MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard, Suite 715 • Baltimore Maryland 21230-1720
410-537-3000 • 1-800-633-6101 • http://www.mde.state.md.us
Air and Radiation Management Administration
Air Quality Compliance Program
410-537-3220

FORM 1:

GENERAL FACILITY INFORMATION
EMISSIONS CERTIFICATION REPORT

Calendar Year: 2022

A. FACILITY IDENTIFICATION Facility Name Gude Landfill	**Do Not Write in This Space** Date Received Regional
Address 600 East Gude Drive	Date Received State
City Rockville County Montgomery Zip Code 20850	AIRS Code
B. Briefly describe the major function of the facility	FINDS Code
Closed Landfill	SIC Code
	Facility Number:
	TEMPO ID:
C. SEASONAL PRODUCTION (%, if applicable)	Reviewed by:
Winter *(Dec.-Feb.)* 25 / Spring *(Mar – May)* 25 / Summer *(Jun – Aug)* 25 / Fall *(Sept – Nov)* 25	Name Date

D. Explain any increases or decreases in emissions from the previous calendar year for each registration at this facility.

Increases or decreases in emissions are generally due to changes in the LFG generation rate from the landfill and the LFG collection rate by the GCCS.

E. CONTROL DEVICE INFORMATION (for NOx and VOC sources only)

Control Device	Capture Efficiency	Removal Efficiency
Landfill Gas Collection Flare System	95%	98% (AP-42 Typical Control Efficiency)

I am familiar with the facility and the installations and sources for which this report is submitted. I have personally examined the information in this report, which consists of 30 pages (including attachments), and certify that the information is correct to the best of my knowledge.

Andrew Kays | Executive Director
Name (Print/Type) | Title | Date

(410) 333-2730
Signature | Telephone

FORM 2:

CRITERIA AIR POLLUTANTS
EMISSIONS CERTIFICATION REPORT

Calendar Year: 2022

Facility Name: Gude Landfill Facility ID: 031-9-0738M Pollutant: VOC

Equipment Description/ Registration No.	SCC Number	Fuel		Actual Emissions		Operating Schedule (Actual)				TOSD	Operating Schedule			Emissions Methods
				Tons/yr	Lbs/day	Hrs/dy	Dys/wk	Wk/yr	Days/yr	Lbs/dy	Hrs/dy	Start	End	
Landfill			S			24	7	52	365		24			
			F	0.33	1.81					1.81				C3
Flare 1		LFG	S	0.03	0.16	24	7	15	110	0.16	24			C3
			F											
Flare 2		LFG	S	0.05	0.27	24	7	34	240	0.27	24			C3
			F											
			S											
			F											
			S											
			F											
			S											
			F											
			S											
			F											
			S											
			F											
			S											
			F											
			S											
			F											
Total				0.41	2.24					2.24				

S - Stack Emissions F - Fugitive Emissions Daily emissions (lbs/day) are lbs/operating day of the source

TOSD: Typical Ozone Season Day means a typical day of that period of the year during which conditions for photochemical conditions are most favorable, which is generally during sustained periods of direct sunlight and warm temperatures (April-September). This section needs to be completed only for VOC and NOx sources.

Fuel: Include emissions for each fuel used. If more than one fuel is used, calculate and list emissions separately for each fuel.

Emission Estimation Method

A1-U.S. EPA Reference Method
A2-Other Particulate Sampling Train
A3-Liquid Absorption Technique
A4-Solid Absorption Technique
A5-Freezing Out Technique
A9-Other, Specify

C1-User calculated based on source test or other measurement
C2-User calculated based on material balance using engineering knowledge of the process
C3-User calculated based on AP-42
C4-User calculated by best guess/engineering Judgment

C5-User calculated based on a State or local agency emission factor
C6-New construction, not operational
C7-Source closed, operation ceased
C8-Computer calculated based on standard

FORM 2:

CRITERIA AIR POLLUTANTS
EMISSIONS CERTIFICATION REPORT

Calendar Year: 2022

Facility Name: Gude Landfill Facility ID: 031-9-0738M Pollutant: NOx

Equipment Description/ Registration No.	SCC Number	Fuel		Actual Emissions		Operating Schedule (Actual)				TOSD	Operating Schedule			Emissions Methods
				Tons/yr	Lbs/day	Hrs/dy	Dys/wk	Wk/yr	Days/yr	Lbs/dy	Hrs/dy	Start	End	
Landfill			S			24	7	52	365		24			
			F	N/A	N/A					N/A				
Flare 1		LFG	S	0.71	3.89	24	7	15	110	3.89	24			C3
			F											
Flare 2		LFG	S	1.39	7.62	24	7	34	240	7.62	24			C3
			F											
			S											
			F											
			S											
			F											
			S											
			F											
			S											
			F											
			S											
			F											
			S											
			F											
			S											
			F											
Total				2.10	11.51					11.51				

S - Stack Emissions F - Fugitive Emissions Daily emissions (lbs/day) are lbs/operating day of the source

TOSD: Typical Ozone Season Day means a typical day of that period of the year during which conditions for photochemical conditions are most favorable, which is generally during sustained periods of direct sunlight and warm temperatures (April-September). This section needs to be completed only for VOC and NOx sources.

Fuel: Include emissions for each fuel used. If more than one fuel is used, calculate and list emissions separately for each fuel.

Emission Estimation Method

A1-U.S. EPA Reference Method
A2-Other Particulate Sampling Train
A3-Liquid Absorption Technique
A4-Solid Absorption Technique
A5-Freezing Out Technique
A9-Other, Specify

C1-User calculated based on source test or other measurement
C2-User calculated based on material balance using engineering knowledge of the process
C3-User calculated based on AP-42
C4-User calculated by best guess/engineering Judgment

C5-User calculated based on a State or local agency emission factor
C6-New construction, not operational
C7-Source closed, operation ceased
C8-Computer calculated based on standard

FORM 2:

CRITERIA AIR POLLUTANTS
EMISSIONS CERTIFICATION REPORT

Calendar Year: 2022

Facility Name: Gude Landfill Facility ID: 031-9-0738M Pollutant: SOx

Equipment Description/ Registration No.	SCC Number	Fuel		Actual Emissions		Operating Schedule (Actual)				TOSD	Operating Schedule			Emissions
				Tons/yr	Lbs/day	Hrs/dy	Dys/wk	Wk/yr	Days/yr	Lbs/dy	Hrs/dy	Start	End	Methods
Landfill			S			24	7	52	365		24			
			F	N/A	N/A					N/A				
Flare 1		LFG	S	0.13	0.71	24	7	15	110	0.71	24			C3
			F											
Flare 2		LFG	S	0.26	1.42	24	7	34	240	1.42	24			C3
			F											
			S											
			F											
			S											
			F											
			S											
			F											
			S											
			F											
			S											
			F											
			S											
			F											
			S											
			F											
Total				0.39	2.13					2.13				

S - Stack Emissions F - Fugitive Emissions Daily emissions (lbs/day) are lbs/operating day of the source

TOSD: Typical Ozone Season Day means a typical day of that period of the year during which conditions for photochemical conditions are most favorable, which is generally during sustained periods of direct sunlight and warm temperatures (April-September). This section needs to be completed only for VOC and NOx sources.

