Notice of Construction (NOC) Worksheet

PUGET SOUND
Clean Air Agency

Source: Pierce Co Recycling Composting and Disposal LLC	**NOC Number:** 12301
Installation Address: 30919 Meridian St E | Graham, WA 98338	**Registration Number:** 11993
Contact Name: Kevin Green	**Contact Email:** kevin.green@wasteconnections.com
Applied Date: 11/17/2022	**Contact Phone:** (253) 847-7555
Engineer: Ralph Munoz	**Inspector:** Rick Woodfork

A. DESCRIPTION

For the Order of Approval:
34.6 Million Ton Capacity Municipal Solid Waste Landfill, with the potential to send landfill gas to a separate landfill gas-to-energy facility. Landfill gas is also treated to remove hydrogen sulfide before being routed to the flare or gas-to-energy facility. Currently operating one 2,200 scfm temporary flare, which will be replaced by a 4,000 scfm permanent flare within 24 months of permit issuance.

Additional Information (if needed):
Pierce County Recycling, Composting and Disposal, LLC (aka Land Recovery Inc. or LRI) operates the LRI 304th Street Landfill in Graham, Washington. The landfill has recently seen increased levels of landfill gas (LFG) controlled by the gas collection and control system (GCCS) which requires additional controls to be placed in order to combust the LFG.

The most recent NOC through which the Agency reviewed the capacity of the landfill was NOC 8023. NOC Order of Approval 8023 was issued in 1999, and this NOC review was for a landfill capacity of 19.8 million tons. Between NOC 8023 and the present, no NOC applications for this landfill have included a request for increased landfill capacity. LRI is now operating or has the potential to operate their landfill with a capacity of 34.4 million tons (as documented now in LRI's 2022 solid waste permit issued by TPCHD as well as emails from the source). This increase in capacity leads to increased, unreviewed production of landfill gas that triggers the new source review (NSR) program and should have gone through an NOC application at the time the increases occurred. This worksheet evaluates this increase in capacity and will require BACT for pollutants with increased emissions. Landfill gas flaring is proposed as the method to control emissions of this increase in landfill gas production. Landfill gas can also be sent to the adjacent gas-to-energy facility (Archaea)for beneficial reuse. This NOC will define the landfill capacity in terms of landfill gas generation rate, which is the landfill characteristic most relevant for air quality.

A permanent flare is in progress to be acquired, but in the meantime a temporary flare is proposed to control the increased LFG. This temporary flare (flare #3) will have 2,200 standard cubic feet per minute (scfm) of capacity, and will replace the current flare #2 which has a capacity of only 1,500 scfm. The proposed flare is temporary in nature and has been proposed by the applicant to be installed no greater than 24 months. This temporary flare was eventually installed and placed in operation in Dec 2022. The landfill now currently has two flares in operation – Flare #1 (3,000 scfm) and the temporary flare #3

(2,200 scfm). The permanent flare will be rated at 4,000 scfm and will replace the Temporary Flare #3 for a total of 7,000 scfm. Any future increase in landfill gas generation beyond 7,000 scfm will constitute a production increase, subject to NOC and SEPA review, regardless of the control method chosen as BACT (likely a flare).

In recent years, Hydrogen Sulfide (H_2S) concentrations in the LFG have increased. The Agency determined that the acceptance of large amounts of gypsum-containing wallboard constituted a change in the method of operation of the landfill that greatly increased the sulfur content of LRI's landfill gas. Therefore, the acceptance of the high-sulfur waste constituted a modification that requires BACT review through this NOC. Observing current LFG flowrate and sulfur content, LRI will also install an H_2S treatment system prior to the flare combustion in order to reduce sulfur in the LFG stream as part of this permit application. This sulfur treatment system will also be necessary to prevent the increased SO_2 emissions associated with the flare installation from crossing thresholds that trigger Prevention of Significant Deterioration (PSD) review.

LRI compiled total reduced sulfur (TRS) readings measured from 7/20/22 through 6/27/23 as shown below:

Date	TRS Reading in ppmv	Source	Comments
7/20/2022	998	Lab Analysis	TRS – ASTM D5504
9/7/2022	2,563	Lab Analysis	TRS – ASTM D5504
10/18/2022	2,729	Lab Analysis	TRS – ASTM D5504
11/17/2022	2,365	Lab Analysis	TRS – ASTM D5504
12/21/2022	1,895	Lab Analysis	TRS – ASTM D5504
1/24/2023	1,600	Lab Analysis	TRS – ASTM D5504
2/15/2023	1,591	Lab Analysis	TRS – ASTM D5504
3/28/2023	1,774	Lab Analysis	TRS – ASTM D5504
5/1/2023	1,663	Lab Analysis	TRS – ASTM D5504
5/16/2023	2,382	Lab Analysis	TRS – ASTM D5504
5/25/2023	725	Lab Analysis	TRS – ASTM D5504
5/31/2023	2,004	Lab Analysis	TRS – ASTM D5504
6/6/2023	1,915	Lab Analysis	TRS – ASTM D5504
6/13/2023	2,770	Lab Analysis	TRS – ASTM D5504
6/21/2023	2,657	Lab Analysis	TRS – ASTM D5504
6/27/2023	2,404	Lab Analysis	TRS – ASTM D5504
Average	***2,002***	***July 2022 to June 2023 Period***	

No testing data is available from November 2020 through July 2021, so the most recent test in July 2020 was also included in the average data set as assume initial reading – a conservative engineering approach. During a July 2022 monitoring event at the flare inlet where samples were shipped to the lab for testing, the lab test result of 959 ppmv H_2S was comparable to the field Draeger tube reading of 1,100 ppmv H_2S.

As a result of the potential to emit (PTE) emission calculations using the H_2S concentrations and flow rates from the flares, it was determined that LRI had the capability of operating above the Prevention of Significant Deterioration (PSD) threshold of 250 tons per year for SO_2 and is now operating as a PSD

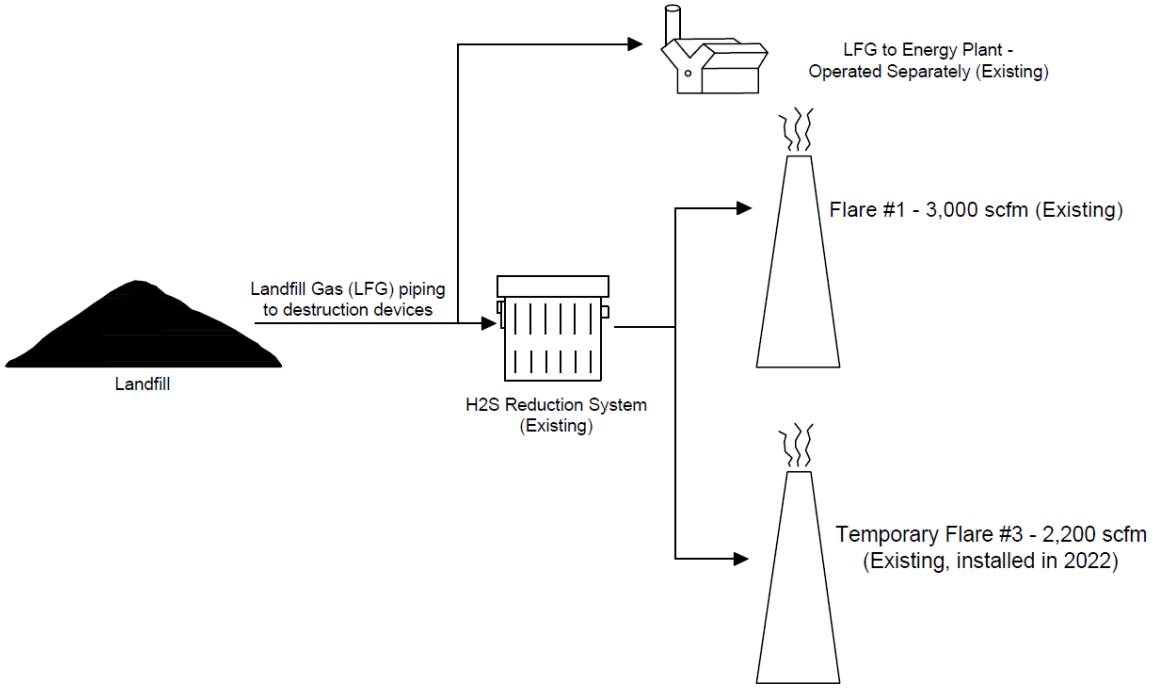
major source. The Agency issued notice of violation number 3-A000700 for the facility operating above the thresholds outlined in NOC 8023 (19.8 MM tons) on 1/4/23. This increase in capacity is being evaluated under this NOC application. The Agency also issued violation # 3-000731 for failure to obtain a PSD permit prior to creating a major stationary source through modifications of an existing source. The facility addressed this violation with this application, particularly addressing SO_2 emissions by controlling the amount of hydrogen sulfide going to the flares.

As a result of the PSD applicability, the Agency must then evaluate this modification and compare the increase in emissions to the PSD significant emission threshold of 40 tons per year SO_2.

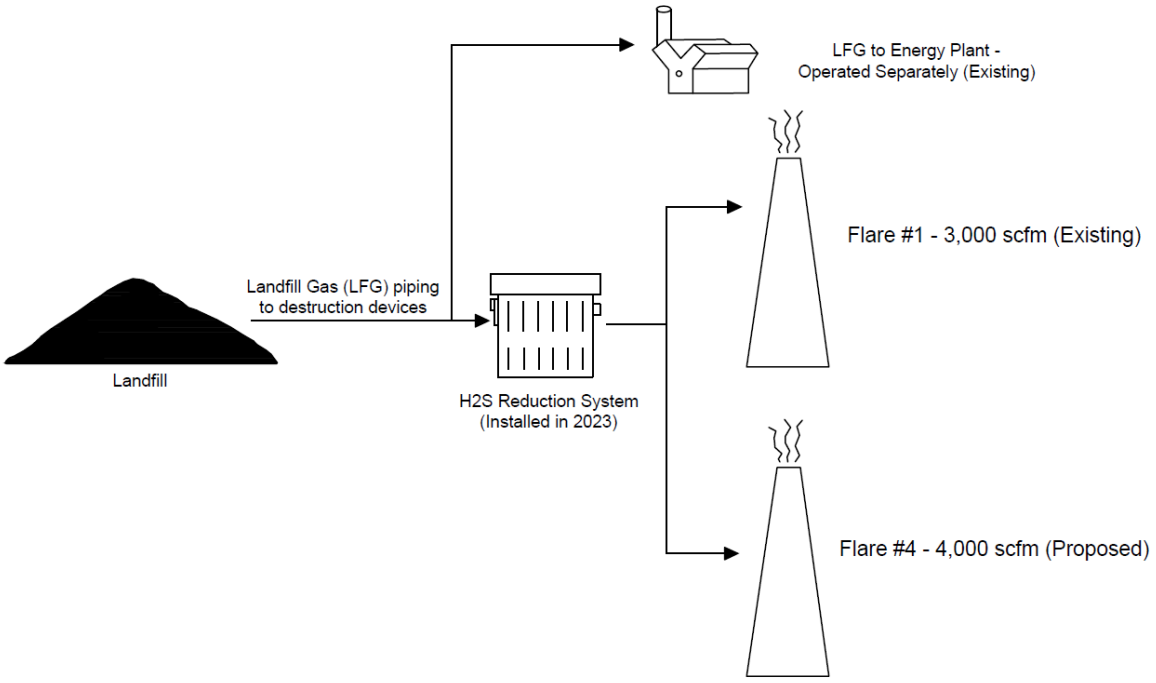
The SO_2 PSD applicability calculation takes the facility's actual baseline emissions of 153 tons per year and adds 39 tons (just below the PSD significant emissions rate of 40 tons) to get a final threshold of 192 tons per year that if exceeded, would trigger PSD for this modification. The baseline actual emissions value of 153 tons per year was calculated pursuant to WAC 173-400-810(1) and (2), using emissions data from 2022 to 2023. The applicant has requested a more stringent limit of 100 tons per year of SO_2, rather than 192 tons per year.

The concentration of H_2S after the H_2S treatment system will be monitored and controlled to ensure that the LRI Landfill's SO_2 flare emissions remain under the PSD avoidance limit (i.e., 192 tons per year). The applicant supplied a description of the H2S control system with the application:

> *The LRI Landfill is planning to implement a hydrogen sulfide (H_2S) reduction system that used solid scavenger type media to remove H_2S from the landfill gas (LFG) stream. A portion of the LFG flow is directed through vessels that contain solid scavenger media. The media is a pelletized type media that typically contains a form of iron hydroxide to react with the H_2S in the gas stream and produce elemental sulfur and water as a byproduct.*
> *LRI has selected the use of Vacuum Scrubber Vessels. Four vessels will be installed in parallel and will receive a portion of the LFG stream for treatment. Initially, LRI plans to utilize Darco BG-1 activated carbon media for use inside the vessels. Darco BG-1 is manufactured by Norit. Darco BG-1 is granular activated carbon, developed for removing H2S from biogas streams, that uses the adsorption process to remove H2S from the LFG stream. Performance efficiencies for BG-1 are estimated at 60%. After the volume of media in the vessels is used up to treat H_2S, the used media is removed from the vessels to be disposed of in the landfill and fresh media is replaced in the vessels. A different media may be used in the future, as performance and costs vary over time and a more economical option may become available. Regardless of the specific type of media selected, the system will operate in the manner consistent with BACT.*



The above diagram will eventually replace Flare #3 with Flare #4 as described above.



Note that the illustrations above reflect the use of the sulfur reduction system on only the gas flared by the landfill, but not the gas that is sent to the LFG-to-energy plant. In contrast, the Agency has determined, below, that BACT requires that all collected landfill gas be treated by the sulfur removal system, regardless of the destination of the gas.

The applicant submitted two separate NOC applications for the temporary flare (12301) and the permanent flare (12325). However, since both the temporary flare and the permanent flare are simply control devices associated with the increase in landfill capacity, the Agency is evaluating these as one permitting project, and both flares are covered in this NOC, as the control devices associated with increased landfill capacity and increased landfill gas generation.

The permit will have an enforceable limit of 100 tons per year on a 12-month rolling basis to protect the PSD threshold. A limit of 192 tons per year would be necessary in order to assure that this flare installation does not exceed the threshold for PSD; however the landfill has requested that this 12-month limit equal 100 tons per year, rather than 192 tons per year.

B. DATABASE INFORMATION

11993 - Waste Connections Inc Dba. Pierce Co Recycling Com...

Basic Equipment

Count: 3

Reg	Name	Item #	NC/Notifi...	BE Code	Year Insta...	Unit...	Rated Capac...	Rated Units	NO...	Comments
11993	Waste C...	2		61 - storage tank		1	10000.00	Gal	☑	Above Ground - Diesel
11993	Waste C...	3		61 - storage tank		1	258.00	Gal	☑	Above ground - gasoline
11993	Waste C...	1	12301	34 - landfill	1999	1			☐	34.4 Million Ton Design Capacity Minicipal Solid Waste Landfill

Comment: 34.4 Million Ton Design Capacity Minicipal Solid Waste Landfill

Control Equipment

Count: 4

Reg	Name	Item #	NC/Notification #	CE Code	Year Installed	Units Installed	NOC Not Required	Comments
11993	Waste Connections...	1	12301	23 - Flaring	2022	1	☐	Temporary replacement flare - 2,200 cfm
11993	Waste Connections...	2	12301	23 - Flaring		1	☐	John Zinc Landfill Gas Incinerator Model ZTOF / Primary unit Flare #1
11993	Waste Connections...	3	12301	23 - Flaring	2024	1	☐	Permanent Flare Parnel Biogas
11993	Waste Connections...	4	12301	99 - Miscellaneous control devi...	2022	4	☐	Vacuum Scrubber Vessels, Hydrogen Sulfide Control unit (Norit Darco BG-1 Activated Carbon or equivalent)

New NSPS due to this NOCOA?	**No**
New NESHAP due to this NOCOA?	**No**
New Synthetic Minor due to this NOCOA?	**No**

LRI landfill is already subject to the requirements of 40 CFR 62 OOO and 40 CFR 63 Subpart AAAA, this modification will not change the applicability of the landfill from these subparts.

C. NOC FEES AND ANNUAL REGISTRATION FEES

NOC Fees:

Fees have been assessed in accordance with the fee schedule in Regulation I, Section 6.04. All fees must be paid prior to issuance of the final Order of Approval.

