operational Information	Vehicle Type		
	Public	Franchise	Transfer
distance (miles/trip)	2.18	1.43	0
trips/yr	77897	16583	2045
growth factor	1.34	1.34	1.34
throughput (VMT/yr)	227553	31776	0
control (sweeping)	42.5	42.5	42.5

Paved Road Emissions

Pollutant	Public	Franchise	Transfer	Total
	(tons/year)			
PM	3.68	2.62	0.00	6.30
PM_{10}	0.74	0.52	0.00	1.26
$PM_{2.5}$	0.18	0.13	0.00	0.31

Total Hazardous Air Pollutants (HAPs):

Emission Unit	HAPs (tons/yr)
Landfill gas (LFG-01)	5.39
Flare (FLR-02)	0.12
Petroleum contaminated soil (PCS-01)	1.88
Total HAPs (tons/yr):	7.39

Total Potential Emissions:

Emission Unit	PM	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO	VOC	NMOC	GHG
	(tons/year)								
Landfill Gas (LFG-01)							7.80	7.82	51,612
Flare (FLR-02)	4.02	4.02	4.02	4.40	10.45	12.33	0.45	0.45	30,316
Compost piles (COM-01)							20.02		
Petroleum contaminated soil (PCS-01)							1.88		
Material Handling (MH-01) H-1	0.10	0.05	0.01						
Material Handling (MH-01) H-2	0.38	0.18	0.03						
Material Handling (MH-01) H-3	0.40	0.12	0.01						
Material Handling (MH-01) H-4	1.75	0.83	0.12						
Unpaved roads (UPR-01)	10.9	2.95	0.30						
Paved roads (PRD-01)	6.30	1.26	0.31						
Aggregate Insignificant	1	1	1	1	1	1	1.00		2,756
Total Emissions	24.9	10.4	5.8	5.4	11.5	13.3	31.1	8.3	84,684
Plant Site Emission Limits (PSELs)	25	14	9	39	39	99	39	49	84,684

The maximum potential emissions for VOC and NMOC were calculated using the lowest operating flow rates of 1000 scfm to the flare (FLR-01) for an entire year.
The maximum potential emissions for PM, PM_{10}, $PM_{2.5}$, SO_2, NO_x and CO were calculated using highest operating flow rates of 2000 scfm to the flare (FLR-01) for an entire year.
The proposed PSELs for PM_{10}, $PM_{2.5}$, CO, NO_x, SO_2, VOC and NMOC are set equal to the Generic PSEL in accordance with OAR 340-222-0040(1). The PSELs for PM and GHG are set their potential to emit.

Fugitive Emissions Factors	PM	PM_{10}	$PM_{2.5}$
	lb/ton waste accepted		
*Projected average waste acceptance = 191,289 tons	0.21	0.06	0.01

*Projected average waste acceptance weight was calculated from 2016 through 2021. The ratio of fugitive particulates to annual waste acceptance was calculated by: Taking the sum of all fugitive emissions (lbs/yr) and dividing by the average waste acceptance to obtain the pounds of fugitive particulates generated per ton of waste accepted by the landfill.

Greenhouse Gas (GHG CO_{2e}) Total Potential Emissions

GHG CO_2e - Landfill Gas Fugitive Emissions:

Emission Source	2021 Emissions	
EPA LandGEM - CO_2	19,693	tons/yr
EPA LandGEM - CH_4	7,470	

Pollutants	Operating Parameter		Emission Factor		Emissions
			GWP	Emission Factor Reference	tons/yr
Fugitive - CO_2	4,923	tons/yr	1	EPA 40 CFR Part 98, Subpart C	4,923
Fugitive - CH_4	1,868		25		46,689
Total Fugitives From Landfill GHG CO_2e Emissions:					**51,612**

1. Assumes 25% of the landfill gas generated in 2021 is lost to the atmosphere as a fugitive gas.
2. GWP – Global Warming Potential

GHG CO_2e - Flare (FLR-02) Emissions:

Emission Source	2021 Emissions			
EPA LandGEM - CO_2	19,693	tons/yr		
EPA LandGEM - CH_4	1.016E+7	m^3/yr	344.7	MMcf/yr

Pollutants	Operating Parameter		Emission Factor			Emissions
			EF	EF Units	Emission Factor Reference	tons/yr
Flare (LFG-01) CO_2	14,768	tons/yr	1	GWP	EPA 40 CFR Part 98, Subpart C	14,768
Flare (LFG-01) CH_4	258.5	MMcf/yr	60.14	tons/MMscf		15,547
Total Landfill Flare GHG CO_2e Emissions:						**30,316**

1. Assumes 75% of the landfill gas generated in 2021 is collected and sent to the LFG-02 flare.
2. GWP – Global Warming Potential

GHG CO_2e Baseline Emission Calculations:

Year	GHG CO_2e Emissions	
	Metric Tonnes	Short Tons
2010	**52,729**	**58,124**
2009	51,085	56,312
2008	48,839	53,836
2007	45,850	50,541
2006	42,476	46,822
2005	39,449	43,485
2004	36,505	40,240
2003	33,917	37,387
2002	31,465	34,684
2001	29,430	32,441
2000	27,392	30,195

GHG CO_2e baseline calculations were based on LandGEM data assuming the following:

1. Assumes 25% of all landfill gas generated for each year was lost to the atmosphere as a fugitive gas, and
2. Assumes 75% of all landfill gas generated for each year was collected and sent to the LFG-01 flare for combustion.