Fuel: Include emissions for each fuel used. If more than one fuel is used, calculate and list emissions separately for each fuel.

Emission Estimation Method

A1-U.S. EPA Reference Method
A2-Other Particulate Sampling Train
A3-Liquid Absorption Technique
A4-Solid Absorption Technique
A5-Freezing Out Technique
A9-Other, Specify

C1-User calculated based on source test or other measurement
C2-User calculated based on material balance using engineering knowledge of the process
C3-User calculated based on AP-42
C4-User calculated by best guess/engineering Judgment

C5-User calculated based on a State or local agency emission factor
C6-New construction, not operational
C7-Source closed, operation ceased
C8-Computer calculated based on standard

1/09/08

FORM 2:

CRITERIA AIR POLLUTANTS
EMISSIONS CERTIFICATION REPORT

Calendar Year: 2022

Facility Name: Gude Landfill Facility ID: 031-9-0738M Pollutant: CO

Equipment Description/ Registration No.	SCC Number	Fuel		Actual Emissions		Operating Schedule (Actual)				TOSD	Operating Schedule			Emissions
				Tons/yr	Lbs/day	Hrs/dy	Dys/wk	Wk/yr	Days/yr	Lbs/dy	Hrs/dy	Start	End	Methods
Landfill			S			24	7	52	365		24			
			F	N/A	N/A					N/A				
Flare 1		LFG	S	1.76	9.64	24	7	15	110	9.64	24			C3
			F											
Flare 2		LFG	S	3.49	19.12	24	7	34	240	19.12	24			C3
			F											
			S											
			F											
			S											
			F											
			S											
			F											
			S											
			F											
			S											
			F											
			S											
			F											
			S											
			F											
Total				5.25	28.76					28.76				

S - Stack Emissions F - Fugitive Emissions Daily emissions (lbs/day) are lbs/operating day of the source

TOSD: Typical Ozone Season Day means a typical day of that period of the year during which conditions for photochemical conditions are most favorable, which is generally during sustained periods of direct sunlight and warm temperatures (April-September). This section needs to be completed only for VOC and NOx sources.

Fuel: Include emissions for each fuel used. If more than one fuel is used, calculate and list emissions separately for each fuel.

Emission Estimation Method

A1-U.S. EPA Reference Method
A2-Other Particulate Sampling Train
A3-Liquid Absorption Technique
A4-Solid Absorption Technique
A5-Freezing Out Technique
A9-Other, Specify

C1-User calculated based on source test or other measurement
C2-User calculated based on material balance using engineering knowledge of the process
C3-User calculated based on AP-42
C4-User calculated by best guess/engineering Judgment

C5-User calculated based on a State or local agency emission factor
C6-New construction, not operational
C7-Source closed, operation ceased
C8-Computer calculated based on standard

FORM 3: PM

EMISSIONS CERTIFICATION REPORT

Particulate Matter

Calendar Year: 2022

Facility Name: Gude Landfill **Facility ID:** 031-9-0738M **Pollutant:** PM

Equipment Description/ Registration No.	SCC Number	Fuel		PM – Filterable		PM 10 –Filterable		PM 2.5 – Filterable		PM Condensable		Operation	Emissions Methods
				Tons/yr	Lbs/day	Tons/yr	Lbs/day	Tons/yr	Lbs/day	Tons/yr	Lbs/day	Days/yr	
Landfill			S									365	
			F	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		C3
Flare 1		LFG	S	0.04	0.22	0.04	0.22	0.04	0.22	0.11	0.60	343	C3
			F										
Flare 2		LFG	S	0.07	0.38	0.07	0.38	0.07	0.38	0.22	1.21		C3
			F										
			S										
			F										
			S										
			F										
			S										
			F										
			S										
			F										
			S										
			F										
			S										
			F										
			S										
			F										
Total				0.11	0.60	0.11	0.60	0.11	0.60	0.33	1.81		

S - Stack Emissions F - Fugitive Emissions Daily emissions (lbs/day) are lbs/operating day of the source

Fuel: Include emissions for each fuel used. If more than one fuel is used, calculate and list emissions separately for each fuel.

Emission Estimation Method

A1-U.S. EPA Reference Method
A2-Other Particulate Sampling Train
A3-Liquid Absorption Technique
A4-Solid Absorption Technique
A5-Freezing Out Technique
A9-Other, Specify

C1-User calculated based on source test or other measurement
C2-User calculated based on material balance using engineering knowledge of the process
C3-User calculated based on AP-42
C4-User calculated by best guess/engineering Judgment

C5-User calculated based on a State or local agency emission factor
C6-New construction, not operational
C7-Source closed, operation ceased
C8-Computer calculated based on standard

2/21/08

FORM 4:

TOXIC AIR POLLUTANTS

Calendar Year: 2022

EMISSIONS CERTIFICATION REPORT

Facility Name: Gude Landfill **Facility ID**: 031-9-0738M **Pollutant**: Hydrogen Chloride *

Equipment Description/ Registration Number[1]		Actual Emissions			Control Device**	% Efficiency
		Tons/yr	Lbs/day	Lbs/hr		
Landfill		-	-	-	O	0
Flare 1		0.1	0.37	0.0	O	98
Flare 2		0.1	0.73	0.0	O	98
TOTALS		0.2	1.10	0.0		

* Please attach all calculations.

* See Attachment 1 for the minimum reporting values.