Fee Description	Cost	Amount Received (Date)
Filing Fee	$ 1,550	
Equipment (1 temporary flare, 1 new flare, 1 new H2S removal system, increased landfill capacity)	$3,000	
Landfill Gas System	$2,750	
SEPA (already completed)	$0	
Rule review (40 CFR 63 Subpart AAAA, 40 CFR 62 Subpart OOO/40 CFR 60 Subpart XXX)	$2,100	
Review of Two or more previous Orders of Approval (evaluation not provided by applicant)	$650	
Document Collection to Support Conclusion that SEPA Requirements were met by a Previous Environmental Review (not provided by applicant) (See WAC 197-11-600)	$900	
Public Notice and Public Hearing ($750 + $2,500) (publication fees will be collected after hearing)	$3,250	
Modeling Review (provided by applicant – Screen model)	$800	
Filing received		$ 1,550 paid
Additional fee received		$13,450 (Paid)
Total		

Receipt #R581088348154 paid 3/23

Registration Fees:
Registration fees are assessed to the facility on an annual basis. Fees are assessed in accordance with Regulation I, Section 7.07.

No changes to the facility annual operating fees as a result of this permit application.

Invoice for Year 2024 Operating Permit Fees

Bill To:
Waste Connections Inc Dba. Pierce Co Recycling Composting and Disposal LLC **17925 Meridian St. E** **Puyallup, WA 98375** **Attention: Accounts Payable**

Invoice Date:	Invoice #:
November 18, 2023	20240022
Due Date:	**Terms:**
January 02, 2024	Net 45 Days
Facility ID (Permit #):	
11993	

Site Address: ***Waste Connections Inc Dba. Pierce Co Recycling Composting and Disposal LLC***
30919 Meridian St E, Graham, WA 98338

The annual operating permit fee is required by Washington State law and Puget Sound Clean Air Agency's Regulation I. Your fees are based on your NAICS code and your actual emissions during 2022.

Facility Fees and Applicable Regulations			Charges
Facility Fee for Operating Permit Sources. Reg I, 7.07(b)(1)(iii)			**$ 41,830.00**
NAICS 562212 -- Solid Waste Landfill			
Emission Surcharges - Reg I, 7.07(b)(2)	**Tons in 2022**	**Per Ton**	
CO (Carbon Monoxide)	74	$ 30	$ 2,220.00
SOx (Sulfur Oxides)	179	$ 60	$ 10,740.00
			$ 12,960.00
Fee Totals			
Operating Permit Fee (After February 16, 2024, the fee is $62,915.00).			**$ 54,790.00**
The Total Fee is due by January 02, 2024. If unpaid after February 16, 2024, an additional delinquent fee of $8,125.00 will be applied. The delinquent fee is equal to 25% of the Operating Permit Fee, not to exceed $8,125 (Reg I, 7.07(b)).			
WA State Department of Ecology surcharge, Reg I, 7.07(d)			**$ 911.76**
For further information regarding the WDOE surcharge, please call 1-360-407-7530.			
TOTAL FEE			**$ 55,701.76**

D. STATE ENVIRONMENTAL POLICY ACT (SEPA) REVIEW

State Environmental Policy Act (SEPA) review was conducted in accordance with Regulation I, Article 2. The SEPA review is undertaken to identify and help government decision-makers, applicants, and the public to understand how a project will affect the environment. A review under SEPA is required for projects that are not categorically exempt in WAC 197-11-800 through WAC 197-11-890. A new source review action which requires a NOC application submittal to the Agency is not categorically exempt.

The applicant supplied a SEPA checklist for the new flare in the permanent flare NOC application

In order to determine whether or not the post-project state of the landfill was covered by an existing SEPA review, the Agency attempted to gather information about the landfill waste capacity and its maximum project landfill gas generation rate from the applicant. The Final Supplemental Environmental

Impact Statement for the landfill, completed in 1995, stated that the final volume of the landfill would be an airspace capacity of 29.2 million cubic yards, including the waste, liner, cover, and other landfill components. The Agency was unable to locate any subsequent SEPA determinations that included an increase in volume beyond that which was reviewed in the FSEIS. The FSEIS did not give a capacity in more commonly used units such as waste design capacity (either in volume or mass units).

During the Agency's review process for this NOC, the applicant did not provide the information that the Agency requested from it regarding the projected maximum landfill gas generation rate, or the current airspace volume of the landfill. Therefore, the Agency is clarifying that this review of the landfill covers a landfill gas generation rate of 7,000 scfm, which is the total flaring capacity after the completion of this project.

For this present permitting action, the Agency has determined that the existing FSEIS adequately captures the environmental impacts of the landfill, including this increase in landfill capacity and landfill gas production.

An increase in gas generation beyond 7,000 scfm will be considered a production increase subject to permitting. For future permitting actions, the Agency will assume that gas production beyond 7,000 scfm is not covered by any SEPA review performed to date. (The applicant could overcome this assumption by demonstrating that the airspace capacity of the landfill will never exceed 29.2 million cubic yards.)

E. TRIBAL CONSULTATION

On November 21, 2019, the Agency's Interim Tribal Consultation Policy was adopted by the Board. Criteria requiring tribal consultation are listed in Section II.A of the policy and include establishment of a new air operating permit source, establishment of a new emission reporting source, modification of an existing emission reporting source to increase production capacity, or establishment or modification of certain equipment or activities. In addition, if the Agency receives an NOC application that does not meet the criteria in Section II.A but may represent similar types and quantities of emissions, the Agency has the discretion to provide additional consultation opportunities.

This project does not meet any of the criteria for consultation listed in Section II.A of the Agency's Interim Tribal Consultation Policy.

F. BEST AVAILABLE CONTROL TECHNOLOGY (BACT) REVIEW

Best Available Control Technology (BACT)

New stationary sources of air pollution are required to use BACT to control all pollutants not previously emitted, or those for which emissions would increase as a result of the new source or modification. BACT is defined in WAC 173-400-030 as, "an emission limitation based on the maximum degree of

reduction for each air pollutant subject to regulation under Chapter 70.94 RCW emitted from or which results from any new or modified stationary source, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each pollutant."

An emissions standard or emissions limitation means "a requirement established under the Federal Clean Air Act or Chapter 70.94 RCW which limits the quantity, rate, or concentration of emissions of air contaminants on a continuous basis, including any requirement relating to the operation or maintenance of a source to assure continuous emission reduction and any design, equipment, work practice, or operational standard adopted under the Federal Clean Air Act or Chapter 70.94 RCW."

Best Available Control Technology for Toxics (tBACT)

New or modified sources are required to use tBACT for emissions control for TAP. Best available control technology for toxics (tBACT) is defined in WAC 173-460-020 as, "the term defined in WAC 173-400-030, as applied to TAP."

LRI is making a modification under this permit that increases emissions from the flares used to control landfill gas since the incoming landfill gas has exceeded the existing flare maximum capacity (3500 scfm to 7000 scfm). As mentioned above in the introduction section of this worksheet, this section will also include an evaluation of the landfill design capacity increasing as well. Furthermore, this analysis includes a review of BACT that was triggered by the acceptance of high-sulfur wallboard waste, which the Agency determined was a modification that triggers permitting, including BACT review.

Landfill Gas Collection and Control (Flares)

The table below summarizes the BACT and RACT determinations for recent PSCAA permits for control of landfill gas which mostly require controls on NMOCs or PM

NOC	Description	BACT/RACT Determination
11963 (9/11/2020)	Modification to add one John Zink 200 cfm flare to existing Cathcart Landfill	VOC BACT: Minimum destruction efficiency of 98% of non-methane organic compounds (NMOC) or 20 ppmv by volume, dry basis as hexane at 3% O2 to be achieved using a non-assisted open flare designed and operated in accordance with §60.18: PM: Flares shall be designed for and operated with no visible emissions as determined by the EPA method 22, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.
11307 (7/3/2019)	Area 8 Lateral Landfill Expansion including	VOC BACT:

	landfill gas collection system and flare	Minimum destruction efficiency of 98% of non-methane organic compounds (NMOC) or 20 ppmv by volume, dry basis as hexane at 3% O2. PM BACT: No visible emissions
11399 (10/11/2017)	340 cfm flare at existing landfill	VOC BACT: minimum 98% destruction of all non-methane organic compounds or reduce the outlet NMOC concentration to less than 20 ppm by volume, dry basis as hexane at 3 percent oxygen.
11400 (10/11/2017)	450 cfm flare at existing landfill	VOC BACT: This landfill gas flare shall achieve a minimum of 98% destruction of all non-methane organic compounds or reduce the outlet NMOC concentration to less than 20 ppm by volume, dry basis as hexane at 3 percent oxygen.
11073 (7/19/2016)	140 cfm spark flare at existing landfill	VOC RACT: • Reduce NMOC emissions by 98 weight-percent or reduce emissions to 20 parts per million by volume as hexane. • Flares shall be designed for and operated with no visible emissions as determined by the EPA method 22, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.

Across the BACT and RACT determinations for flares at landfills in PSCAA jurisdiction permitted in the last five years, 98% minimum destruction efficiency of non-methane organic carbon (NMOC) or flare outlet emissions of 20 ppmv as hexane or less have been consistently required for open flares. Compliance with this limit has been demonstrated through use of a flare meeting the design requirements of 40 CFR 60.18. NOCs 11399 and 11400 were for replacement flares which resulted in an increase in air emissions and therefore were required to be reviewed under BACT but were not for an expansion of the landfill itself, whereas NOC 11307 was for a lateral expansion to an existing landfill. Both NOC 11307 and NOC 11073 also include a no visible emissions requirement on the flare.

The previous PSCAA BACT and RACT NMOC determinations are consistent with 40 CFR 60 Subpart WWW requirements but would also be consistent with the new landfill subpart 40 CFR 60 Subpart XXX (examined more below) and control technology capable of meeting 40 CFR 60.33(c) and 60.18:

40 CFR 60.33c (c)- Emission guidelines for municipal solid waste landfill emissions.

> ***(c)*** *For approval, a State plan shall include provisions for the control of collected MSW landfill emissions through the use of control devices meeting the requirements of paragraph (c)(1), (2), or (3) of this section, except as provided in § 60.24.*
>
> ***(1)*** *An open flare designed and operated in accordance with the parameters established in § 60.18; or*
>
> ***(2)*** *A control system designed and operated to reduce NMOC by 98 weight percent; or*

(3) *An enclosed combustor designed and operated to reduce the outlet NMOC concentration to 20 parts per million as hexane by volume, dry basis at 3 percent oxygen, or less.*

40 CFR 60.18 - General control device and work practice requirements further provides the following:

(1) Flares shall be designed for and operated with no visible emissions as determined by the methods specified in paragraph (f), except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.

Other Regulatory Agencies:

A review of several BACT databases was conducted to determine if there were emission-control specifications specifically for landfill operations. The search resulted in the following:

Origin	Process Source	BACT Determination
MassDep (November 28, 2012)	Flares with biomass digester gas for fuel	▪ NO_x – 2.70 lbs per Mscf/min gas flared ▪ CO – 13.70 lbs per Mscf/min gas flared ▪ PM – 0.15 lbs per Mscf/min gas flared ▪ CO_2 – 7,105 lbs per Mscf/min gas flared ▪ VOC – 0.55 lbs per Mscf/min gas flared ▪ SO_2 – 99.5 percent oxidation of 200 ppm H_2S inlet emissions ▪ H_2S – 200 ppm inlet concentration
SCAQMD (No. 538706)	Flare for oil and gas operations	▪ VOC – 10 ppmv on a dry, volumetric basis corrected to 3% oxygen (O_2) ▪ NO_x - 15 ppmv on a dry, volumetric basis corrected to 3% oxygen (O_2) ▪ CO - 10 ppmv on a dry, volumetric basis corrected to 3% oxygen (O_2)
SCAQMD (No. 245157)	Flare for landfill operations(8,750 scfm)	▪ Minimum temperature in flare stack: 1400 ^oF ▪ NOx 0.06 lbs/MMBtu ▪ CO 0.01 lbs/MMBtu ▪ PM 6.1 lbs/MMscf ▪ Minimum non-methane organic compounds (NMHC) destruction efficiency of 98% or maximum NMHC concentration in stack of 20 ppm, dry corrected to 3% O2 as hexane
MaineDep (A-1086-71-A-N)	Flare with biomass digester gas for fuel	▪ NO_x – 48.0 lbs per MMscf gas flared ▪ CO – 1.8 lbs per MMscf gas flared ▪ PM – 0.02 lbs/MMBtu ▪ VOC – 12.10 lbs per MMscf gas flared ▪ SO_2 – 2.0 lbs per MMscf gas flared ▪ Opacity – visible emissions from the flare shall not exceed 10% on a 6 minute block average basis, except for no more than one

Origin	Process Source	BACT Determination
		(1) six (6) minute block average in a 3 hour period
SJVAPCD	Flare with biomass digester gas for fuel	▪ NO_x 0.06 lbs/MMBtu ▪ ≤ 40 ppmv Sulfur in digester gas

Texas: https://www.tceq.texas.gov/permitting/air/nav/air_bact_chemsource.html
No specific landfill operation BACT found on this site; however, it does include Flare operations which requires that the flare meet the standards of 40 CFR 60.18 (similar to what the Agency has required in the past for flares in NOC 11073)

CARB - https://www.arb.ca.gov/bact/bactnew/determination.php?var=932
The California Air Resources Board website had two results matching the landfill operation BACT requirements.

The first result was for Sycamore Landfill in San Diego County APCD using a landfill gas flare, and the BACT requirement was 20ppmv VOC @3% O2.

The other was for Santa Maria Regional Landfill in Santa Barbara County APCD, requiring the flare meet 20 ppmv @3% O2 for VOC, 0.4 lbs of CO/MMbtu and 0.05 lbs of NOx/MMBtu.

San Joaquin Valley Air Pollution District
http://www.valleyair.org/busind/pto/bact/bactLoader.htm
San Joaquin Valley had a BACT listed for Landfill Gas collection systems, but rescinded this BACT in 2016. (BACT search ID 1.4.3).

Bay Area Air Quality Management District
http://www.baaqmd.gov/permits/permitting-manuals/bact-tbact-workbook
Bay area has BACT information for Landfill Operations, outlined below:

Source:	*Flare - Digester Gas or Landfill Gas from Non-Hazardous Waste landfill*	**Revision:**	*1*
		Document #:	*80.1*
Class:	*All*	**Date:**	*12/16/91*

Determination

POLLUTANT	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice	TYPICAL TECHNOLOGY
POC	1. *n/d* 2. *Ground level, enclosed, ≥0.6 sec. retention time at ≥1400°F, auto combustion air control, automatic shoutoff gas valve and automatic re-start system*[b]	1. *n/d* 2. *BAAQMD Approved Design and Operation*[b]
NOx	1. *≤0.06 lb/MMBtu* 2. *0.06 lb/MMBtu*	1. *n/s* 2. *n/s*
SO_2	1. *Scrubbing and/or carbon adsorption for hydrogen sulfide removal*[c] 2. *n/d*	1. *BAAQMD Approved Design and Operation*[b] 2. *n/d*
CO	1. *n/d* 2. *Same as for POC above*[b]	1. *n/a* 2. *BAAQMD Approved Design and Operation*[b]
PM_{10}	1. *n/s* 2. *n/s*	1. *Fuel Gas Filter* 2. *Knockout Vessel*
NPOC	1. *n/a* 2. *n/a*	1. *n/a* 2. *n/a*

Source:	*Landfill Gas Gathering System*	Revision:	*1*
		Document #:	*101.1*
Class:	*All*	Date:	*10/18/91*

Determination

POLLUTANT	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice	TYPICAL TECHNOLOGY
POC	1. *n/d* 2. *Horizontal and vertical gas collection lines vented to I.C. Engine or enclosed flare*[b]	1. *n/d* 2. *BAAQMD Approved Design and Operation*[c]
NOx	1. *n/a* 2. *n/a*	1. *n/a* 2. *n/a*
SO_2	1. *n/d* 2. *n/d*	1. *n/d* 2. *n/d*
CO	1. *n/a* 2. *n/a*	1. *n/a* 2. *n/a*
PM_{10}	1. *n/a* 2. *n/a*	1. *n/a* 2. *n/a*
NPOC	1. *n/a* 2. *n/a*	1. *n/a* 2. *n/a*

References

b. See I.C. Engine and flare sections of this workbook for respective BACT limits
c. BAAQMD

A recent permit was issued by Bay Area AQMD for a new landfill gas-to-energy plant, which included the use of two landfill gas-fired lean burn IC engines, a landfill gas treatment system, and a waste gas flare. The part of Bay Area landfill energy plant that is applicable to the flare project is the waste gas flare: http://www.baaqmd.gov/~/media/files/engineering/title-v-permits/e0432/22636_2011_8_newmajorfacility_ee.pdf

From the permit's statement of basis, this facility was required to meet the BACT guidelines outlined in documents 101.1 and 80.1 for BACT. However, pursuant to Regulation 2-2-110, secondary emissions from abatement devices that are required to meet BACT or BARCT requirements for another pollutant are exempt from the Regulation 2-2-301 BACT requirements but must achieve a RACT level of control for these secondary pollutants instead. This permit did not specifically require the BACT level controls listed in Document 80.1 for NOx, SO2, PM10, and CO but RACT was discussed in detail. This permit required the following for the flare:

VOC: 98% by weight destruction efficiency or no more than 30 ppmv NMOC at the outlet, expressed as methane and corrected to 3% Oxygen.