**Control Device
- S = Scrubber
- B = Baghouse
- ESP = Electrostatic Precipitator
- A = Afterburner
- C = Condenser
- AD = Adsorbtion
- O = Other

[1]Emissions must be broken down by equipment registration number (ex. 9-0076, 9-0077)

1/09/08

FORM 5:

BILLABLE TOXIC AIR POLLUTANTS

Calendar Year: 2022

Emissions Certification Report

Facility Name: Gude Landfill   Facility ID#: 031-9-0738M

Chemical Name	CAS Number		Actual Emissions				Estimation Method
			Tons/year	Lbs/day	Lbs/hr		
carbon disulfide	75-15-0	S	0.0	0.0	0.0		C3
		F	0.0	0.0	0.0		C3
carbonyl sulfide	463-58-1	S	0.0	0.0	0.0		C3
		F	0.0	0.0	0.0		C3
chlorine	7782-50-5	S	N/A	N/A	N/A		
		F	N/A	N/A	N/A		
cyanide compounds	57-12-5	S	N/A	N/A	N/A		
		F	N/A	N/A	N/A		
hydrochloric acid	7647-01-0	S	0.2	1.10	0.0		C3
		F	N/A	N/A	N/A		
hydrogen fluoride	7664-39-3	S	N/A	N/A	N/A		
		F	N/A	N/A	N/A		
methyl chloroform	71-55-6	S	0.0	0.0	0.0		C3
		F	0.0	0.0	0.0		C3
methylene chloride	75-09-2	S	0.0	0.0	0.0		C3
		F	0.0	0.1	0.0		C3
perchloroethylene	127-18-4	S	0.0	0.0	0.0		C3
		F	0.0	0.1	0.0		C3
phosphine	7803-51-2	S	N/A	N/A	N/A		
		F	N/A	N/A	N/A		
titanium tetrachloride	7550-45-0	S	N/A	N/A	N/A		
		F	N/A	N/A	N/A		
TOTALS			0.2	1.30	0.0		

S-Stack Emissions   F-Fugitive Emissions   Daily emissions (lbs/day) are lbs/operating day of the source

Emission Estimation Method

A1-U.S. EPA Reference Method
A2-Other Particulate Sampling Train
A3-Liquid Absorption Technique
A4-Solid Absorption Technique
A5-Freezing Out Technique
A9-Other, Specify

C1-User calculated based on source test or other measurement
C2-User calculated based on material balance using engineering knowledge of the process
C3-User calculated based on AP-42
C4-User calculated by engineering judgment
C5-User calculated based on a State or local agency factor
C6-New construction, not operational
C7-Source closed, operation ceased
C8-Computer calculated based on standards

This form is to include only the chemicals identified.

PLEASE NOTE: Be sure to attach all data and calculations necessary to support the emissions figures shown above.

FORM 6: Greenhouse Gases

GREENHOUSE GAS AIR POLLUTANTS

Calendar Year: 2022

EMISSIONS CERTIFICATION REPORT

Facility Name: Gude Landfill **Facility ID**: 031-9-0738M **Pollutant**: Carbon Dioxide *

Equipment Description/ Registration Number[1]	Actual Emissions		
	Tons/yr	Lbs/day	Lbs/hr
Landfill	387.54	2,123.51	88.48
Flare 1	1,726.27	9,459.01	394.13
Flare 2	3,411.46	18,692.93	778.87
TOTALS	5,525.27	30,275.45	1,261.48

[1]Emissions must be broken down by equipment registration number (ex. 9-0076, 9-0077)

This form must be used to report Greenhouse gas emissions:

- carbon dioxide (CO_2)
- methane (CH_4)
- nitrous oxide (N_2O)
- hydrofluorocarbons (HFCs)
- perfluorocarbons (PFCs)
- sulfur hexafluoride (SF_6)

* Use a separate form for each pollutant.

* Please attach all calculations.

1/15/08

FORM 6: Greenhouse Gases

GREENHOUSE GAS AIR POLLUTANTS

Calendar Year: 2022

EMISSIONS CERTIFICATION REPORT

Facility Name: Gude Landfill **Facility ID**: 031-9-0738M **Pollutant**: Methane *

Equipment Description/ Registration Number[1]		Actual Emissions		
		Tons/yr	Lbs/day	Lbs/hr
Landfill		86.62	474.63	19.78
Flare 1		0.06	0.33	0.01
Flare 2		0.12	0.66	0.03
TOTALS		86.80	475.62	19.82

This form must be used to report Greenhouse gas emissions:

- carbon dioxide (CO2)
- methane (CH4)
- nitrous oxide (N2O)
- hydrofluorocarbons (HFCs)
- perfluorocarbons (PFCs)
- sulfur hexafluoride (SF6)

* Use a separate form for each pollutant.

* Please attach all calculations.

[1]Emissions must be broken down by equipment registration number (ex. 9-0076, 9-0077)

1/15/08

FORM 6: Greenhouse Gases

GREENHOUSE GAS AIR POLLUTANTS

Calendar Year: 2022

EMISSIONS CERTIFICATION REPORT

Facility Name: Gude Landfill **Facility ID**: 031-9-0738M **Pollutant**: Nitrous Oxide *

Equipment Description/ Registration Number[1]		Actual Emissions		
		Tons/yr	Lbs/day	Lbs/hr
Landfill		N/A	N/A	N/A
Flare 1		0.01	0.05	0.00
Flare 2		0.02	0.11	0.00
TOTALS		0.03	0.16	0.01

This form must be used to report Greenhouse gas emissions:

- carbon dioxide (CO_2)
- methane (CH_4)
- nitrous oxide (N_2O)
- hydrofluorocarbons (HFCs)
- perfluorocarbons (PFCs)
- sulfur hexafluoride (SF_6)

* Use a separate form for each pollutant.

* Please attach all calculations.

[1]Emissions must be broken down by equipment registration number (ex. 9-0076, 9-0077)

1/15/08

ATTACHMENT 1

(EMISSION CALCULATIONS)

Table 1. Projected LFG Generation Rates

Gude Landfill, Rockville, MD

Year	Disposal Rate (tons/yr)	Refuse In-Place (tons)	Disposal Rate (Mg/yr)	Refuse In-Place (Mg)	LFG Generation Rate (scfm)
1965	388,900	0	352,804	0	0
1966	388,900	388,900	352,804	352,804	187
1967	388,900	777,800	352,804	705,608	366
1968	388,900	1,166,700	352,804	1,058,412	538
1969	388,900	1,555,600	352,804	1,411,217	704
1970	388,900	1,944,500	352,804	1,764,021	863
1971	388,900	2,333,400	352,804	2,116,825	1,016
1972	388,900	2,722,300	352,804	2,469,629	1,163
1973	388,900	3,111,200	352,804	2,822,433	1,304
1974	388,900	3,500,100	352,804	3,175,237	1,439
1975	385,750	3,889,000	349,946	3,528,041	1,569
1976	380,550	4,274,750	345,229	3,877,988	1,693
1977	392,450	4,655,300	356,025	4,223,217	1,809
1978	414,550	5,047,750	376,073	4,579,242	1,927
1979	413,750	5,462,300	375,348	4,955,315	2,050
1980	410,900	5,876,050	372,762	5,330,663	2,168
1981	412,816	6,286,950	374,500	5,703,425	2,281
1982	187,462	6,699,766	170,062	6,077,925	2,389
1983	0	6,887,228	0	6,247,987	2,386
1984	0	6,887,228	0	6,247,987	2,292
1985	0	6,887,228	0	6,247,987	2,202
1986	0	6,887,228	0	6,247,987	2,116
1987	0	6,887,228	0	6,247,987	2,033
1988	0	6,887,228	0	6,247,987	1,953
1989	0	6,887,228	0	6,247,987	1,877
1990	0	6,887,228	0	6,247,987	1,803
1991	0	6,887,228	0	6,247,987	1,732
1992	0	6,887,228	0	6,247,987	1,664
1993	0	6,887,228	0	6,247,987	1,599
1994	0	6,887,228	0	6,247,987	1,536
1995	0	6,887,228	0	6,247,987	1,476
1996	0	6,887,228	0	6,247,987	1,418
1997	0	6,887,228	0	6,247,987	1,363
1998	0	6,887,228	0	6,247,987	1,309
1999	0	6,887,228	0	6,247,987	1,258
2000	0	6,887,228	0	6,247,987	1,209
2001	0	6,887,228	0	6,247,987	1,161
2002	0	6,887,228	0	6,247,987	1,116
2003	0	6,887,228	0	6,247,987	1,072
2004	0	6,887,228	0	6,247,987	1,030
2005	0	6,887,228	0	6,247,987	989
2006	0	6,887,228	0	6,247,987	951
2007	0	6,887,228	0	6,247,987	913
2008	0	6,887,228	0	6,247,987	878
2009	0	6,887,228	0	6,247,987	843
2010	0	6,887,228	0	6,247,987	810
2011	0	6,887,228	0	6,247,987	778
2012	0	6,887,228	0	6,247,987	748
2013	0	6,887,228	0	6,247,987	719
2014	0	6,887,228	0	6,247,987	690
2015	0	6,887,228	0	6,247,987	663
2016	0	6,887,228	0	6,247,987	637
2017	0	6,887,228	0	6,247,987	612
2018	0	6,887,228	0	6,247,987	588
2019	0	6,887,228	0	6,247,987	565
2020	0	6,887,228	0	6,247,987	543
2021	0	6,887,228	0	6,247,987	522
2022	0	6,887,228	0	6,247,987	501

Methane Content of LFG Adjusted to: 50%

Selected Decay Rate Constant (k): 0.04 yr^{-1}

Selected Ultimate Methane Recovery Rate (Lo): 100 m^3/Mg

NMOC Concentration in LFG: 595 ppmv as Hexane

Table 2. Flare Stack and Fugitive Emissions

Month	Total LFG Flow to Flare 1 (MM scf)	Total LFG Flow to Flare 2 (MM scf)	Average CH4 Concentration (% by vol.)	Total CH4 Flow to Flare 1 (MM scf)	Total CH4 Flow to Flare 2 (MM scf)	Total Estimated Fugitive Flow (MM scf)	Average CO_2 Concentration (% by vol.)
January	0.04	9.15	34.90%	0.01	3.19	1.11	24.6%
February	0.00	11.49	39.01%	0.00	4.48	1.39	26.4%
March	0.00	14.05	35.61%	0.00	5.00	1.71	25.3%
April	0.00	13.43	34.58%	0.00	4.64	1.63	25.1%
May	13.08	3.98	35.40%	4.63	1.41	0.48	24.6%
June	17.71	0.00	37.23%	6.59	0.00	0.00	25.5%
July	0.99	9.88	27.16%	0.27	2.68	1.20	18.2%
August	0.00	14.62	32.34%	0.00	4.73	1.78	22.4%
September	0.00	15.18	27.34%	0.00	4.15	1.84	18.7%
October	3.54	11.84	25.96%	0.92	3.07	1.44	20.0%
November	9.79	0.00	25.73%	2.52	0.00	0.00	20.7%
December	9.07	3.51	28.26%	2.56	0.99	0.43	21.2%
Total | Average | Total	54.21	107.13	32.15%	17.50	34.36	13.01	22.8%

	Flare 1			Flare 2		
Total LFG flow to flare :	54.21	MM scf	[Site-Specific]	107.13	MM scf	[Site-Specific]
Average CH_4 Content :	32.15%		[Site-Specific]	32.15%		[Site-Specific]
Total CH_4 flow to flare :	17.50	MM scf	[Site-Specific]	34.36	MM scf	[Site-Specific]
Total estimated fugitive:	13.01	MM scf	[Site-Specific]			
Flare control efficiency :	98.0%		[Manufacturer]			
Site-specific heat content :	325.3	Btu/scf LFG	[Site-Specific]			
Collection Efficiency:	95.0%		[per EPA Part 98]			
GCCS Operation Hours :	8223	Hours	[Site-Specific]			
Annual Hours in Year:	8760	Hours				
Operation Fraction ($f_{Rec,n}$) =	0.9387	Hours/Hours	[per EPA Part 98]			

Step 1. NO_X Emissions

The NO_X emissions from the flare are calculated using the John Zink emission factor of 0.08 lb/MMBTU.

Using the NO_X emission rate factor, the site-specific heat content of the LFG, and the total LFG flow, NO_X emissions are:

= 0.08 lb NO_X/MMBTU · Site-Specific Heat Content · LFG Flow to Flare · (1 ton / 2,000 lb)

= 0.71 tons NO_X flare 1 emissions

where:
Total LFG Flow to Flare 1 = 54.21 MMscf
Site-Specific Heat Content = 325.3 MMBTU/MMscf

1.39 tons NO_X flare 2 emissions

where:
Total LFG Flow to Flare 2 = 107.13 MMscf
Site-Specific Heat Content = 325.3 MMBTU/MMscf

Step 3. CO Emissions

The CO emissions from the flare are calculated using the John Zink emission factor of 0.2 lb CO/MMBTU.