SO2: Sulfur Dioxide (SO2) emissions from the flare (A-1) shall not exceed 6.11 pounds per hour.

NOx: Nitrogen oxide (NOx) emissions from the A-1 flare shall not exceed 0.06 pounds of NOx

CO: Carbon monoxide (CO) emissions from the A-1 flare shall not exceed 0.20 pounds of CO per million BTU of heat input

South Coast AQMD:
SCAQMD sets forth sulfur requirements in gaseous fuels in Regulation 431.1, shown below:

(c) Sulfur Content Requirements

(1) Natural gas

A person shall not transfer, sell or offer for sale for use in the jurisdiction of the District natural gas containing sulfur compounds calculated as H_2S in excess of 16 parts per million by volume (ppmv).

(2) Other Gaseous Fuels

On or after the applicable compliance dates specified in Table 1, a person shall not burn in equipment requiring a Permit to Operate, purchase, transfer, sell or offer for sale for use in the jurisdiction of the District, any gaseous fuel containing sulfur compounds calculated as H_2S, in excess of the concentration limits as measured over the averaging periods for various gaseous fuels as specified in Table 1.

TABLE 1

Fuel Type	Sulfur Limits ppmv	Averaging Period	Compliance Date On or After
Refinery Gas			
Small Refiners	40	4 hrs	May 4, 1996
Other Refiners	40	4 hrs	May 4, 1994
Landfill Gas	150	Daily	June 12, 1998
Sewage Digester Gas	40 or 40 and 500	Daily or Monthly and 15-minutes	November 17, 1995 November 17, 1995
Other Gases	40	4 hrs	May 4, 1994

This regulation shows incoming sulfur requirements to be 150 ppm on a 24-hour averaging time if the fuel will burned/combusted; in this case, the landfill gas will be burned in the flare so it would be applicable. Due to the limit being on an averaging time, there will be requirements for a continuous monitoring system such as a Continuous emission monitoring system (CEMS) or a continuous fuel gas monitoring system (CFGMS). As evidenced by the table on Page 2, above, LRI has seen high fluctuations in hydrogen sulfide, and this has caused them to exceed PSD thresholds for SO2 which a continuous monitoring system would help accurately assess these emissions. Considering that this is listed in a rule/regulation for the agency and was not determined based on a BACT/LAER determination for a project increase, means that this standard is achieved in practice for sources within the South Coast AQMD and is therefore considered in this analysis as not overly burdensome. This rule, however, also contains an option for an alternative monitoring plan (located in attachment A to the rule linked above), to be approved by SCAQMD, instead of a CEMS or CFGMS. Rules typically contain standards that are less stringent than BACT or LAER determinations within the same jurisdiction.

The applicant also supplied a top down BACT analysis that included a review of recently issued RACT or BACT determinations for Sox from many California agencies. The table below presents the information found:

Landfill Name	State, Air Jurisdiction	Control Technology	LFG TRS Limit in ppmv & Averaging Specifics	Permit Condition and Basis
Potrero Hills Landfill	CA, BAAQMD	Controls not required, based on sulfur content in landfill gas	504 ppmv H2S [*Averaging via*: Quarterly Draeger tube samples, plus an annual source test]	#10. Basis: Regulation 9-1-302 (exhaust limit on SOx), voluntary limit on SO2 PTE to avoid public notice, Regulation 2-2-405
Redwood Landfill	CA, BAAQMD	Activated Carbon for flare	350 ppmv H2S annual average, 370 ppmv during any test on flare [*Averaging via*: Annual Average of Quarterly LFG Testing]	#18. Basis: Cumulative increase, RACT, Air Toxics Hot Spots Act and Regulations 2-5-302.3 (H2S acute health risk), 9-1-302 (exhaust limit on SOx), and 9-2-301 (H2S limit)
Vasco Road Landfill	CA, BAAQMD	Controls not required, based on sulfur content in landfill gas	320 ppmv [*Averaging via*: Rolling Annual Average of Quarterly LFG Testing]	#12. Basis: RACT for SO2 and Regulation 9-1-302 (exhaust limit on SOx),
Columbia Ridge	OR, ODEQ	Controls not required, based on sulfur content in landfill gas	300 ppmv [*Averaging via*: Shall Not Exceed]	Federal PSD BACT determination based on cost effectiveness analysis
Newby Island Landfill	CA, BAAQMD	Activated Carbon [used as partial control to meet sulfur limit]	300 ppmv [*Averaging via*: Shall Not Exceed]	#10. Basis: Cumulative Increase, Regulation 2-1-204, 2-2-303 (limit to avoid SOx offsets)
Sonoma Central Landfill	CA, BAAQMD	Controls not required, based on sulfur content in landfill gas	300 ppmv [*Averaging via*: Shall Not Exceed]	#7. Basis: Regulation 9-1-302 (exhaust limit on SOx).
Keller Canyon Landfill	CA, BAAQMD	Controls not required, based on sulfur content in landfill gas	300 ppmv [*Averaging via*: Shall Not Exceed]	#34. Basis: Cumulative Increase and Regulations 9-1-302 (exhaust limit on SOx),and 2-6-503.
West Contra Costa	CA, BAAQMD	Controls not required, based on sulfur content in landfill gas	300 ppmv [*Averaging via*: Shall Not Exceed]	#10. Basis: Regulation 9-1-302 (exhaust limit on SOx), Cumulative Increase.

New Jersey:
Landfills (state.nj.us) a PowerPoint presentation discussing "State of the Art" (SOTA) emission limitations for landfills. This presentation was not a regulation, though DEP has published the SOTA document: State of the Art Manual (nj.gov) dated May 6, 2023

On page 8:
Sulfur dioxide (SO2) emissions limits controlled through precombustion of H2S and control requirements for MSW landfills:

1. For collected LFG with an H2S concentration greater than 10,000 ppmv, a minimum 97% removal of all sulfur compounds, extracted by the LFG system prior to the combustion device; OR
2. For collected LFG with an H2S concentration less than or equal to 10,000 ppmv, H2S inlet concentration (prior to the combustion device) shall not exceed 200 ppmv. Compliance with this provision will be provided by monitoring of the H2S concentration in the gas stream before any combustion controls (e.g., flare).

Federal Standards and RBLC

EPA's RACT BACT LAER Clearinghouse (RBLC) –
There was only one determination, Mill Seat Landfill, that was available for non-assisted candlestick flares (Explained in more detail in "analysis" section of this worksheet). The EPA BACT clearinghouse had a BACT determination for an open flare at the Mill Seat Landfill (included in Appendix B). Mill Seat Landfill had open and enclosed flares, and the determination for the open flare was rated at lowest achievable emission rate (LAER) which is a more stringent standard than BACT. The emission rates were as follows:

- 0.068 pound per million British thermal units (lb/MMBtu) heat input for NOx
- 0.31 lb/MMBtu heat input for CO

Federal standards:
There are 2 relevant federal standards applicable to landfill operations that were also looked at in addition to the BACT reviews of other agencies:

40 CFR 60 XXX Requirements:
On July 14, 2016, EPA issued New Source Performance Standards for Municipal Solid Waste Landfills as Subpart XXX: Standards of Performance for Municipal Solid Waste Landfills that Commenced Construction, Reconstruction, or Modification after July 17. 2014.

Subpart XXX replaces the current NSPS regulating MSW landfills, Subpart WWW for those new source landfills that have commenced lateral or vertical expansion after July 17, 2014.

The relevant standards from this subpart are outlined in 60.762(b)(2)(ii) and (iii) (Collection and Control system)

(ii)Collection system. Install and start up a collection and control system that captures the gas generated within the landfill as required by paragraphs (b)(2)(ii)(C) or (D) and (b)(2)(iii) of this section:

(C) An active collection system must:

(1) Be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control system equipment;

(2) Collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of 5 years or more if active; or 2 years or more if closed or at final grade.

(3) Collect gas at a sufficient extraction rate;

(4) Be designed to minimize off-site migration of subsurface gas.

(iii)Control system. Route all the collected gas to a control system that complies with the requirements in either paragraph (b)(2)(iii)(A), (B), or (C) of this section.

(A) A non-enclosed flare designed and operated in accordance with the parameters established in § 60.18 except as noted in § 60.764(e); or

(B) A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen. The reduction efficiency or parts per million by volume must be established by an initial performance test to be completed no later than 180 days after the initial startup of the approved control system using the test methods specified in § 60.764(d). The performance test is not required for boilers and process heaters with design heat input capacities equal to or greater than 44 megawatts that burn landfill gas for compliance with this subpart.

(1) If a boiler or process heater is used as the control device, the landfill gas stream must be introduced into the flame zone.

(2) The control device must be operated within the parameter ranges established during the initial or most recent performance test. The operating parameters to be monitored are specified in § 60.766;

(C) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or beneficial use such as fuel for combustion, production of vehicle fuel, production of high-Btu gas for pipeline injection, or use as a raw material in a chemical manufacturing process. Venting of treated landfill gas to the ambient air is not allowed. If the treated landfill gas cannot be routed for subsequent sale or beneficial use, then the treated landfill gas must be controlled according to either paragraph (b)(2)(iii)(A) or (B) of this section.

(D) All emissions from any atmospheric vent from the gas treatment system are subject to the requirements of paragraph (b)(2)(iii)(A) or (B) of this section. For purposes of this subpart, atmospheric vents located on the condensate storage tank are not part of the treatment system and are exempt from the requirements of paragraph (b)(2)(iii)(A) or (B) of this section.

The relevant standards for controlling landfill gas with a gas collection and control system are the same in Subpart XXX as they were in Subpart WWW.

40 CFR 63 AAAA requirements:
This subpart is the federal standard promulgated under 40 CFR 63 Subpart AAAA which regulates hazardous air pollutants at municipal solid waste landfills that are a major source of HAPs, co-located with a major source of HAPs or are area sources that meet the landfill size thresholds in the rule.

This subpart requires most of the same requirements as 40 CFR 60 Subpart XXX, there are references to WWW within this subpart but as of Sept 27, 2021 most of the newer requirements of this rule no longer reference WWW or Emission Guidelines 40 CFR 62 Subpart Cc. The newer requirements are more closely outlined in XXX or emission guidelines 40 CFR 62 subpart OOO.

The requirements of 40 CFR 60, Subpart Cc are outlined above under "similar permits" 60.33c (c) and 40 CFR 60 Subpart XXX is also outlined above under "**40 CFR 60 XXX requirements"** for informational purposes.

Analysis and recommendations for NMOC/TAPs:

Flares are generally categorized in two ways: (1) by the height of the flare tip: ground or elevated, and (2) by the method of enhancing mixing at the flare tip: steam-assisted, air-assisted, pressure-assisted, or non-assisted. In addition to designating flares by the height of the flare tip, flares can be identified as enclosed or not, single, or multipoint, and permanent or temporary/portable installation. While each flare-type designation will impact the flare design, these designations are considered secondary to the assist type.

40 CFR 60.18(c)(ii) states the net heating value of the LFG being combusted should be as follows:

1) For steam- or air-assisted flares, 300 British thermal units per standard cubic foot (Btu/scf) or greater
2) For non-assisted flares, 200 Btu/scf or greater.

Pressure-assisted flares typically require a higher heat content than those that are steam- or air-assisted. If this minimum is not met by the waste LFG, then the flare will experience flameout issues, and enough auxiliary fuel would need to be introduced to make up the difference. Adding fuel increases the amount of gas to be combusted, which also increases emissions.

Landfills typically use a combination of enclosed steam- or air-assisted flares or open non-assisted flares, depending on the heat content of the LFG to be combusted. The temporary flare under this permit application is an unassisted open flare, whereas the permanent flare is a Parnel Biogas enclosed unassisted flare.

Based on the information found from other agencies as well as federal standards, the use of a gas collection system and flare that meets the standards of 60 Subpart XXX 60.762(b)(2)(iIi)(B) is considered BACT for VOC and TAC:

40 CFR 60 subpart XXX

A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen. The reduction efficiency or parts per million by volume must be established by an initial performance test to be completed no later than 180 days after the initial startup of the approved control system using the test methods specified in § 60.764(d). The performance test is not required for boilers and process heaters with design heat input capacities equal to or greater than 44 megawatts that burn landfill gas for compliance with this subpart.

40 CFR 63 Subpart AAAA requires testing to demonstrate that a flare meets the requirements of 40 CFR 63.11(b) (requirements are listed differently from 40 CFR 60.18, but the flare requirements for minimum velocity, VE, heat capacity are the same across 60.18 and 63.11(b)). The applicant provided emission calculations for the flare and used a control efficiency of 98.9% instead of 98% so this will be placed in the permit to protect the emission limits being compared to the SQERs for TAPs.

The following table summarizes the Agency's BACT determination for the new temp flare and the permanent flare for PM, VOC and TAP:

Pollutant	BACT
VOC/TAPs (NMOC)	Minimum destruction efficiency of 98.9% of non-methane organic compounds (NMOC) or 20 ppmv by volume, dry basis as hexane at 3% O2 to be achieved using a non-assisted open or enclosed flare designed and operated in accordance with §60.18.
PM	Flares shall be designed for and operated with no visible emissions as determined by the EPA method 22, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.

Analysis and recommendations for Hydrogen Sulfide/Sulfur Dioxide BACT:

The additional part of this application is the application of BACT to the increase in sulfur emissions that occurred due to the result of the increased acceptance of sulfur containing waste as well as the increase in emissions associated with the landfill capacity increase that has not yet gone through NSR review.

The Agency has not issued any sulfur reduction BACT's for landfills in the jurisdiction. The analysis above includes sulfur reduction requirements from other agencies such as California, Oregon, and New Jersey. Additionally, the applicant provided a top down BACT analysis using the following technology for review:

Pre-Combustion Control

- o Sulfa Treat
- o FerroSorp
- o Iron Sponge
- o Activated Carbon
- o LO-CAT

Post-Combustion Control
- o Exhaust "Scrubbing"

Post combustion control was evaluated but determined to be technically infeasible due to the cost and the fact that there doesn't seem to be any current landfills using this technology (mostly done at coal and oil-fired power plants). Also the Iron sponge technology was also eliminated due to the fact that in rare cases the sponge could combust once it came into contact with oxygen. This could be reduced with excess water on the sponge, but it was still eliminated as the other control technologies are just as good without the extra risk of combustion.

The remaining precombustion controls were evaluated by the applicant, and a cost analysis was also provided with the application and reviewed by the Agency. The cost was completed with the assumption that the average inlet concentration is 2000 ppm and the removal tons were evaluated as follows:

Estimated Annual Pollutant Reduction

Technology	Flare Inlet Concentration (ppmv)	SOX Emissions (lb/day)	SOX Emissions (tons/yr)
Uncontrolled	2,000	1,053.26	192.22
Controlled	300	157.99	28.83
Uncontrolled Minus Controlled	1,700	895.27	163.39

The resulting cost analysis shows:

Technology	Cost per Emissions Reduced ($/ton SOx)
LO-CAT	$19,408
SulfaTreat	$8,539
Activated Carbon	$8,506

The Sulfatreat and activated carbon are considered technically feasible and economically feasible for the reduction of sulfur in the landfill gas entering the flares. This will reduce the SO2 emissions generated at the outlet of the flares.