Using the CO emission rate factor, the site-specific heat content of the LFG, and the total LFG flow, CO emissions are:

= 0.2 lb CO/MMBTU · Site-Specific Heat Content of LFG · LFG Flow to Flare · (1 ton / 2,000 lb)

= 1.76 tons CO flare 1 emissions

where:
Total LFG Flow to Flare 1 = 54.21 MMscf
Site-Specific Heat Content = 325.3 MMBTU/MMscf

3.49 tons CO flare 2 emissions

where:
Total LFG Flow to Flare 2 = 107.13 MMscf
Site-Specific Heat Content = 325.3 MMBTU/MMscf

Step 4. PM Emissions

The emission of filterable particulate matter (PM_{10}) is estimated using the flare emission factor published by the EPA's AP-42 (Section 2.4) of 17 lb PM/MMcf CH_4 and assuming that 25% of this total is filterable PM_{10} and $PM_{2.5}$.

Using the site-specific methane flow rate and the AP-42 emission factor, the PM_{10} and $PM_{2.5}$ emissions are:

= (17 lb PM/MMcf CH_4 · 25%) · (Total CH_4 Flow) · (1 ton/2,000 lb)

= 0.04 tons PM_{10} and $PM_{2.5}$ Flare 1

where:
Total CH_4 Flow = 17.50 MMscf

0.07 tons PM_{10} and $PM_{2.5}$ Flare 2

where:
Total CH_4 Flow = 34.36 MMscf

The emission of condensable particulate matter (PM_{CON}) is estimated using the AP-42 flare emission factor of 17 lb PM/MMcf CH_4 and assuming that 75% of this total is PM_{CON}.

Using the site-specific methane flow rate to the flare, the PM_{CON} emissions are:

= (17 lb PM/MMcf CH_4 · 75%) · (Total CH_4 Flow) · (1 ton/2,000 lb)

= 0.11 tons condensable PM Flare 1

where:
Total CH_4 Flow = 17.50 MMscf

0.22 tons condensable PM Flare 2

where:
Total CH_4 Flow = 34.36 MMscf

Step 5. SO_X Emissions

SO_X emissions from the flare are estimated using the total CH_4 flow and the sulfur concentration factor published by the EPA's AP-42 (Section2.4) of 46.9 ppm.

To determine SO_X emission, first, calculate the volume flow of sulfur to the flare using AP-42 Eq. 2-4(3), which incorporates a CH_4 multiplication factor (for 50% CH_4 content of LFG) of 2.0:

= 2.0 · total CH_4 flow · (46.9 ppm / 1,000,000) · (1 cubic meter / 35.3 cf)

	Flare 1			Flare 2		
=	46.5	cubic meter sulfur		91.3	cubic meter sulfur	
where:			where:			
Total CH_4 flow =		17,504,628 scf	Total CH_4 flow =		34,358,212 scf	

Next, calculate the mass flow of sulfur to the flare using AP-42 Eq. 2-4(4):

= sulfur volume · 32 g/mol / (0.00008205 · 1,000 g/kg · 298 K)

=	60.9 kg sulfur			119.5 kg sulfur	
where:			where:		
Sulfur volume flow =	46.5	cubic meter	Sulfur volume flow =	91.3	cubic meter
Sulfur MW =	32	g/mol	Sulfur MW =	32	g/mol
Ideal gas conversion factor =	0.00008205		Ideal gas conversion factor =	0.00008205	
LFG temperature =	298	K	LFG temperature =	298	K

Finally, calculate the SO_X emissions from the flare using AP-42 Eq. 2-4(7), which incorporates a mole ratio of SO_2 to sulfur of 2:

= sulfur mass flow · 2.0 · 2.2 lb/kg · (1 ton / 2,000 lb)

=	**0.13**	**tons SO_X flare 1 emissions**		**0.26**	**tons SO_X flare 2 emissions**
where:			where:		
Sulfur mass flow =	60.9	kg	Sulfur mass flow =	119.5	kg

Step 6. VOC Emissions

VOC emissions from the flare and from the landfill (as fugitive emissions) are estimated using the total LFG flow to the flare, NMOC concentration of 595 ppm, and the assumption that 39% of NMOCs are VOCs [AP-42].

Step 6a. Flare VOC Emissions

To determine VOC emissions, first, calculate the volume flow of NMOCs in the LFG at the flare:

= total LFG flow · (595 ppm / 1,000,000) / (35.3 ft^3/m^3)

	Flare 1			Flare 2	
=	913.7	cubic meter NMOC		1,805.7	cubic meter NMOC
where:			where:		
Total LFG flow =	54,207,800	scf	Total LFG flow =	107,125,284	scf
NMOC Concentration =	595.0	ppm	NMOC Concentration =	595.0	ppm

Next, calculate the mass flow of NMOC to the flare:

= NMOC volume flow · 86.17 g/mol / (0.00008205 · 1,000 g/kg · 298 K)

	Flare 1			Flare 2	
=	3,220.1	kg NMOC		6,363.5	kg NMOC
where:			where:		
NMOC volume flow =	913.7	cubic meter/yr	NMOC volume flow =	1,805.7	cubic meter/yr
NMOC MW =	86.17	g/mol	NMOC MW =	86.17	g/mol
Ideal gas conversion factor =	0.00008205		Ideal gas conversion factor =	0.00008205	
LFG temperature =	298	K	LFG temperature =	298	K

Next, calculate the mass flow of VOC to the flare:

= NMOC mass flow · VOC content · 2.2 lb/kg · (1 ton / 2,000 lb)

	Flare 1			Flare 2	
=	1.4	tons VOC		2.7	tons VOC
where:			where:		
NMOC mass flow =	3,220.1	kg	NMOC mass flow =	6,363.5	kg
VOC content of NMOC =	39%	[AP-42]	VOC content of NMOC =	39%	[AP-42]

Next, calculate the uncombusted flare emission of VOCs using the flare VOC control efficiency determined during the latest flare emission test:

= VOC mass flow · (1 - flare VOC control efficiency)

	Flare 1			Flare 2	
=	**0.03**	**tons VOC flare 1 emissions**		**0.05**	**tons VOC flare 2 emissions**
where:			where:		
VOC mass flow =	1.4	tons	VOC mass flow =	2.7	tons
Flare VOC control efficiency =	98.0%	[Manufacturer]	Flare VOC control efficiency =	98.0%	[Manufacturer]

Step 6b. Fugitive VOC Emissions

To determine fugitive VOC emissions, first, calculate the volume flow of NMOCs in the estimated fugitive LFG flow:

= Total Fugitive LFG Flow · (595 ppm / 1,000,000) / (35.3 ft^3/m^3)

= 219.2 cubic meter NMOC

where:

Total fugitive LFG flow =	13,006,970	scf
NMOC Concentration =	595.0	ppm

Next, calculate the fugitive mass flow of NMOC from the landfill:

= NMOC volume flow · 86.17 g/mol / (0.00008205 · 1,000 g/kg · 298 K)

= 772.6 kg NMOC

where:

NMOC volume flow =	219.2	cubic meter/yr
NMOC MW =	86.17	g/mol
Ideal gas conversion factor =	0.00008205	
LFG temperature =	298	K

Next, calculate the fugitive mass flow of VOC from the landfill:

= NMOC mass flow · VOC content · 2.2 lb/kg · (1 ton / 2,000 lb)

= **0.33 tons VOC fugitive emissions**

where:

NMOC mass flow =	772.6	kg
VOC content of NMOC =	39%	[AP-42]

Step 7. HAP Emissions

HAP emissions from the flare and from the landfill (as fugitive emissions) are estimated using the fugitive LFG flow, the LFG flow to the flare, and the default conentration of the HAPs typically found in LFG as provided in the EPA's AP-42 (Section 2.4).

The attached Table 3 presents a summary of HAP emissions. The following is a sample calculation for the emission of toluene, a HAP; other HAP emissions were determined via similar methods.

Step 7a. Flare HAP Emissions

HAP emissions from the flare and from the landfill (as fugitive emissions) are estimated using the LFG collection efficiency, the LFG generation rate, and the default concentration of the HAPs typically found in LFG as provided in the EPA's AP-42 (Section 2.4).

The attached Table 3 presents a summary of HAP emissions. The following is a sample calculation for the emission of toluene, a HAP; other HAP emissions were determined via similar methods.

The uncombusted flare emission of toluene are calculated based on the LFG flow to the flare.

To determine toluene flare emissions, first, calculate the volume flow of toluene in the LFG sent to the flare using AP-42 Eq. 2-4(3):

= total LFG flow · (39.3 ppm / 1,000,000) · (1 cubic meter / 35.3 cf)

=	60.4	cubic meter toluene/yr		119.3	cubic meter toluene/yr
where:			where:		
Total LFG flow =	54,207,800	scf	Total LFG flow =	107,125,284	scf
Toluene content =	39.3	ppm	Toluene content =	39.3	ppm

Next, calculate the mass flow of toluene using AP-42 Eq. 2-4(4):

= toluene volume flow · 92.13 g/mol / (0.00008205 · 1,000 g/kg · 298 K)

=	227.4	kg toluene/yr		449.4	kg toluene/yr
where:			where:		
Toluene volume flow =	60.4	cubic meter/yr	Toluene volume flow =	119.3	cubic meter/yr
Toluene MW =	92.13	g/mol	Toluene MW =	92.13	g/mol
Ideal gas conversion factor =	0.00008205		Ideal gas conversion factor =	0.00008205	
LFG temperature =	298	K	LFG temperature =	298	K

Next, calculate the uncombusted flare emissions of toluene using the flare HAP control efficiency determined during the latest flare emission test:

= toluene mass flow rate · (1 - flare HAP control efficiency) · (1 ton / 908 kg)

=	0	tons toluene flare 1 emissions		0	tons toluene flare 2 emissions
where:			where:		
toluene mass flow =	227.4	kg/yr	toluene mass flow =	449.4	kg/yr
Flare HAP control efficiency =	98.0%	[Manufacturer]	Flare HAP control efficiency =	98.0%	[Manufacturer]

Step 7b. Fugitive HAP Emissions

The fugitive emission of toluene is calculated based on the estimated fugitive LFG flow from the landfill.

To determine fugitive toluene emissions, first, calculate the volume flow of toluene in the estimated fugitive LFG using AP-42 Eq. 2-4(3):

= estimated fugitive LFG flow · (39.3 ppm / 1,000,000) · (1 cubic meter / 35.3 cf)

= 14.5 cubic meter toluene/yr

where:

Total LFG flow =	13,006,970	scf
Toluene content =	39.3	ppm

Next, calculate the mass flow of toluene using AP-42 Eq. 2-4(4):

= toluene volume flow · 92.13 g/mol / (0.00008205 · 1,000 g/kg · 298 K)

= 54.6 kg toluene/yr

where:

Toluene volume flow =	14.5	cubic meter/yr
Toluene MW =	92.13	g/mol
Ideal gas conversion factor =	0.00008205	
LFG temperature =	298	K

Next, calculate the fugitive emissions of toluene by converting the mass flow into tons:

= toluene mass flow rate · (1 ton / 908 kg)

= 0 tons toluene fugitive emissions

where:

toluene mass flow =	54.6	kg/yr

Table 3. Flare 1 Toxic Air Pollutant Emissions

Methane flow to flare =	17.5	MM scf/yr [Table 2]
Flare operational =	365	days/yr
NMOC Content =	595	AP-42