Based on the evaluated sources and the California agency RACT/BACT analysis, an outlet standard of 300 ppm SOx was typically considered BACT without the use of additional controls and only on the composition of the inlet concentration of the landfill. With the additional use of controls, it should be more than feasible to reach a lower emission standard such as the 150 ppm sulfur content standard found in the SCAQMD Rule linked above. This also allows for fluctuations in the inlet concentrations of TRS or H2S as the landfill operates. If the average concentration of the inlet gas is 2000 ppm, this would be close to 95% control of sulfur which can be seen in the presentation given in the New Jersey State of

the Art presentation. The 150 ppm sulfur content limit in the SCAQMD Rule would have a monitoring frequency of "daily" due to the idea that the facility would otherwise be subject to the requirement to operate a continuous emission monitoring system. The Agency believes that with an alternative monitoring plan allowed under this rule, that a monthly averaging time is more appropriate but with a tiered approach to the amount of monitoring based on the levels of TRS or H2S measured at the outlet of the sulfur removal system. See the permit conditions for details.

Recommendations:

Pollutant	BACT
SO2/Sox/Odors	150 ppmv sulfur content (measured as H2S or TRS) on a rolling monthly average in the LFG prior to combustion in the flare or being routed to gas to energy facility.

Additional comments on BACT:

As part of the Agency's normal operating practice for processing an NOC application, the applicant was shared a copy of the draft worksheet for review and comment on 3/22/24. This review helps ensure accurate documentation of changes and equipment at the facility that could have been missed or misrepresented from the permit application. LRI responded with several comments countering the Agency's determination of BACT on 6/7/24

LRI Landfill Draft
Approval Order Wor

The Agency has reviewed the comments and our response to the following is below:

-LRI provided example facilities for which an alternative monitoring plan was approved in the state of California. The Agency used these examples to set a monitoring plan via the permit conditions (see permit conditions)

-In the provided monitoring plans, LRI noted that these plans allowed for an averaging time of 12 months. The Agency originally sent a draft with a 24-hour block averaging time (midnight to midnight) with the intention to require the use of a CEMS. The Agency has reviewed the alternative monitoring plan examples sent in the response and agrees that a CEMS can be avoided with the use of an alternative monitoring plan. This alternative monitoring plan will be used to show compliance with the 150 ppmv H_2S limit on a monthly basis and the monitoring frequency will be based on the outlet concentration of the sulfur removal system depending on how close it is to the 150 ppm permit threshold.

The Agency is not considering the use of handheld instantaneous readings (colorimetric tubes or portable handheld H_2S monitors) at this time, which differs from the approved monitoring plans in

California. In order to ensure accuracy of the readings, the Agency will require that the facility take readings only with the SCAQMD method (or another Agency-approved method) for the beginning of operation. Since the Agency did not require the submittal and approval by the facility for all key elements of an alternative plan (relative accuracy, correlation values, etc), the facility should consider developing a site-specific data set relating hand-held electronic or tube-based (such as colorimetric or Draeger tubes) methods to the SCAQMD method measurements. After some time has elapsed, the facility could apply for a modification of the permit to change the monitoring methodology, if the accuracy of the simpler measurement methods can be established.

-LRI provided examples of permits issued in California which also used the cited rule in the above BACT analysis section. These analyses were provided to show the Agency that the landfill gas does not need to be controlled before being sent to the landfill gas waste to energy facilities in each of the 3 permits provided. The Agency reviewed these permits and determined that none of them provide a basis for which the landfill gas does not need to be controlled before being sent to a waste-to-energy facility. The reason the sulfur in the landfill gas is an issue before this Agency in this NOC review is a result of operational changes made by LRI which led to elevated H2S concentrations in the gas and elevated SO2 emissions from landfill gas combustion. Neither the landfill nor the energy facility using landfill gas from the site identified those emissions nor anticipated those emissions at the time original permits were reviewed and issued to both parties. All increased emissions of SO2 have their causal link to the change in method of operations at the landfill, when the landfill began accepting high-sulfur waste. All sulfur that is processed at the landfill gas-to-energy plant originates from the landfill. Not only is the landfill responsible for this situation, this NOC review for the landfill must address the fact that in the event the energy recovery facility closed, all of the landfill gas collected would need to be treated prior to flaring on the landfill site.

1) In the first example provided (Ameresco/Ox Bow example), The landfill and the energy facility were reviewed under separate permit actions. Both sites originally had 150 ppmv H2S limits for the landfill gas fired, in flares and engines. When the engines were permitted at Ameresco, the assumption was that the H2S content in the gas would be the same as the landfill gas collected and flared at the landfill. The gas treatment train was not installed for H2S/SO2 emission control purposes. It is clear that the system was installed to protect the engines and engine emission control devices from damage due to contaminants in the landfill gas (e.g. siloxanes and other organics). The gas treatment system could remove some sulfur compounds from the gas, but that was not required or relied upon in the original permit review. In 2013, the landfill gas testing at the landfill identified gas concentrations greater than 150 ppmv H2S. Subsequent testing showed no relief and the BAAQMD initiated enforcement action in response. The landfill submitted an application to modify H2S concentration limit. That review led to the 265 ppmv H2S limitation, but it was coupled with a reduction in the gas throughput limit to the flares at the landfill. The determination was that there was no annual emission increases in SO2 at the landfill with the change in H2S limitation, when coupled with the gas throughput limitation. The review showed an emission decrease in other criteria pollutants as a result of the new throughput limitation. Nothing was found in the landfill gas permit support documents that indicated what this change could create for SO2 emissions from the energy facility. It appears that it was assumed the gas treatment train at the energy facility could deal with the higher sulfur content coming from the landfill while still meeting their limitation of 150 ppmv H2S fired in

the engines. Overall, it would appear in hindsight that this change at the landfill would have increased the overall SO2 annual emissions at the energy site since all of the sulfur received from the landfill would be emitted through the engine combustion or through the flare used to dispose of the gas treatment system generation.

This example does not provide evidence to support the claim that offsite use of landfill gas is the responsibility of the facility using the gas. The gas treatment train at Ameresco was not installed for SO2 emission control as both sites were relying on landfill gas to have no more than 150 ppmv H2S. When circumstances at the landfill changed and the H2S concentration increased beyond the established limits, emission controls were not a part of the permit modification. It was solely modified to equate to a "no increase" in annual emissions for the landfill alone. This is not comparable to the permit application being evaluated under this worksheet.

2) In the next example, Potrero Hills, there are a number of project-specific timing related factors in the current permits that exist today which should have been included in the analysis. The previous version of the landfill operating permit identified a landfill gas flare emission limit of 300 ppm SO2 and a landfill gas flare feed limit for reduced sulfur concentration limit of 1300 ppmv TRS (as H2S). The flare emission limit of 300 ppmv SO2 is a general regulatory limit identified in BAAQMD regulations (suggesting it is RACT). The November 2015 statement of basis discussion about the SO2 emissions from the collected landfill gas and its flaring focuses on the ambient air quality standards evaluation through dispersion modeling. That SOB document concluded that landfill gas meeting the 1300 ppmv TRS limit into the flare would also support meeting the 300 ppm SO2 emission limit in the flare exhaust. Both of those values led that analysis to conclude the NAAQS for SO2 would not be violated with that level of emissions. In the records we could locate, there is no indication of an actual RACT or BACT determination fed into those values/conclusions. In the updated operating permit document provided by LRI for the Potrero Hills Landfill show the landfill gas sulfur limit has been reduced from 1300 ppmv TRS to 560 ppmv TRS. The permit says this is a surrogate for the SO2 limit at the flare stack and the basis for this limit includes the same general regulation cited for that stack limit. The basis citation also indicated that this was a voluntary limit taken to avoid public comment. (The Agency was unable to determine what voluntary limit was being avoided.) The Potrero Hills Energy facility was clearly subjected to new source review where BACT determinations were made. The BACT determination that drove the landfill gas sulfur control was for the IC engines as they received a BACT limit of 9 ppmv SO2. The permit then specifies that the compliance demonstration for the engine SO2 emission limit will be through the monitoring of the inlet landfill gas sulfur content (explicitly linking the landfill gas sulfur content to compliance with the energy facility's emissions limits). It also appears that the analysis concluded that a landfill gas sulfur concentration no greater than 150 ppmv TRS will produce engine emissions that meet the 9 ppmv concentration limit. In this same permit, it appears the waste gas flare supporting the energy facility operation was not subject to BACT. Instead, an SO2 limit for the flare was identified at 300 ppmv SO2 and periodic testing at the flare exhaust was identified as the compliance demonstration method for that unit. This provided example is different than what is happening under this permit modification and does not provide a clear example why the landfill gas would not need to be controlled

before entering the waste to energy facility. This example shows that an engine limit was being met with a surrogate monitoring of the inlet landfill gas control.

In conclusion, the provided examples were not adequate to show that it is a commonly used assumption that landfill gas treatment is the responsibility of the landfill gas to energy facility which uses the gas. The examples did not show any indication that a modification commenced at any of the landfills which triggered BACT like this modification that is occurring at LRI landfill. It appears to the Agency that these examples and the choices made at these facilities had more to do with the timing and permit sequences.

G. EMISSION ESTIMATES

Landfill gas emissions:

Landfill gas emissions are generated from the decomposition of materials deposited into the landfill. Landfill gas is composed primarily of Methane (CH4) and carbon dioxide (CO_2). There are other constituents present in the gas as well, which includes hydrogen sulfide and non-methane organic compound(s) (NMOC). Landfill gas is collected from LRI by an active gas collection system that is complying with 40 CFR 60 Subpart WWW/XXX. Collected landfill gas is then partially directed through the Archea gas-to-energy facility where it is processed, and the remaining gas is then flared on site (flare emissions calculated below this section). For the purposes of this worksheet, it is assumed all gas will be handled and emitted by LRI and no landfill gas is being sent to the gas to energy facility.

Landfill Gas (LFG) production is typically estimated using waste placed using the U.S. EPA's LandGEM, V3.02 model (LandGEM). LandGEM predicts the amount of LFG based on a first-order decomposition rate equation from the decomposition of landfilled waste in municipal solid waste landfills. The model defaults are based on empirical data from U.S. landfills. If available, field test data can be used in lieu of certain model default input values. LRI was asked to provide LandGEM emission calculations for the increase in landfill capacity of 19.8 to 34.4 MMtons but failed to provide this information. The Agency could not determine waste in place for each year (as required by LandGEM calculations) so a scaled approach was used from previous emission calculated in the previous order of approval which approved the 19.8 MMtons (NOC 8023)

NOC 8023 used LandGEM and estimated the following information:

Generation of Landfill Gas and its Components NOC 8023

Component	input/output	Year of Max Generation
Refuse (Tons)	19,800,000	2052
Landfill Gas (Tons/year)	88,121	2052
Methane (Tons/year)	23,540	2052
NMOC Component (Tons/yr)	150.5	2052
Vinyl Chloride (Tons/year)	1.3	2052

Fugitive Landfill Gas and its Components*

Assuming 85% control the Landfill will still have the following fugitive emissions

Component	input/output	Year of Max
Refuse (Tons)	19,800,000	2052
Landfill Gas (Tons/year)	13,218	2052
Methane (Tons/year)	3531	2052
NMOC Component (Tons/yr)	22.6	2052
Vinyl Chloride (Tons/year)	0.2	2052

The new landfill "refuse" capacity is 34,400,000 tons. The information above was extrapolated for all expected pollutants:

Generation of Landfill Gas and its Components NOC 12301

Component	input/output	Year of Max Generation
Refuse (Tons)	34,400,000	2052
Landfill Gas (Tons/year)	153,092	2052
Methane (Tons/year)	6,135	2052
NMOC Component (Tons/yr)	261.5	2052
Vinyl Chloride (Tons/year)	2.25	2052

For fugitive emissions, the original NOC estimated 85% collection efficiency from the Gas Collection system.

Collection efficiency is discussed in AP-42 Chapter 2.4 for landfills on page 8 : Draft AP42 2.4 MUNICIPAL SOLID WASTE LANDFILLS, October 2008 (epa.gov)
AP-42 states that Landfill Gas Control Systems range in effectiveness in collecting the LFG from 50% to 95% with the average being 75%, recommended by EPA for emission inventory purposes. The lower collection efficiencies are experienced at landfills with a large number of open cells, no liners, shallow soil covers, poor collection system and cap maintenance programs and/or a large number of cells without gas collection. The higher collection efficiencies may be achieved at closed sites employing good liners, extensive geomembrane-clay composite caps in conjunction with well-engineered gas collection systems, and aggressive operation and maintenance of the cap and collection system. Sites complying with 40 CFR 60 Subpart WWW are typically more efficient than the historical landfills not subject to any standards, and newer landfills subject to 40 CFR 60 Subpart XXX should be more effective overall due to the requirements of a landfill gas collection and control system and design plans that have received more attention during their review by state and local agencies. In the case of this landfill, the landfill is subject to the more stringent requirements of NSPS XXX or 40 CFR 62 subpart OOO.

For the purposes of calculating fugitive emissions for this case, it is reasonable to consider that the 85% used in the original NOC is representative of the average landfill collection efficiency since no additional review has occurred by the Agency for the gas collection design plan.

Fugitive Landfill Gas and its Components*

Assuming 85% control the Landfill will still have the following fugitive emissions

Component	input/output	Year of Max
Refuse (Tons)	34,400,000	2052
Landfill Gas (Tons/year)	22,964	2052
Methane (Tons/year)	920	2052
NMOC Component (Tons/yr)	40	2052
Vinyl Chloride (Tons/year)	0.34	2052

Flare Emissions:

Potential Annual Emission calculations from the increased flaring capacity were provided by the applicant and reviewed by the agency for completeness and accuracy. Both emission calculations at 2,200 scfm and 4,000 scfm were provided by the applicant. Emissions of the 4,000 scfm flare are shown here as they are higher than 2,200 scfm flare (which is temporary). Emissions were determined using EPA's AP-42 emission factors, performance testing data or Waste Industry Air Coalition (WIAC) comparison for landfill emission factors against AP-42.

Appendix D - WIAC Paper (unprotected)

Table 1 below lists pertinent assumptions (e.g., capped 12-month rolling average flowrate for the largest flare [i.e., 4000 scfm], methane content of landfill gas etc.) and presents Non-Methane Organic Compounds (NMOC), Volatile Organic Compounds (VOC), Carbon Monoxide (CO), Nitrogen Oxides (NOX), Particulate Matter and Sulfur Dioxide (SO2) emissions per AP-42, Chapter 2.4 methodology.

Potential Annual Emissions
Table 1
Permanent Flare (Flare #4), LRI Landfill, Pierce County, Washington

Prepared By:	AK	10/19/2023
Reviewed By:	TAB	10/20/2023

	Maximum Flow Rate to Permanent Flare #4	Total Monthly Flow	Total Monthly Flow	Heat Content		Heat Release
	scfm	m^3	ft^3	BTU	MMBTU	MMBTU/Hr
January	4,000	5,056,924 m^3	178,560,000 ft^3	84,994,560,000	84,995	114.2
February	4,000	4,567,545 m^3	161,280,000 ft^3	76,769,280,000	76,769	114.2
March	4,000	5,056,924 m^3	178,560,000 ft^3	84,994,560,000	84,995	114.2
April	4,000	4,893,798 m^3	172,800,000 ft^3	82,252,800,000	82,253	114.2
May	4,000	5,056,924 m^3	178,560,000 ft^3	84,994,560,000	84,995	114.2
June	4,000	4,893,798 m^3	172,800,000 ft^3	82,252,800,000	82,253	114.2
July	4,000	5,056,924 m^3	178,560,000 ft^3	84,994,560,000	84,995	114.2
August	4,000	5,056,924 m^3	178,560,000 ft^3	84,994,560,000	84,995	114.2
September	4,000	4,893,798 m^3	172,800,000 ft^3	82,252,800,000	82,253	114.2
October	4,000	5,056,924 m^3	178,560,000 ft^3	84,994,560,000	84,995	114.2
November	4,000	4,893,798 m^3	172,800,000 ft^3	82,252,800,000	82,253	114.2
December	4,000	5,056,924 m^3	178,560,000 ft^3	84,994,560,000	84,995	114.2
Total landfill gas consumption =	48,000	59,541,206 m^3/yr	2,102,400,000 ft^3/yr	1,000,742,400,000	1,000,742	1,370.9
Methane consumption (assuming 50% of LFG is						

Compound	Molecular Weight	Concentration	Uncontrolled Emissions Estimate (Q_p)	Uncontrolled Emission Rate (UM_P)	Emission Rate (98.9% destruction for NMOC/VOC)	Total Emissions
	(gram/mol)	(ppmv)	(m^3/yr)	(Mg/yr)	(Mg/yr)	(tons/yr)
Non-Methane Organic Compounds (NMOC)	86.18	595	35,427.0	124.9	1.37	1.5
Volatile Organic Compounds (VOCs) = NMOC	86.18	235	13,992.2	49.3	0.54	0.6
Carbon Monoxide (CO)	28.01	—	—	—	—	75.1
Nitrogen Oxides (NO_X)	—	—	—	—	—	30.0
Particulate Matter , 10 µm (PM10)	—	—	—	—	0.5	0.6
Sulfur Dioxide (SO2) based on H_2S conc.	64.00	300	17,862.4	46.75	46.8	52

Notes:

Important to note, the SO2 emissions shown above were calculated by the Applicant assuming 300ppmv since this is what was initially requested in the application as a limit for H2S. This review has limited H2S to 150 ppm instead of the requested 300 ppm.