Pollutant	Molecular Weight (g/gmol)	AP-42 Concentration (ppmv)	Pollutant inflow (lb/yr)	Destruction Efficiency	Toxic Air Pollutants Emissions		
					(lb/day)	(lb/hr)	(tpy)
1,1,1-Trichloroethane (methyl chloroform)	133.4	0.48	5.7	98.0%	0.0	0	0
1,1,2,2-Tetrachloroethane	167.85	1.11	16.6	98.0%	0.0	0.0	0.0
1,1-Dichloroethane (ethylidene dichloride)	98.96	2.35	20.7	98.0%	0.0	0	0
1,1-Dichloroethene (vinylidene chloride)	96.94	0.20	1.7	98.0%	0.0	0.0	0
1,2-Dichloroethane (ethylene dichloride)	98.96	0.41	3.6	98.0%	0.0	0.0	0.00
1,2-Dichloropropane (propylene dichloride)	112.99	0.18	1.8	98.0%	0.0	0	0
1,4-Dichlorobenzene	147.02	0.21	2.8	98.0%	0.0	0	0.0
Acrylonitrile	53.06	6.33	30.0	98.0%	0.00	0.00	0.00
Benzene	78.11	1.91	13.3	98.0%	0.00	0.00	0.0
Carbon disulfide	76.14	0.58	3.9	98.0%	0.0	0.0	0
Carbon tetrachloride	153.82	0.004	0.1	98.0%	0.0	0.0	0.00
Carbonyl sulfide (carbon oxysulfide)	60.08	0.49	2.6	98.0%	0.0	0.0	0
Chlorobenzene	112.56	0.25	2.5	98.0%	0.0	0.0	0
Chloroethane (ethyl chloride)	64.51	1.25	7.2	98.0%	0.00	0.000	0.00
Chloromethane (methyl chloride)	50.49	1.21	5.5	98.0%	0.0	0.0	0.0
Dichloromethane (methylene chloride)	84.93	14.3	108.3	98.0%	0.0	0	0
Ethylbenzene	106.17	4.61	43.7	98.0%	0.0	0	0
n-Hexane	86.18	6.57	50.5	98.0%	0.0	0	0
Hydrogen Chloride	36.46	42	136.6	0.0%	0.37	0.0	0.1
Mercury (total)	200.59	0.000292	0.0	0.0%	0.000	0.0000	0.000
Methyl Isobutyl Ketone (MIBK)	100.16	1.87	16.7	98.0%	0.0	0	0
Tetrachloroethylene (perchloroethylene)	165.83	3.73	55.2	98.0%	0.0	0	0
Toluene	92.13	39.3	323.0	98.0%	0.0	0	0
Trichloroethylene (trichloroethene)	131.39	2.82	33.1	98.0%	0.0	0	0
Vinyl chloride (chloroethene)	62.5	7.34	40.9	98.0%	0.00	0.0	0.00
Xylenes (o-, m-, p-, mixtures)	106.17	12.10	114.6	98.0%	0.0	0	0
Total Air Toxics					**0.37**	**0.00**	**0.10**

Note: Concentrations are based on default LFG concentrations published in EPA's AP-42 Section 2.4.

Table 4. Flare 2 Toxic Air Pollutant Emissions

Methane flow to flare =	34.4	MM scf/yr [Table 2]
Flare operational =	365	days/yr
NMOC Content =	595	AP-42

Pollutant	Molecular Weight (g/gmol)	AP-42 Concentration (ppmv)	Pollutant inflow (lb/yr)	Destruction Efficiency	Toxic Air Pollutants Emissions		
					(lb/day)	(lb/hr)	(tpy)
1,1,1-Trichloroethane (methyl chloroform)	133.4	0.48	11.2	98.0%	0.0	0	0
1,1,2,2-Tetrachloroethane	167.85	1.11	32.6	98.0%	0.0	0.0	0.0
1,1-Dichloroethane (ethylidene dichloride)	98.96	2.35	40.7	98.0%	0.0	0	0
1,1-Dichloroethene (vinylidene chloride)	96.94	0.20	3.4	98.0%	0.0	0.0	0
1,2-Dichloroethane (ethylene dichloride)	98.96	0.41	7.1	98.0%	0.0	0.0	0.00
1,2-Dichloropropane (propylene dichloride)	112.99	0.18	3.6	98.0%	0.0	0	0
1,4-Dichlorobenzene	147.02	0.21	5.4	98.0%	0.0	0	0.0
Acrylonitrile	53.06	6.33	58.8	98.0%	0.00	0.00	0.00
Benzene	78.11	1.91	26.1	98.0%	0.00	0.00	0.0
Carbon disulfide	76.14	0.58	7.7	98.0%	0.0	0.0	0
Carbon tetrachloride	153.82	0.004	0.1	98.0%	0.0	0.0	0.00
Carbonyl sulfide (carbon oxysulfide)	60.08	0.49	5.2	98.0%	0.0	0.0	0
Chlorobenzene	112.56	0.25	4.9	98.0%	0.0	0.0	0
Chloroethane (ethyl chloride)	64.51	1.25	14.1	98.0%	0.00	0.000	0.00
Chloromethane (methyl chloride)	50.49	1.21	10.7	98.0%	0.0	0.0	0.0
Dichloromethane (methylene chloride)	84.93	14.3	212.7	98.0%	0.0	0	0
Ethylbenzene	106.17	4.61	85.7	98.0%	0.0	0	0
n-Hexane	86.18	6.57	99.1	98.0%	0.0	0	0
Hydrogen Chloride	36.46	42	268.1	0.0%	0.73	0.0	0.1
Mercury (total)	200.59	0.000292	0.0	0.0%	0.000	0.0000	0.000
Methyl Isobutyl Ketone (MIBK)	100.16	1.87	32.8	98.0%	0.0	0	0
Tetrachloroethylene (perchloroethylene)	165.83	3.73	108.3	98.0%	0.0	0	0
Toluene	92.13	39.3	634.0	98.0%	0.0	0	0
Trichloroethylene (trichloroethene)	131.39	2.82	64.9	98.0%	0.0	0	0
Vinyl chloride (chloroethene)	62.5	7.34	80.3	98.0%	0.00	0.0	0.00
Xylenes (o-, m-, p-, mixtures)	106.17	12.10	224.9	98.0%	0.0	0	0
Total Air Toxics					**0.73**	**0.00**	**0.10**

Note: Concentrations are based on default LFG concentrations published in EPA's AP-42 Section 2.4.