Table 2 shown below presents emission calculations associated with Toxic Air Pollutants/Compounds (TAPs or TACs). The most recent lab analysis data (from June 2023) was used to calculate TAP emissions associated with this flare capacity upgrade. For pollutants that had non detect values in the lab analysis, the Waste Industry Air Coalition (WIAC) values were used found here:

Appendix D - WIAC Paper (unprotected)

The calculations also show AP-42 values for comparison purposes.

When calculating TAPs emissions for purposes of comparison to the Small Quantity Emission Rates (SQERs), a netting basis is allowed to deduct the actual emissions from the emission source that was removed and replaced with a new source per RCW 70.94, Chapter 173-460 WAC. In this case, the temporary flare is replacing a 1,500 scfm capacity permanent flare that was taken out of service in December 2022. The actual flow at the replaced flare for the previous 12 months, from December 2021 through November 2022 was 956 scfm on average. Therefore, the effective flowrate that was compared to the SQER is 2,200 minus 956, or 1,244 scfm.

TABLE 2: POTENTIAL TAP EMISSIONS PART 1

CAS #	Pollutant Common Name	MW (g/mol)	AP-42 EF (ppmv)	WIAC-1 (ppmv)	WIAC 2 (ppmv)	June 2023 LFG Test Results (ppm)	EF To Use (ppmv)	Source	Uncontrolled Emissions Estimate (Q_p) (m3/yr)	Uncontrolled Emission Rate (UM_p) (Mg/yr)	Controlled Emission Rate after combustion (98.9% destruction) (Mg/yr)	Total Emissions (tpy)	Total Emissions (lb/yr)
71-55-6	1,1,1-Trichloroethane	133.41	0.48	0.168	0.168	ND	0.168	WIAC	10.00	5.46E-02	6.00E-04	6.62E-04	1.32
79-00-5	1,1,2,-Trichloroethane					ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane*					ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
79-34-5	1,1,2,2-Tetrachloroethane	167.85	1.11	0.07	0.005	ND	0.005	WIAC	0.30	2.04E-03	2.25E-05	2.48E-05	0.05
75-34-3	1,1-Dichloroethane	98.97	2.35	0.741	0.741	ND	0.741	WIAC	44.12	1.79E-01	1.96E-03	2.16E-03	4.33
75-35-4	1,1-Dichloroethene	96.94	0.2	0.092	0.092	ND	0.092	WIAC	5.48	2.17E-02	2.39E-04	2.63E-04	0.53
120-82-1	1,2,4-Trichlorobenzene					ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
95-63-6	1,2,4 trimethylbenzene	120.19				ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
106-93-4	1,2-Dibromoethane	187.88	0.001	0.046	0.005	ND	0.005	WIAC	0.30	2.29E-03	2.52E-05	2.77E-05	0.06
107-06-2	1,2-Dichloroethane	98.96	0.41	0.12	0.12	ND	0.12	WIAC	7.14	2.89E-02	3.18E-04	3.51E-04	0.70
78-87-5	1,2-Dichloropropane	112.99	0.18	0.023	0.023	ND	0.023	WIAC	1.37	6.33E-03	6.96E-05	7.67E-05	0.15
106-99-0	1,3-Butadiene					ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
542-75-6	1,3-Dichloropropene					ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
108-67-8	1,3,5 trimethylbenzene	120.19				ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
106-46-7	1,4-Dichlorobenzene	147	0.21	1.607	1.448	ND	1.448	WIAC	86.22	5.18E-01	5.70E-03	6.28E-03	12.57
123-91-1	1,4-Dioxane (1,4-Diethylene oxide)					ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
540-84-1	2,2,4 trimethyl pentane	114.23				ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
591-78-6	2-hexanone	100.16				ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
67-63-0	2-Propanol	60.11	50.1	7.908	7.908	13.1	13.1	2023 LFG Testing	779.99	1.92E+00	2.11E-02	2.32E-02	46.49
622-96-8	4-ethyltoluene	120.19				ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
67-64-1	Acetone	58.08	7.01	6.126	7.075	21.7	21.7	2023 LFG Testing	1,292.04	3.07E+00	3.38E-02	3.72E-02	74.41
107-13-1	Acrylonitrile	53.06	6.33	0.036	<0.036	ND	0.036	WIAC	2.14	4.65E-03	5.12E-05	5.64E-05	0.11
107-05-1	Allyl chloride					ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
80-56-8	a-pinene	136.23				ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
71-43-2	Benzene	78.11	1.91	0.972	0.972	4.97	4.97	2023 LFG Testing	295.92	9.45E-01	1.04E-02	1.15E-02	22.92
100-44-7	Benzyl chloride					ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
18172-67-	b-pinene	136.23				ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
75-27-4	Bromodichloromethane	163.83	3.13	0.311	<0.264	ND	0.311	WIAC	18.52	1.24E-01	1.36E-03	1.50E-03	3.01
75-25-2	Bromoform					ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
1016-97-8	Butane	58.12	5.03			ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
124-38-9	Carbon Dioxide					ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
75-15-0	Carbon disulfide	76.13	0.58	0.32	0.221	ND	0.221	WIAC	13.16	4.10E-02	4.51E-04	4.97E-04	0.99
630-08-0	Carbon monoxide	28.01	141			ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
56-23-5	Carbon tetrachloride*	153.84	0.004	0.007	<0.007*	ND	0.007	WIAC	0.42	2.62E-03	2.88E-05	3.18E-05	0.06
463-58-1	Carbonyl sulfide	60.07	0.49	0.183	0.183		0	2023 LFG Testing	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
108-90-7	Chlorobenzene	112.56	0.25	0.227	0.227	ND	0.227	WIAC	13.52	6.22E-02	6.84E-04	7.54E-04	1.51
75-45-6	Chlorodifluoromethane*	86.47	1.3	0.355	0.355	ND	0.355	WIAC	21.14	7.48E-02	8.22E-04	9.06E-04	1.81
75-00-3	Chloroethane	64.52	1.25	0.239	0.448	ND	0.448	WIAC	26.67	7.04E-02	7.74E-04	8.53E-04	1.71
67-66-3	Chloroform	119.39	0.03	0.021	0.01	ND	0.01	WIAC	0.60	2.91E-03	3.20E-05	3.52E-05	0.07
74-87-3	Chloromethane	50.49	1.21	0.249	0.136	ND	0.136	WIAC	8.10	1.67E-02	1.84E-04	2.03E-04	0.41
156-59-2	cis-1,2 dichloroethene	96.94				ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
98-82-8	cumene	120.19				ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
110-82-7	cyclohexane	84.16				0.992	0.992	2023 LFG Testing	59.06	2.03E-01	2.24E-03	2.46E-03	4.93
124-48-1	Dibromochloromethane					ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
75-71-8	Dichlorodifluoromethane*	120.91	15.7	1.751	0.964	ND	0.964	WIAC	57.40	2.84E-01	3.12E-03	3.44E-03	6.88
75-43-4	Dichlorofluoromethane*	102.92	2.62			ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
75-09-2	Dichloromethane	84.94	14.3	3.395	3.395	ND	3.395	WIAC	202.14	7.02E-01	7.72E-03	8.51E-03	17.02
115-10-6	dimethyl ether	46.07				ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
77-78-1	Dimethyl sulfide	62.13	7.82	6.809	6.809		0	2023 LFG Testing	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
74-84-0	Ethane	30.07	889	7.943	7.943		0	2023 LFG Testing	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
64-17-5	Ethanol	46.08	27.2	118.618	64.425	57.5	57.5	2023 LFG Testing	3,423.62	6.45E+00	7.10E-02	7.82E-02	156.43
141-78-6	ethyl acetate	88.11				2.22	2.22	2023 LFG Testing	132.18	4.76E-01	5.24E-03	5.77E-03	11.55
75-08-1	Ethyl mercaptan	62.13	2.28	1.356	0.226		0	2023 LFG Testing	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
100-41-4	Ethylbenzene	106.16	4.61	6.789	6.789	3.63	3.63	2023 LFG Testing	216.13	9.38E-01	1.03E-02	1.14E-02	22.75
75-69-4	Fluorotrichloromethane*	137.38	0.76	0.327	0.327	ND	0.327	WIAC	19.47	1.09E-01	1.20E-03	1.33E-03	2.65
142-82-5	heptane	100.21				1.66	1.66	2023 LFG Testing	98.84	4.05E-01	4.46E-03	4.91E-03	9.82
87-68-3	Hexachlorobutadiene					ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
110-54-3	Hexane	86.18	6.57	2.324	2.063	0.924	20	WIAC	1,190.82	4.20E+00	4.62E-02	5.09E-02	101.76
7647-01-0	Hydrochloric Acid	36.5	42			ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
7783-06-4	Hydrogen sulfide*	34.08	35.5	23.578	23.578		300	Proposed BACT	17,862.36	2.49E+01	2.74E-01	3.02E-01	603.60
7439-97-6	Mercury (total)	200.61	0.000292				0	2023 LFG Testing	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
67-56-1	methanol	32.04				19.9	19.9	2023 LFG Testing	1,184.87	1.55E+00	1.71E-02	1.88E-02	37.64
74-83-9	Methyl bromide (Bromomethane)*					ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
78-93-3	Methyl ethyl ketone	72.11	7.09	10.557	12.694	13.9	13.9	2023 LFG Testing	827.62	2.44E+00	2.68E-02	2.96E-02	59.17
108-10-1	Methyl isobutyl ketone	100.16	1.87	0.75	0.75	1.14	1.14	2023 LFG Testing	67.88	2.78E-01	3.06E-03	3.37E-03	6.74
74-93-1	Methyl mercaptan	48.11	2.49	1.292	1.266		0	2023 LFG Testing	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
1634-04-4	Methyl tert butyl ether					ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
103-65-1	n-propyl benzene	120.2				ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
95-47-6	o xylene	106.16				2.09	2.09	2023 LFG Testing	124.44	5.40E-01	5.94E-03	6.55E-03	13.10
1330-20-7	p,&m-Xylene	106.16	12.1	16.582	16.582	5.98	5.98	2023 LFG Testing	356.06	1.55E+00	1.70E-02	1.87E-02	37.48
127-18-4	Perchloroethylene (tetrachloroethylene)					ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
109-66-0	Pentane	72.15	3.29	1.48E+01		ND	14.757	WIAC	878.65	2.59E+00	2.85E-02	3.14E-02	62.86
74-98-6	Propane	44.09	11.1	14.757	19.858	0	0	2023 LFG Testing	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
115-07-1	propene	42.08				16.5	16.5	2023 LFG Testing	982.43	1.69E+00	1.86E-02	2.05E-02	40.99
100-42-5	styrene	104.15				ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
75-65-0	tertbutanol	74.12				ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
127-18-4	Tetrachloroethylene	165.83	3.73	1.193	1.193	ND	1.193	WIAC	71.03	4.82E-01	5.30E-03	5.84E-03	11.66
109-99-9	tetrahydrofuran	72.11				4.46	4.46	2023 LFG Testing	265.55	7.83E-01	8.61E-03	9.49E-03	18.99
108-88-3	Toluene	92.14	39.3	25.405	25.405	9.43	9.43	2023 LFG Testing	561.47	2.12E+00	2.33E-02	2.56E-02	51.30
156-60-5	trans-1,2-dichloroethene	96.94	2.84	0.051	0.051	ND	0.051	WIAC	3.04	1.20E-02	1.32E-04	1.46E-04	0.29
79-01-6	Trichloroethene	131.4	2.82	0.681	0.681	ND	0.681	WIAC	40.55	2.18E-01	2.40E-03	2.64E-03	5.28
593-60-2	Vinyl bromide					ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
108-05-4	Vinyl acetate					ND	0	Non Detect	0.00	0.00E+00	0.00E+00	0.00E+00	0.00
75-01-4	Vinyl chloride	62.5	7.34	1.077	1.077	ND	1.077	WIAC	64.13	1.64E-01	1.80E-03	1.99E-03	3.97

* These toxics are considered ozone depleting substances.

TABLE 2: POTENTIAL TAP EMISSIONS PART 2

CAS #	Pollutant Common Name	Pollutant Alternate Name	MW (g/mol)	EF To Use (ppmv)	EF Source	Total Emissions (lb/yr)	HAP?	TAC?	Averaging Period	ASIL (µg/m³)	SQER (lb/averaging period)	De Minimis (lb/averaging	Permanent Flare #4 Emission (lb/averaging period)	Permanent Flare #4 Emission (lb/averaging period)	Under deminimis?	Under SQER?
71-55-6	1,1,1-Trichloroethane	Methyl Chloroform	133.41	0.168	WIAC	1.32	Yes	Yes	24-hr	5000	370	19	0.003625199	0.003625199	UNDER	UNDER
79-34-5	1,1,2,2-Tetrachloroethane		167.85	0.005	WIAC	0.05	Yes	Yes	year	0.017	2.8	0.14	0.049547119	0.049547119	UNDER	UNDER
75-34-3	1,1-Dichloroethane	Ethylidene dichloride	98.97	0.741	WIAC	4.33	Yes	Yes	year	0.63	100	5.1	4.329610563	4.329610563	UNDER	UNDER
75-35-4	1,1-Dichloroethene	Vinylidene chloride, 1,1-dichl	96.94	0.092	WIAC	0.53	Yes	Yes	24-hr	200	15	0.74	0.001442531	0.001442531	UNDER	UNDER
107-06-2	1,2-Dichloroethane	Ethylene dichloride	98.96	0.12	WIAC	0.70	Yes	Yes	year	0.038	6.2	0.31	0.701080663	0.701080663	OVER	UNDER
78-87-5	1,2-Dichloropropane	Propylene dichloride	112.99	0.023	WIAC	0.15	Yes	Yes	year	0.1	16	0.81	0.153424565	0.153424565	UNDER	UNDER
67-63-0	2-Propanol	Isopropyl alcohol	60.11	13.1	2023 LFG Testing	46.49	No	Yes	1-hr	3200	5.9	0.3	0.005306901	0.005306901	UNDER	UNDER
67-64-1	Acetone		58.08	21.7	2023 LFG Testing	74.41	No	No					0.008493942	0.008493942		
107-13-1	Acrylonitrile		53.06	0.036	WIAC	0.11	Yes	Yes	year	0.0034	0.56	0.028	0.112770837	0.112770837	OVER	UNDER
71-43-2	Benzene	Benzene (No-Co Disposal/Ur	78.11	4.97	2023 LFG Testing	22.92	Yes	Yes	year	0.13	21	1	22.91870543	22.92	OVER	OVER
75-27-4	Bromodichloromethane		163.83	0.311	WIAC	3.01	No	Yes	year	0.027	4.4	0.22	3.008021087	3.01	OVER	UNDER
75-15-0	Carbon disulfide		76.13	0.221	WIAC	0.99	Yes	Yes	24-hr	800	59	3	0.002721337	0.002721337	UNDER	UNDER
56-23-5	Carbon tetrachloride		153.84	0.007	WIAC	0.06	Yes	Yes	year	0.17	27	1.4	0.063576171	0.063576171	UNDER	UNDER
463-58-1	Carbonyl sulfide	COS	60.07	0	2023 LFG Testing	0.00	Yes	Yes	24-hr	10	0.74	0.037	0	0	UNDER	UNDER
108-90-7	Chlorobenzene		112.56	0.227	WIAC	1.51	Yes	Yes	24-hr	1000	74	3.7	0.004132798	0.004132798	UNDER	UNDER
75-45-6	Chlorodifluoromethane		86.47	0.355	WIAC	1.81	No	Yes	24-hr	50000	3700	190	0.0049651	0.0049651	UNDER	UNDER
75-00-3	Chloroethane	Ethyl chloride	64.52	0.448	WIAC	1.71	Yes	Yes	24-hr	30000	2200	110	0.004675269	0.004675269	UNDER	UNDER
67-66-3	Chloroform		119.39	0.01	WIAC	0.07	Yes	Yes	year	0.043	7.1	0.35	0.070484725	0.070484725	UNDER	UNDER
74-87-3	Chloromethane	Methyl chloride	50.49	0.136	WIAC	0.41	Yes	Yes	24-hr	90	6.7	0.33	0.001110653	0.001110653	UNDER	UNDER
106-46-7	1,4-Dichlorobenzene	Dichlorobenzene, p-dichlorob	147	1.448	WIAC	12.57	Yes	Yes	year	0.091	15	0.74	12.56645999	12.57	OVER	UNDER
75-71-8	Dichlorodifluoromethane	Freon 12	120.91	0.964	WIAC	6.68	No	No					0.000785529	0.000785529		
75-09-2	Dichloromethane	Methylene chloride	84.94	3.395	WIAC	17.02	Yes	Yes	year	60	9800	490	17.02468525	17.02468525	UNDER	UNDER
77-78-1	Dimethyl sulfide	Methyl sulfide	62.13	0	2023 LFG Testing	0.00	Yes	No					0	0		
74-84-0	Ethane		30.07	0	2023 LFG Testing	0.00	No	No					0	0		
64-17-5	Ethanol		46.08	57.5	2023 LFG Testing	156.43	No	No					0.017856785	0.017856785		
75-08-1	Ethyl mercaptan	Ethanethiol	62.13	0	2023 LFG Testing	0.00	No	No					0	0		
100-41-4	Ethylbenzene		106.16	3.63	2023 LFG Testing	22.75	Yes	Yes	year	0.4	65	3.2	22.75069096	22.75	OVER	UNDER
106-93-4	1,2-Dibromoethane	EDB, Ethylene dibromide	187.88	0.005	WIAC	0.06	Yes	Yes	year	0.0017	0.27	0.014	0.055459712	0.055459712	OVER	UNDER
75-69-4	Fluorotrichloromethane	Freon 11, Trichlorofluorometh	137.38	0.327	WIAC	2.65	No	No					0.000302757	0.000302757		
110-54-3	Hexane		86.18	20	WIAC	101.76	Yes	Yes	24-hr	700	52	2.6	0.278785818	0.278785818	UNDER	UNDER
7783-06-4	Hydrogen sulfide		34.08	300	Proposed BACT	603.60	No	Yes	24-hr	2	0.15	0.0074	1.65369355	1.65	OVER	OVER
78-93-3	Methyl ethyl ketone	MEK	72.11	13.9	2023 LFG Testing	59.17	No	Yes	24-hr	5000	370	19	0.162122946	0.162122946	UNDER	UNDER
108-10-1	Methyl isobutyl ketone	MIBK	100.16	1.14	2023 LFG Testing	6.74	Yes	Yes	24-hr	3000	220	11	0.018468574	0.018468574	UNDER	UNDER
74-93-1	Methyl mercaptan		48.11	0	2023 LFG Testing	0.00	No	No					0	0		
127-18-4	Tetrachloroethylene	Perchloroethylene, Tetrachlor	165.83	0	Non Detect	11.68	Yes	Yes	year	0.16	27	1.3	11.67967076	11.68	OVER	UNDER
74-98-6	Propane		44.09	0	2023 LFG Testing	0.00	No	No					0	0		
108-88-3	Toluene	Toluene (No Co-Disposal/Ukr	92.14	9.43	2023 LFG Testing	51.30	Yes	Yes	24-hr	5000	370	19	0.140538105	0.140538105	UNDER	UNDER
156-60-5	trans-1,2-dichloroethene	t-1,2-dichloroethene, trans-1,	96.94	0.051	WIAC	0.29	No	Yes	24-hr	810	60	3	0.000799664	0.000799664	UNDER	UNDER
79-01-6	Trichloroethene	Trichloroethylene, TCE	131.4	0.681	WIAC	5.28	Yes	Yes	year	0.21	34	1.7	5.282865251	5.282865251	OVER	UNDER
75-01-4	Vinyl chloride		62.5	1.077	WIAC	3.97	Yes	Yes	year	0.11	18	0.92	3.973953461	3.973953461	OVER	UNDER
1330-20-7	p,&m-Xylene		106.16	5.98	2023 LFG Testing	37.48	Yes	No	24-hr	220	16	0.82	0.102682465	0.102682465	UNDER	UNDER
1016-97-8	Butane	n-Butane	58.12	0	Non Detect	0.00	No	No					0	0		
630-08-0	Carbon monoxide		28.01	0	Non Detect	0.00	No	Yes	1-hr	23000	43	1.1	0	0	UNDER	UNDER
75-43-4	Dichlorofluoromethane	Freon 21	102.92	0	Non Detect	0.00	No	No					0	0		
7439-97-6	Mercury (total)		200.61	0	2023 LFG Testing	0.00	Yes	Yes	24-hr	0.03	0.0022	0.00011	0	0	UNDER	UNDER
109-66-0	Pentane		72.15	14.757	WIAC	62.86	No	No					0.007175586	0.007175586		
124-38-9	Carbon Dioxide			0	Non Detect	0.00	No	No					0	0		
7647-01-0	Hydrochloric Acid		36.5	0	Non Detect	0.00	Yes	Yes	24-hr	9	0.67	0.033	0	0	UNDER	UNDER
115-07-1	propene		42.08	16.5	2023 LFG Testing	40.99	No	Yes	24-hr	3000	220	11	0.112303649	0.112303649	UNDER	UNDER
67-56-1	methanol		32.04	19.9	2023 LFG Testing	37.64	Yes	Yes	24-hr	20000	1500	74	0.103128755	0.103128755	UNDER	UNDER
156-59-2	cis-1,2 dichloroethene		96.94	0	Non Detect	0.00	No	No					0	0		
141-78-6	ethyl acetate		88.11	2.22	2023 LFG Testing	11.55	No	No					0.00131826	0.00131826		
109-99-9	tetrahydrofuran		72.11	4.46	2023 LFG Testing	18.99	No	Yes	24-hr	2000	150	7.4	0.052019305	0.052019305	UNDER	UNDER
110-82-7	cyclohexane		84.16	0.992	2023 LFG Testing	4.93	No	Yes	24-hr	6000	440	22	0.013503663	0.013503663	UNDER	UNDER
540-84-1	2,2,4 trimethyl pentane		114.23	0	Non Detect	0.00	Yes	No					0	0		
142-82-5	heptane		100.21	1.66	2023 LFG Testing	9.82	No	No					0.001121094	0.001121094		
100-42-5	styrene		104.15	0	Non Detect	0.00	Yes	Yes	24-hr	870	65	3.2	0	0	UNDER	UNDER
95-47-6	o xylene		106.16	2.09	2023 LFG Testing	13.10	Yes	Yes	24-hr	220	16	0.82	0.03588735	0.03588735	UNDER	UNDER
108-67-8	1,3,5 trimethylbenzene		120.19	0	Non Detect	0.00	No	Yes	24-hr	60	4.4	0.22	0	0	UNDER	UNDER
95-63-6	1,2,4 trimethylbenzene		120.19	0	Non Detect	0.00	No	Yes	24-hr	60	4.4	0.22	0	0	UNDER	UNDER
115-10-6	dimethyl ether		46.07	0	Non Detect	0.00	No	No					0	0		
75-69-4	trichlorofluoromethane		137.37	0.327	WIAC	2.65	No	No					0.000302757	0.000302757		
75-65-0	tertbutanol		74.12	0	Non Detect	0.00	No	No					0	0		
591-78-6	2-hexanone		100.16	0	Non Detect	0.00	No	Yes	24-hr	30	2.2	0.11	0	0	UNDER	UNDER
98-82-8	cumene		120.19	0	Non Detect	0.00	Yes	Yes	24-hr	400	30	1.5	0	0	UNDER	UNDER
80-56-8	a-pinene		136.23	0	Non Detect	0.00	No	No					0	0		
103-65-1	n-propyl benzene		120.2	0	Non Detect	0.00	No	No					0	0		
622-96-8	4-ethyltoluene		120.19	0	Non Detect	0.00	No	No					0	0		
18172-67-3	b-pinene		136.23	0	Non Detect	0.00	No	No					0	0		

A copy of the spreadsheet used to calculate emissions is on file with the agency and available upon request for review. It is also embedded in this document for electronic retrieval.

Flare4 Emissions
NOC #2 2023.xlsx

Additionally, some recent data gathered in San Diego County, California, suggest that landfill gas may contain small but appreciable concentrations of arsenic. (See

https://www.sdapcd.org/content/dam/sdapcd/documents/permits/emissions-calculation/landfill/APCD-Landfill-Operations.pdf) The Cedar Hills Landfill in King County, Washington, is collecting data related to arsenic emissions in winter/spring 2024, though these data are still under analysis as of the time of drafting of this worksheet. If data from other landfills suggest that arsenic emissions from LRI Landfil could lead to an exceedance of an ASIL, the Agency could exercise its authority under Regulation III, Section 2.05(b) and (c), to require the landfill to measure arsenic concentrations in landfill gas and conduct modeling to determine how those emissions affect concentrations in ambient air.

H. OPERATING PERMIT OR PSD

The facility is a Title V "**air operating permit source**" and conditions of this Order will be incorporated into the AOP when it is first issued. There is currently no title V operating permit issued for this facility but is still in progress. The LRI stationary source is a municipal solid waste landfill. This type of stationary source is not among the listed categories at 40 CFR § 52.21(b)(1)(i)(*a*), incorporated by reference at WAC 173-400-720(4)(a)(vi), and thus it is not subject to the major stationary source threshold of 100 tons per year (tpy). It also is not among the listed categories at 40 CFR § 52.21(b)(1)(iii), incorporated by reference at WAC 173-400-720(4)(a)(vi), and thus it is not subject to the requirement to count fugitive emissions when making the major stationary source determination. Therefore, the applicable threshold for determining whether the facility is a major stationary source is 250 tpy and fugitive emissions are not counted in quantifying the facility's potential to emit for purposes of this determination.

Based on recent samples of the landfill gas as shown above in the introduction, the potential to emit (PTE) emission calculations using the H_2S concentrations and flow rates from the flares, it was determined that LRI had the capability of operating above the Prevention of Significant Deterioration (PSD) threshold of 250 tons per year for SO_2 and is now operating as a major source. Using the current on-site flaring capacity of 5200 scfm and a concentration H_2S in landfill gas of 2500 ppm, consistent with the measurements summarized on Page 2, above, the current Potential to Emit for SO_2 is 577 tons per year, making the facility a PSD major source. (Even if the facility installs sulfur controls prior to issuance of this permit, those controls cannot be taken into account for PSD applicability purposes until enforceable restrictions on SO_2 emissions are in place through permit conditions.) The Agency must then evaluate this modification and compare the increase in emissions to the PSD significant emission threshold of 40 tons per year SO_2.

The SO_2 PSD significance threshold takes the actual baseline emissions of 153 tons per year and adds the allowable increment of 39 tons to get a final threshold of 192 tons per year that if exceeded, would trigger PSD for this modification. The concentration of H_2S after the H_2S treatment system will be monitored and controlled to ensure that the LRI Landfill's SO_2 flare emissions remain under the significant emission limit (i.e., 192 tons per year). However, the applicant has requested a more stringent limit of 100 tons per year.

I. AMBIENT TOXICS IMPACT ANALYSIS

As can be seen from the table below, two of the pollutants exceeded the SQER values found in WAC 173-460-150 when the facility installs the permanent flare (flare #4), Hydrogen Sulfide and Benzene.

Therefore, modeling was conducted using the emission rates shown above in the emission calculation section.

TABLE 2: POTENTIAL TAP EMISSIONS PART 2

CAS #	Pollutant Common Name	Pollutant Alternate Name	MW (g/mol)	EF To Use (ppmv)	EF Source	Total Emissions (lb/yr)	HAP?	TAC?	Averaging Period	ASIL (µg/m³)	SQER (lb/averaging period)	De Minimis (lb/averaging	Permanent Flare #4 Emission (lb/averaging period)	Permanent Flare #4 Emission (lb/averaging period)	Under deminimis?	Under SQER?
71-55-6	1,1,1-Trichloroethane	Methyl Chloroform	133.41	0.168	WIAC	1.32	Yes	Yes	24-hr	5000	370	19	0.003625199	0.003625199	UNDER	UNDER
79-34-5	1,1,2,2-Tetrachloroethane		167.85	0.005	WIAC	0.05	Yes	Yes	year	0.017	2.8	0.14	0.049547119	0.049547119	UNDER	UNDER
75-34-3	1,1-Dichloroethane	Ethylidene dichloride	98.97	0.741	WIAC	4.33	Yes	Yes	year	0.63	100	5.1	4.329610563	4.329610563	UNDER	UNDER
75-35-4	1,1-Dichloroethene	Vinylidene chloride, 1,1-dichl	96.94	0.092	WIAC	0.53	Yes	Yes	24-hr	200	15	0.74	0.001442531	0.001442531	UNDER	UNDER
107-06-2	1,2-Dichloroethane	Ethylene dichloride	98.96	0.12	WIAC	0.70	Yes	Yes	year	0.038	6.2	0.31	0.701080663	0.701080663	*OVER*	UNDER
78-87-5	1,2-Dichloropropane	Propylene dichloride	112.99	0.023	WIAC	0.15	Yes	Yes	year	0.1	16	0.81	0.153424565	0.153424565	UNDER	UNDER
67-63-0	2-Propanol	Isopropyl alcohol	60.11	13.1	2023 LFG Testing	46.49	No	Yes	1-hr	3200	5.9	0.3	0.005306901	0.005306901	UNDER	UNDER
67-64-1	Acetone		58.08	21.7	2023 LFG Testing	74.41	No	No					0.008493942	0.008493942		
107-13-1	Acrylonitrile		53.06	0.036	WIAC	0.11	Yes	Yes	year	0.0034	0.56	0.028	0.112770837	0.112770837	*OVER*	UNDER
71-43-2	Benzene	Benzene (No-Co Disposal/Ur	78.11	4.97	2023 LFG Testing	22.92	Yes	Yes	year	0.13	21	1	22.91870543	22.92	*OVER*	*OVER*
75-27-4	Bromodichloromethane		163.83	0.311	WIAC	3.01	No	Yes	year	0.027	4.4	0.22	3.008021087	3.01	*OVER*	UNDER
75-15-0	Carbon disulfide		76.13	0.221	WIAC	0.99	Yes	Yes	24-hr	800	59	3	0.002721337	0.002721337	UNDER	UNDER
56-23-5	Carbon tetrachloride		153.84	0.007	WIAC	0.06	Yes	Yes	year	0.17	27	1.4	0.063576171	0.063576171	UNDER	UNDER
463-58-1	Carbonyl sulfide	COS	60.07	0	2023 LFG Testing	0.00	Yes	Yes	24-hr	10	0.74	0.037	0	0	UNDER	UNDER
108-90-7	Chlorobenzene		112.56	0.227	WIAC	1.51	Yes	Yes	24-hr	1000	74	3.7	0.004132798	0.004132798	UNDER	UNDER
75-45-6	Chlorodifluoromethane		86.47	0.355	WIAC	1.81	No	Yes	24-hr	50000	3700	190	0.0049651	0.0049651	UNDER	UNDER
75-00-3	Chloroethane	Ethyl chloride	64.52	0.448	WIAC	1.71	Yes	Yes	24-hr	30000	2200	110	0.004675269	0.004675269	UNDER	UNDER
67-66-3	Chloroform		119.39	0.01	WIAC	0.07	Yes	Yes	year	0.043	7.1	0.35	0.070484725	0.070484725	UNDER	UNDER
74-87-3	Chloromethane	Methyl chloride	50.49	0.136	WIAC	0.41	Yes	Yes	24-hr	90	6.7	0.33	0.001110653	0.001110653	UNDER	UNDER
106-46-7	1,4-Dichlorobenzene	Dichlorobenzene, p-dichlorob	147	1.448	WIAC	12.57	Yes	Yes	year	0.091	15	0.74	12.56645999	12.57	*OVER*	UNDER
75-71-8	Dichlorodifluoromethane	Freon 12	120.91	0.964	WIAC	6.86	No	No					0.000785529	0.000785529		
75-09-2	Dichloromethane	Methylene chloride	84.94	3.395	WIAC	17.02	Yes	Yes	year	60	9800	490	17.02468525	17.02468525	UNDER	UNDER
77-78-1	Dimethyl sulfide	Methyl sulfide	62.13	0	2023 LFG Testing	0.00	Yes	No					0	0		
74-84-0	Ethane		30.07	0	2023 LFG Testing	0.00	No	No					0	0		
64-17-5	Ethanol		46.08	57.5	2023 LFG Testing	156.43	No	No					0.017856785	0.017856785		
75-08-1	Ethyl mercaptan	Ethanethiol	62.13	0	2023 LFG Testing	0.00	No	No					0	0		
100-41-4	Ethylbenzene		106.16	3.63	2023 LFG Testing	22.75	Yes	Yes	year	0.4	65	3.2	22.75069096	22.75	*OVER*	UNDER
106-93-4	1,2-Dibromoethane	EDB, Ethylene dibromide	187.86	0.005	WIAC	0.06	Yes	Yes	year	0.0017	0.27	0.014	0.055459712	0.055459712	*OVER*	UNDER
75-69-4	Fluorotrichloromethane	Freon 11, Trichlorofluoromet	137.38	0.327	WIAC	2.65	No	No					0.000302757	0.000302757		
110-54-3	Hexane		86.18	20	WIAC	101.76	Yes	Yes	24-hr	700	52	2.6	0.278785818	0.278785818	UNDER	UNDER
7783-06-4	Hydrogen sulfide		34.08	300	Proposed BACT	603.60	No	Yes	24-hr	2	0.15	0.0074	1.65369355	1.65	*OVER*	*OVER*
78-93-3	Methyl ethyl ketone	MEK	72.11	13.9	2023 LFG Testing	59.17	No	Yes	24-hr	5000	370	19	0.162122946	0.162122946	UNDER	UNDER
108-10-1	Methyl Isobutyl ketone	MIBK	100.16	1.14	2023 LFG Testing	6.74	Yes	Yes	24-hr	3000	220	11	0.018468574	0.018468574	UNDER	UNDER
74-93-1	Methyl mercaptan		48.11	0	2023 LFG Testing	0.00	No	No					0	0		
127-18-4	Tetrachloroethylene	Perchloroethylene, Tetrachlor	165.83	0	Non Detect	11.68	Yes	Yes	year	0.16	27	1.3	11.67967076	11.68	*OVER*	UNDER
74-98-6	Propane		44.09	0	2023 LFG Testing	0.00	No	No					0	0		
108-88-3	Toluene	Toluene (No Co-Disposal/Ulti	92.14	9.43	2023 LFG Testing	51.30	Yes	Yes	24-hr	5000	370	19	0.140538105	0.140538105	UNDER	UNDER
156-60-5	trans-1,2-dichloroethene	t-1,2-dichloroethene, trans-1,	96.94	0.051	WIAC	0.29	No	Yes	24-hr	810	60	3	0.000799664	0.000799664	UNDER	UNDER
79-01-6	Trichloroethene	Trichloroethylene, TCE	131.4	0.681	WIAC	5.26	Yes	Yes	year	0.21	34	1.7	5.282865251	5.282865251	*OVER*	UNDER
75-01-4	Vinyl chloride		62.5	1.077	WIAC	3.97	Yes	Yes	year	0.11	18	0.92	3.973953461	3.973953461	*OVER*	UNDER
1330-20-7	p,&m-Xylene		106.16	5.98	2023 LFG Testing	37.48	Yes	No	24-hr	220	16	0.82	0.102682465	0.102682465	UNDER	UNDER
1016-97-8	Butane	n-Butane	58.12	0	Non Detect	0.00	No	No					0	0		
630-08-0	Carbon monoxide		28.01	0	Non Detect	0.00	No	Yes	1-hr	23000	43	1.1	0	0	UNDER	UNDER
75-43-4	Dichlorofluoromethane	Freon 21	102.92	0	Non Detect	0.00	No	No					0	0		
7439-97-6	Mercury (total)		200.61	0	2023 LFG Testing	0.00	Yes	Yes	24-hr	0.03	0.0022	0.00011	0	0	UNDER	UNDER
109-66-0	Pentane		72.15	14.757	WIAC	62.86	No	No					0.007175586	0.007175586		
124-38-9	Carbon Dioxide			0	Non Detect	0.00	No	No					0	0		
7647-01-0	Hydrochloric Acid		36.5	0	Non Detect	0.00	Yes	Yes	24-hr	9	0.67	0.033	0	0	UNDER	UNDER
115-07-1	propene		42.08	16.5	2023 LFG Testing	40.99	No	Yes	24-hr	3000	220	11	0.112303649	0.112303649	UNDER	UNDER
67-56-1	methanol		32.04	19.9	2023 LFG Testing	37.64	Yes	Yes	24-hr	20000	1500	74	0.103128755	0.103128755	UNDER	UNDER
156-59-2	cis-1,2 dichloroethene		96.94	0	Non Detect	0.00	No	No					0	0		
141-78-6	ethyl acetate		88.11	2.22	2023 LFG Testing	11.55	No	No					0.00131826	0.00131826		
109-99-9	tetrahydrofuran		72.11	4.46	2023 LFG Testing	18.99	No	Yes	24-hr	2000	150	7.4	0.052019305	0.052019305	UNDER	UNDER
110-82-7	cyclohexane		84.16	0.992	2023 LFG Testing	4.93	No	Yes	24-hr	6000	440	22	0.013503663	0.013503663	UNDER	UNDER
540-84-1	2,2,4 trimethyl pentane		114.23	0	Non Detect	0.00	Yes	No					0	0		
142-82-5	heptane		100.21	1.66	2023 LFG Testing	9.82	No	No					0.001121094	0.001121094		
100-42-5	styrene		104.15	0	Non Detect	0.00	Yes	Yes	24-hr	870	65	3.2	0	0	UNDER	UNDER
95-47-6	o xylene		106.16	2.09	2023 LFG Testing	13.10	Yes	Yes	24-hr	220	16	0.82	0.03588735	0.03588735	UNDER	UNDER
108-67-8	1,3,5 trimethylbenzene		120.19	0	Non Detect	0.00	No	Yes	24-hr	60	4.4	0.22	0	0	UNDER	UNDER
95-63-6	1,2,4 trimethylbenzene		120.19	0	Non Detect	0.00	No	Yes	24-hr	60	4.4	0.22	0	0	UNDER	UNDER
115-10-6	dimethyl ether		46.07	0	Non Detect	0.00	No	No					0	0		
75-69-4	trichlorofluoromethane		137.37	0.327	WIAC	2.65	No	No					0.000302757	0.000302757		
75-65-0	tertbutanol		74.12	0	Non Detect	0.00	No	No					0	0		
591-78-6	2-hexanone		100.16	0	Non Detect	0.00	No	Yes	24-hr	30	2.2	0.11	0	0	UNDER	UNDER
98-82-8	cumene		120.19	0	Non Detect	0.00	Yes	Yes	24-hr	400	30	1.5	0	0	UNDER	UNDER
80-56-8	a-pinene		136.23	0	Non Detect	0.00	No	No					0	0		
103-65-1	n-propyl benzene		120.2	0	Non Detect	0.00	No	No					0	0		
622-96-8	4-ethyltoluene		120.19	0	Non Detect	0.00	No	No					0	0		
18172-67-3	b-pinene		136.23	0	Non Detect	0.00	No	No					0	0		

Important to note that the source used netting allowed under the regulations to subtract the existing emissions of the 956 scfm flare from the new emissions emitted from the temp and permanent flares so that only the permanent flare would trigger the need for modeling.

The WAC defines the first tier review in 173-460-080. Sources are allowed reductions from existing emissions units as outlined in section (3):

(3) Reduction of TAPs from existing emission units. An applicant may include in an acceptable source impact analysis proposed reductions in actual emissions of a particular TAP from emission units at the source that are not new or modified for the purpose of offsetting emissions of that TAP caused by the new or modified source. The reductions in TAP emissions authorized by this subsection must be included in the approval order as enforceable emission limits and must meet all the requirements of WAC 173-460-071.

WAC 173-460-071 requires the permit have the offset emission be an enforceable limit in the permit as well as public notice requirements for using the netting option. The requirement to remove the existing 1,500 scfm flare will be placed in the permit and be effectively immediately upon permit issuance.

For the two pollutants which were over the SQER in the table above, modeling was conducted and provided by the applicant.

The benzene stack parameters:

```
TITLE: Benzene Emissions


--------------------------------------------------------------------------------
*****************************  STACK PARAMETERS  *****************************
--------------------------------------------------------------------------------

SOURCE EMISSION RATE:         0.328E-03 g/s            0.260E-02 lb/hr
STACK HEIGHT:                     15.24 meters             50.00 feet
STACK INNER DIAMETER:             3.658 meters            144.00 inches
PLUME EXIT TEMPERATURE:          1158.2 K                 1625.0 Deg F
PLUME EXIT VELOCITY:             18.288 m/s                60.00 ft/s
STACK AIR FLOW RATE:             407152 ACFM
RURAL OR URBAN:                   RURAL

INITIAL PROBE DISTANCE =          5000. meters            16404. feet
```

Hydrogen Sulfide stack parameters:

```
TITLE: H2S Emissions


--------------------------------------------------------------------------------
*****************************  STACK PARAMETERS  *****************************
--------------------------------------------------------------------------------

SOURCE EMISSION RATE:         0.869E-02 g/s              0.690E-01 lb/hr
STACK HEIGHT:                    15.24 meters                50.00 feet
STACK INNER DIAMETER:             3.658 meters              144.00 inches
PLUME EXIT TEMPERATURE:         1158.2 K                   1625.0 Deg F
PLUME EXIT VELOCITY:            18.288 m/s                   60.00 ft/s
STACK AIR FLOW RATE:            407152 ACFM
RURAL OR URBAN:                  RURAL

INITIAL PROBE DISTANCE =         5000. meters               16404. feet
```

For more parameters used in the modeling such as building downwash, etc, see modeling files provided in the application on file with the agency. Results of the modeling are shown below:

LRI NOC Application - 4000 scfm Permanent Flare

AERSCREEN Pollutant Summary						
Pollutant Common Name	Total Emissions (lb/yr)	Total Emissions (lb/hr)	Averaging Period	ASIL (ug/m^3)	AERSCREEN concentration (ug/m^3) Permanent Flare (1 hr concentration)	Under ASIL?
Benzene	22.92	0.00262	Year	0.13	0.002992	Yes
Hydrogen Sulfide	603.6	0.0689	24-h	2	0.0794	Yes

*Nearest property boundary is approximately 150 meters from the flare. AERSCREEN raw output files are attached in the following pages.

Results are below the applicable ASILs found in the regulation. No further analysis was conducted.

J. APPLICABLE RULES & REGULATIONS

Puget Sound Clean Air Agency Regulations

SECTION 7.09(b): The owner or operator of a registered source shall develop and implement an operation and maintenance plan to ensure continuous compliance with Regulations I, II, and III. A copy of the plan shall be filed with the Control Officer upon request. The plan shall reflect good industrial practice and shall include, but not be limited to, the following:
(1) Periodic inspection of all equipment and control equipment;
(2) Monitoring and recording of equipment and control equipment performance;

(3) Prompt repair of any defective equipment or control equipment;
(4) Procedures for startup, shut down, and normal operation;
(5) The control measures to be employed to ensure compliance with Section 9.15 of this regulation; and
(6) A record of all actions required by the plan.
The plan shall be reviewed by the source owner or operator at least annually and updated to reflect any changes in good industrial practice.

SECTION 6.09: Within 30 days of completion of the installation or modification of a stationary source subject to the provisions of Article 6 of this regulation, the owner or operator or applicant shall file a Notice of Completion with the Agency. Each Notice of Completion shall be submitted on a form provided by the Agency, and shall specify the date upon which operation of the stationary source has commenced or will commence.

SECTION 9.03: (a) It shall be unlawful for any person to cause or allow the emission of any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour, which is:
(1) Darker in shade than that designated as No. 1 (20% density) on the Ringelmann Chart, as published by the United States Bureau of Mines; or
(2) Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in Section 9.03(a)(1).
(b) The density or opacity of an air contaminant shall be measured at the point of its emission, except when the point of emission cannot be readily observed, it may be measured at an observable point of the plume nearest the point of emission.
(c) This section shall not apply when the presence of uncombined water is the only reason for the failure of the emission to meet the requirements of this section.

SECTION 9.09: General Particulate Matter (PM) Standard. It shall be unlawful for any person to cause or allow the emission of particulate matter in excess of the following concentrations:
Equipment Used in a Manufacturing Process: 0.05 gr/dscf

SECTION 9.11: It shall be unlawful for any person to cause or allow the emission of any air contaminant in sufficient quantities and of such characteristics and duration as is, or is likely to be, injurious to human health, plant or animal life, or property, or which unreasonably interferes with enjoyment of life and property.

SECTION 9.13: It shall be unlawful for any person to cause or allow the installation or use of any device or use of any means designed to mask the emission of an air contaminant which causes detriment to health, safety or welfare of any person.

SECTION 9.15: It shall be unlawful for any person to cause or allow visible emissions of fugitive dust unless reasonable precautions are employed to minimize the emissions. Reasonable precautions include, but are not limited to, the following:
(1) The use of control equipment, enclosures, and wet (or chemical) suppression techniques, as practical, and curtailment during high winds;
(2) Surfacing roadways and parking areas with asphalt, concrete, or gravel;

(3) Treating temporary, low-traffic areas (e.g., construction sites) with water or chemical stabilizers, reducing vehicle speeds, constructing pavement or rip rap exit aprons, and cleaning vehicle undercarriages before they exit to prevent the track-out of mud or dirt onto paved public roadways; or
(4) Covering or wetting truck loads or allowing adequate freeboard to prevent the escape of dust-bearing materials.

REGULATION I, SECTION 9.20(a): It shall be unlawful for any person to cause or allow the operation of any features, machines or devices constituting parts of or called for by plans, specifications, or other information submitted pursuant to Article 6 of Regulation I unless such features, machines or devices are maintained in good working order.

REGULATION I, SECTION 12.01: This article shall apply to all continuous emission monitoring systems (CEMS) required under an order, operating permit, or regulation of the Agency. This article shall not be construed to relieve any person of the responsibility to comply with any requirement of 40 CFR Part 60, 61, or 63. Portions of these federal requirements that are less stringent than the provisions of Article 12 shall not supercede the requirements of Article 12.

Washington State Administrative Code

WAC 173-400-040(3): Fallout. No person shall cause or allow the emission of particulate matter from any source to be deposited beyond the property under direct control of the owner or operator of the source in sufficient quantity to interfere unreasonably with the use and enjoyment of the property upon which the material is deposited.

WAC 173-400-040(4): Fugitive emissions. The owner or operator of any emissions unit engaging in materials handling, construction, demolition or other operation which is a source of fugitive emission:

(a) If located in an attainment area and not impacting any nonattainment area, shall take reasonable precautions to prevent the release of air contaminants from the operation.

WAC173-400-111(7): Construction limitations.

(a) Approval to construct or modify a stationary source becomes invalid if construction is not commenced within eighteen months after receipt of the approval, if construction is discontinued for a period of eighteen months or more, or if construction is not completed within a reasonable time. The permitting authority may extend the eighteen-month period upon a satisfactory showing by the permittee that an extension is justified.

Federal

40 CFR 62 Subpart OOO: Federal Plan Requirements for Municipal Solid Waste Landfills That Commenced Construction on or Before July 17, 2014 and Have Not Been Modified or Reconstructed Since July 17, 2014

This Federal Plan requirement was promulgated on May 21, 2021 and applies to the following sources:

§ 62.16711 Designated facilities.

> (a) The designated facility to which this subpart applies is each municipal solid waste landfill in each state, protectorate, and portion of Indian country that meets the conditions of paragraphs (a)(1) and (2) of this section:
>
> > (1) The municipal solid waste landfill commenced construction, reconstruction, or modification on or before July 17, 2014.
> >
> > (2) The municipal solid waste landfill has accepted waste at any time since November 8, 1987, or the landfill has additional capacity for future waste deposition.

LRI Landfill falls under the applicability of this section of the rule. They have been subject to this rule since June 21, 2021. This rule effectively made 40 CFR 60 Subpart WWW obsolete, and the source is no longer reporting under this old rule.

This subpart contains extensive requirements regarding the collection of landfill gas and the destruction of organic HAPs and VOCs in that landfill gas. This means that a landfill's gas collection and control system must be adequately sized to capture landfill gas and must include sufficient flaring capacity to flare all captured landfill gas. Because the applicant has not stated that there will be future increases in landfill gas production rates, the Agency is left to assume that the flaring capacity will be adequate to comply with the requirements of this subpart. Note that if landfill gas production increases beyond the 7,000 scfm reviewed in this permitting action, additional flaring capacity would likely be needed in order to comply with Subpart OOO. However, an increase in gas production beyond 7,000 scfm would also trigger NOC permitting, for the increase in gas production (and for its associated control equipment, such as a flare).

Installation of new flares may trigger monitoring, testing, and reporting requirements under Subpart OOO. **The Subpart OOO requirements may not all be captured in the conditions of this Order of Approval.** The Agency is not delegated the authority to enforce Subpart OOO. This subpart is enforced directly by US EPA. At this time, it is unclear if the facility is adequately complying with the requirements of this subpart, specifically wellhead monitoring temperatures, gas collection and design plan requirements, surface methane migration, etc.

EPA has recently issued a notice of violation to LRI (pasted below). The violation claims that the facility has a design capacity of 27.3 MMtons of waste which is above the 19.8 MM tons the Agency approved under the previous order of Approval. EPA cited Violation 1: Failure to comply with PSD Requirements, Violation 2: Modification to control equipment without a pre-construction permit (which is similar to the Agency's violation 3-A000700), Violation 3: failure to operate an Adequate Active Collection system, Violation 4: failure to operate the landfill active collection system at all times, Violation 5: Failure to Install and Operate Wells Consistent with the Design Plan, Violation 6: Failure to Minimize Offsite Migration of Landfill Gas, Violation 7: Failure to Manage Water in Landfill Vertical Wells, Violation 8: Failure to Adequately Manage Surface Methane Concentrations and Conduct Compliant Surface

Emission Monitoring (SEM), Violation 9: Failure to Implement Cover Integrity Monitoring and Repair the Landfill Cover, Violation 10: Failure to Operate the Collection System with Negative Pressure, Violation 11: Failure to Operate Each Interior Wellhead at Required Temperature, Violation 12: Failure to Operate Each Interior Wellhead at Required Oxygen Level, Violation 13: Failure to Take Corrective Action at Wells, Violation 14-16: Failure to Conduct Monthly Well Monitoring, Violation 17: Failure to Route all Collected Gas to a Control System, Violation 18: Failure to Comply with Good Air Pollution Control Practices, Violation 19: Failure to Accurately Report Total Waste Accepted, Violation 20: Failure to Accurately Report GHG Emissions. The Agency is not aware of the status of this violation at this time.

CAA_LRI_NOV.pdf

40 CFR 63 Subpart XXX: Standards of Performance for Municipal Solid Waste Landfills That Commenced Construction, Reconstruction, or Modification After July 17, 2014

This rule applies to the following sources:

§ 60.760 Applicability, designation of affected source, and delegation of authority.

> (a) The provisions of this subpart apply to each municipal solid waste landfill that commenced construction, reconstruction, or modification after July 17, 2014. Physical or operational changes made to an MSW landfill solely to comply with subparts Cc, Cf, or WWW of part 60 are not considered construction, reconstruction, or modification for the purposes of this section.

The rule goes on to define modification as:

> *Modification* means an increase in the permitted volume design capacity of the landfill by either lateral or vertical expansion based on its permitted design capacity as of July 17, 2014. Modification does not occur until the owner or operator commences construction on the lateral or vertical expansion.

EPA guidance has stated that for the purposes of Subpart XXX, the "permitted volume design capacity" is based on permitting by any governmental agency, not only air permitting. It appears that the permitted capacity in the facility's waste permits issued by the Tacoma-Pierce County Health Department has not changed since July 17, 2014. Therefore, for the purposes of Subpart XXX, there has not been a modification that triggers applicability of the subpart.

Note that, while the permitted design capacity in permits issued by the Tacoma-Pierce County Health Department are a part of the determination in NSPS applicability, they are not relevant to the applicability of the Notice of Construction permitting program. This is why this worksheet covers that increase in landfill capacity that was not originally covered in the 19.8 MM ton capacity order of approval.

40 CFR 63 Subpart AAAA: National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills

This NESHAP Is applicable to sources as outlined in Section 63.1935:

§ 63.1935 Am I subject to this subpart?
You are subject to this subpart if you meet the criteria in paragraph (a) or (b) of this section.

> (a) You are subject to this subpart if you own or operate an MSW landfill that has accepted waste since November 8, 1987, or has additional capacity for waste deposition and meets any one of the three criteria in paragraphs (a)(1) through (3) of this section:
>
> > (1) Your MSW landfill is a major source as defined in § 63.2 of subpart A.
> >
> > (2) Your MSW landfill is collocated with a major source as defined in § 63.2 of subpart A.
> >
> > (3) Your MSW landfill is an area source landfill that has a design capacity equal to or greater than 2.5 million megagrams (Mg) and 2.5 million cubic meters (m3) and has estimated uncontrolled emissions equal to or greater than 50 megagrams per year (Mg/yr) NMOC as calculated according to § 63.1959.

The applicability criteria defines a subject landfill as one that is a major source or collocated with a major source as defined in 40 CFR 63.2 of subpart A. Specifically, major source is defined as, "a stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants…." LRI has also accepted waste since November 5, 1999 (NOC approval date 8023) and had a design capacity greater than the applicability requirement in (3) listed above; therefore, they are subject to the requirements of this rule.

K. PUBLIC NOTICE

This project does not meet the criteria for mandatory public notice under WAC 173-400-171(3). Criteria requiring public notice includes, but is not limited to, a project that exceeds emission threshold rates as defined in WAC 173-400-030 (e.g. 40 tpy NOx, VOC, or SO_2, 100 tpy CO, 15 tpy PM_{10}, 10 tpy $PM_{2.5}$, 0.6 tpy lead), includes a WAC 173-400-091 synthetic minor limit, has a toxic air pollutant emission increase above the acceptable source impact level in WAC 173-460-150, or has significant public interest. A notice of application was posted on the Agency's website for 15 days. No requests or responses were received. A copy of the website posting is below:

New Construction Projects

Company	Address	Project Description	Date Posted	Contact Engineer
Pierce Co Recycling Composting and Disposal LLC	30919 Meridian St E, Graham, WA 98338	Application submitted to replace existing flare with a larger temporary flare, as well as installation of a sulfur control system.	1/9/24	Ralph Munoz

The Agency has determined that significant public interest exists and will hold a 30-day public comment period. Summary of comment period, pending.

L. RECOMMENDED APPROVAL CONDITIONS

Standard Conditions:

1. Approval is hereby granted as provided in Article 6 of Regulation I of the Puget Sound Clean Air Agency to the applicant to install or establish the equipment, device or process described hereon at the installation address in accordance with the plans and specifications on file in the Engineering Division of the Puget Sound Clean Air Agency.

2. This approval does not relieve the applicant or owner of any requirement of any other governmental agency.

Specific Conditions:

3. The owner and/or operator shall comply with the applicable requirements of 40 CFR 62 Subpart OOO as well as 40 CFR 63 Subpart A and AAAA.

4. The permitted landfill gas generation rate is 7,000 scfm @ 50% methane. The owner and/or operator shall demonstrate compliance with this operational limit by having a flaring capacity of no more than 7,000 scfm shown with documentation such as vendor documents or nameplate capacity.

5. The owner and/or operator shall install and maintain an active landfill gas collection and control system that meets the parameters of 40 CFR 63.1959(b). This gas collection and control system shall, at a minimum, comply with the most recent design plan submitted to the agency for review or be updated and submitted if the facility decides to use a different design.

6. The landfill gas collected with the landfill gas collection and control system can be routed to a gas-to-energy facility for processing. Any landfill gas not routed through the gas-to-energy facility shall be routed to the flare station for processing as follows:

a. The owner and/or operator shall ensure the permanent 4,000 scfm enclosed flare operated under this condition achieves a minimum of 98.9% destruction of all non-methane organic compounds: or

b. Reduce the outlet NMOC concentration to less than 20 ppm by volume, dry basis as hexane at 3 percent oxygen.

c. The owner and/or operator shall ensure the Flares be designed for and operated with no visible emissions as determined by EPA Method 22, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.

7. The owner and/or operator shall install and maintain a sulfur removal system that controls the sulfur content of both the gas sent to the flare station and the gas sent to the gas-to-energy facility.

8. The sulfur removal system shall be operated such that the outlet concentration of the sulfur removal system shall not exceed 150 ppmv total reduced sulfur (TRS), calculated as hydrogen sulfide (H2S), recorded as a calendar month average. The sulfur removal system shall be installed immediately upon permit issuance, and compliance with the 150 ppmv sulfur outlet standard on a calendar month average shall be met no later than nine months after permit issuance.

    a. The owner and/or operator shall monitor the sulfur content as follows:

        i. Most recent TRS calendar month average < 100 ppmv

            1. Sample monthly using SCAQMD Method 307-91 or other Agency approved method.

        ii. 100 ppmv ≤ Most recent TRS calendar month average < 125 ppmv

            1. Sample bi-weekly (i.e., every other week) using SCAQMD Method 307-91 or other Agency approved method.

        iii. 125 ppmv ≤ Most recent TRS calendar month average ≤ 150 ppmv

            1. Sample weekly using SCAQMD Method 307-91 or other Agency approved method.

        iv. Readings above 150 ppmv shall be reported to the Agency as possible compliance deviations. The reports shall contain explanations on the believed root cause along with any corrective action taken (if any) as a result. Sampling as outlined in iii. above shall continue until readings fall below specified thresholds of this condition.

Compliance with the 150 ppmv monthly average sulfur limit of this permit condition shall be determined by averaging all SCAQMD method measurements taken during the month if more than one reading is taken.

9. Emissions of sulfur dioxide (SO_2) from flaring of landfill gas from all flares at the landfill may not exceed 100 tons in any 12-consecutive-month period. Compliance with this condition shall be calculated as outlined in Permit Condition 10.

10. The owner and/or operator shall submit to the Agency annual reports of the total sulfur content of the landfill gas and the resulting SO_2 emissions. The report shall contain all sulfur readings taken for the month and show the calculated monthly average based on the sampling conditions outlined in Permit Condition 8. The first report is due no later than 60 days following the end of the first 12 months of H2S or TRS sampling following the compliance dates specified in Permit Condition 8. An annual report shall be submitted no later than 60 days following the end of each reporting year and shall consist of the amount of total landfill gas combusted in the flare, the applicable monthly rolling average sulfur content of the landfill gas as determined by Permit Condition 7, and total calculated SO_2 emitted from the flares.

11. Any spent media from the sulfur control system that is disposed of in the landfill must be enclosed, encapsulated, or treated in such a way as to prevent the return of the adsorbed sulfur back into the landfill gas.

12. To the greatest degree possible, roads used by the vehicular traffic at the facility shall be paved. Truck wheels shall be washed and an aggressive dust control and road sweeping program developed and implemented through the facility's Operation and Maintenance (O&M) Plan as required by Puget Sound Clean Air Agency Regulation I, Section 7.09.

13. The owner and/or operator shall maintain and follow a complaint response plan, including the following:

    a. Designation of a responsible person to respond to and record complaints regarding odor, fugitive dust or nuisance.

    b. An informational bulletin that will be mailed out to any person that contacts the landfill, or to other interested persons forwarded from a local governmental agency that has a complaint or questions about the complaint response process. This informational bulletin shall include an explanation of the landfill's odor and nuisance control plans, and the name and phone number of the person responsible for responding to the complaints.

    c. Land Recovery Inc shall record and investigate complaints regarding odor, fugitive dust, or nuisance as soon as possible, but no later than 12 hours after receipt of the complaint. The investigation will include documentation of wind direction and speed

during the time the complaint occurred. Land Recovery Inc shall document its findings and use good industrial practices to correct any problems identified by the complaint investigations within 24 hours.

d. Land Recovery Inc shall maintain records on-site of all complaints received regarding odor, fugitive dust or nuisance including the date and time of the complaint, the nature of the complaint, the wind speed and wind direction at the time of the complaint, and the date, time and nature of any corrective action taken.

e. The complaint response plan shall be maintained on-site and made available to Puget Sound Clean Air Agency personnel upon request.

14. The owner and/or operator shall conduct an initial performance test on the permanent 4,000 scfm flare (once it has replaced the temporary flare) within 180 days after initial startup in order to verify compliance with the standards in Condition No. 6a or 6b, and 6c. The flare does not need to be started up just to conduct a performance test; the owner and/or operator may wait until LFG is used in the flare or is not routed to the landfill gas to energy facility. The test shall be conducted as close as possible to normal operation.

15. The initial performance test required by Permit Condition 13 shall use the test methods and procedures outlined in 40 CFR § 62.16718(d) and any other applicable EPA test reference methods

16. The owner and/or operator shall submit a test notification to the Puget Sound Clean Air Agency in accordance with Section 3.07 of Regulation I before any source test required by this permit is conducted.

17. The owner and/or operator shall submit a test protocol to the Agency 30 days before conducting performance tests required by this permit.

18. The owner and/or operator shall submit a test report to the Puget Sound Clean Air Agency in no later than 60 days after any performance test is conducted. This source test shall outline the results of the test and indicate whether the owner and/or operator failed any test.

19. The owner and/or operator shall operate the permanent 4,000 scfm enclosed flare at an average set point temperature at or above the temperature range recorded during the most recent source test showing compliance with Condition No. 6a or 6b. The owner or operator must collect at least one measured data point for each 15-minute monitoring period in every hour the flare is receiving landfill gas. For the purposes of this condition, flare operating temperature shall be based on a rolling 3-hour average and shall only include hourly data which has at least one measured data point during three 15-minute monitoring periods during each hour. The flare operating temperature requirement does not apply to periods of start-ups, shutdowns and/or malfunctions provided that these events are not actively processing landfill gas and do not last for more than 1 hour.

20. The owner and/or operator shall report to the agency within the semi-annual NSPS/NESHAP report when either:

    a. The 3-hour rolling average flare temperature readings were more than 82 degrees F below the set point temperature.
    b. Startup, shutdown or malfunction events lasted longer than an hour and the flare was actively receiving landfill gas.

21. The owner/or operator shall develop a written start-up, shutdown, and malfunction plan according to the provisions of 40 CFR 63.6(e)(3). A copy of the plan must be maintained on site at all times.

22. The flare shall be equipped with both local and remote alarms, automatic combustion air control, and automatic gas shutoff valves.

23. The owner and/or operator shall either remove or seal in the closed position any valve that has the potential to bypass the flare unless that bypass is meant to send the landfill gas to a gas-to-energy facility. Any bypasses of the flare not being sent to gas-to-energy facility shall be measured and logged. The records shall be maintained on file and made available upon request of Agency personnel.

24. The owner and/or operator may test emissions from the flare at any time in order to update flare operating set points established in Permit Condition 18, using the test methods specified in 40 CFR 62.16718(e) following the notification procedures of Section 3.07 of Regulation I, and submitting the test report to the Agency within 60 days after the testing.

25. The owner and/or operator shall take corrective action whenever the 3-hour rolling average flare temperature drops below the set point temperature determined during the most recent performance test.

26. The temporary flare rated at 2200 scfm, shall only be located on the facility for no more than 24 months from the date of issuance of this order of approval.

27. Records demonstrating compliance with this order must be kept and maintained onsite for at least 5 years. Such records and the O&M plan shall be made available for review by the Puget Sound Clean Air Agency upon request.

28. The owner and/or operator shall permanently remove the existing 1,500 scfm flare that the temporary flare is intended to replace with this order of approval.

29. This order, issued for the increase in landfill capacity from 19.8 MM tons to 34.6 MM tons, the addition of a new enclosed flare and a temporary flare, and the addition of a sulfur removal system, hereby cancels and supersedes Orders of Approval 8023, 8912, and 9245.

M. CORRESPONDENCE AND SUPPORTING DOCUMENTS

N. REVIEWS

Reviews	Name	Date
Engineer:	Ralph Munoz	9/20/2024
Inspector:	Rick Woodfork	10/23/2024
Second Review:	John Dawson	10/23/2024
Applicant Name:	(See discussion beginning on Page 23.)	