Table 5. Fugitive Landfill Toxic Air Pollutant Emissions

Fugitive Methane Flow =	4.2	MM scf/yr [Table 2]
NMOC Content =	595	AP-42

Pollutant	Molecular Weight (g/gmol)	Default Concentration (ppmv)	Pollutant inflow (lb/yr)	Toxic Air Pollutants Emissions		
				(lb/day)	(lb/hr)	(tpy)
1,1,1-Trichloroethane (methyl chloroform)	133.4	0.48	1.4	0.0	0	0
1,1,2,2-Tetrachloroethane	167.85	1.11	4.0	0.0	0.0	0.0
1,1-Dichloroethane (ethylidene dichloride)	98.96	2.35	5.0	0.0	0	0
1,1-Dichloroethene (vinylidene chloride)	96.94	0.20	0.4	0.0	0.0	0
1,2-Dichloroethane (Ethylene dichloride)	98.96	0.41	0.9	0.0	0.0	0.00
1,2-Dichloropropane (propylene dichloride)	112.99	0.18	0.4	0.0	0	0
1,4-Dichlorobenzene	147.02	0.21	0.7	0.0	0	0.0
Acrylonitrile	53.06	6.33	7.2	0.02	0.00	0.00
Benzene	78.11	1.91	3.2	0.01	0.00	0.0
Carbon disulfide	76.14	0.58	0.9	0.0	0.0	0
Carbon tetrachloride	153.82	0.004	0.0	0.0	0.0	0.00
Carbonyl sulfide (Carbon oxysulfide)	60.08	0.49	0.6	0.0	0.0	0
Chlorobenzene	112.56	0.25	0.6	0.0	0.0	0
Chloroethane (Ethyl chloride)	64.51	1.25	1.7	0.00	0.000	0.00
Chloromethane (Methyl chloride)	50.49	1.21	1.3	0.0	0.0	0.0
Dichloromethane (Methylene chloride)	84.93	14.3	25.9	0.1	0	0
Ethylbenzene	106.17	4.61	10.4	0.0	0	0
n-Hexane	86.18	6.57	12.1	0.0	0	0
Mercury (total)	200.59	0.000292	0.0	0.000	0.0000	0.000
Methyl Isobutyl Ketone (MIBK)	100.16	1.87	4.0	0.0	0	0
Tetrachloroethylene (Perchloroethylene)	165.83	3.73	13.2	0.0	0	0
Toluene	92.13	39.3	77.2	0.2	0	0
Trichloroethylene (Trichloroethene)	131.39	2.82	7.9	0.0	0	0
Vinyl chloride (Chloroethene)	62.5	7.34	9.8	0.03	0.0	0.00
Xylenes (o-, m-, p-, mixtures)	106.17	12.10	27.4	0.1	0	0
Total Air Toxics				**0.46**	**0.00**	**0.00**

Note: Concentrations are based on default LFG concentrations published in EPA's AP-42 Section 2.4.

TABLE 6. FLARE 1 GREENHOUSE GAS EMISSIONS ESTIMATES

Source	GHG	GHG Emission Factor (kg/MMBTU)	GHG Emissions (kg/yr)	GHG Emissions (tpy)	Comments
Flare	Methane (CH_4)	0.0032	56.4	**0.06**	Anthropogenic
Flare	Nitrous Oxide (N_2O)	0.00063	11.1	**0.01**	Anthropogenic
Flare	Carbon Dioxide (CO_2)	52.07	918,253.8	**1,010.08**	Biogenic: CO_2 from CH_4 combustion
Flare	Carbon Dioxide (CO_2)	n/a	651,086.0	**716.19**	Biogenic: CO_2 "pass through" in LFG

Total LFG Throughput:	54.2	MMscf/yr
CH_4 Content:	32.1%	
LFG Heat Content (HHV):	325.3	BTU/scf
CO_2 Content:	22.8%	

Notes:
1. CH_4 and N_2O emission factors from Subpart C (Table C-2).
2. CO_2 emissions that "pass through" as the CO_2 fraction in LFG are calculated on a mass balance. 40 CFR Part 98 Subpart C does not provide emission factor.
3. EPA Part 98 does not require reporting of landfill flare emissions.
4. For completeness, both biogenic and anthropogenic GHG emissions are reported herein.

TABLE 7. FLARE 2 GREENHOUSE GAS EMISSIONS ESTIMATES

Source	GHG	GHG Emission Factor (kg/MMBTU)	GHG Emissions (kg/yr)	GHG Emissions (tpy)	Comments
Flare	Methane (CH_4)	0.0032	111.5	**0.12**	Anthropogenic
Flare	Nitrous Oxide (N_2O)	0.00063	22.0	**0.02**	Anthropogenic
Flare	Carbon Dioxide (CO_2)	52.07	1,814,650.3	**1,996.12**	Biogenic: CO_2 from CH_4 combustion
Flare	Carbon Dioxide (CO_2)	n/a	1,286,674.2	**1,415.34**	Biogenic: CO_2 "pass through" in LFG

Total LFG Throughput:	107.1	MMscf/yr
CH_4 Content:	32.1%	
LFG Heat Content (HHV):	325.3	BTU/scf
CO_2 Content:	22.8%	

Notes:
1. CH_4 and N_2O emission factors from Subpart C (Table C-2).
2. CO_2 emissions that "pass through" as the CO_2 fraction in LFG are calculated on a mass balance. 40 CFR Part 98 Subpart C does not provide emission factor.
3. EPA Part 98 does not require reporting of landfill flare emissions.
4. For completeness, both biogenic and anthropogenic GHG emissions are reported herein.

TABLE 8. LANDFILL GREENHOUSE GAS EMISSIONS ESTIMATES

Source	GHG	GHG Emissions (metric tons)	(tpy)	Comments
Landfill	Methane (CH_4)	78.6	**86.62**	See Note 5.
Landfill	Nitrous Oxide (N_2O)	n/a	n/a	See Note 4.
Landfill	Carbon Dioxide (CO_2) in uncaptured LFG	235.3	**259.27**	Biogenic
Landfill	Carbon Dioxide (CO_2) from CH4 oxidation	116.4	**128.27**	Biogenic

Collection Efficiency (CE):	95.0%		[Per Table HH-3]
Cumulative LFG Flow (Collected/Recovered):	161.33	MMscf/yr	
Recovered CH_4 Quantity:	996.0	metric tons	[Eq. HH-4 at 0.0423 lb/cf CH_4 density]
Recovered CO_2 Quantity:	1,937.7	metric tons	
CH_4 Content:	32.1%		
CO_2 Content:	22.8%		
Annual Operating Hours Fraction (F_{REC}):	0.9387	hr/hr	
Oxidation Fraction:	35%		

Notes:
1. CH_4 and N_2O emission factors and global warming potential (GWP) values from 40 CFR Part 98 Subpart A (Table A-1) and Subpart C (Table C-2). See Notes 5 and 6.
2. Flare CO_2 emissions that "pass through" as the CO_2 fraction in LFG are calculated on a mass balance. 40 CFR Part 98 Subpart C does not provide emission factor.
3. EPA Part 98 does not require reporting of landfill flare emissions.
4. For completeness, both biogenic and anthropogenic GHG emissions are reported herein.
5. Fugitive emissions of N_2O from the landfill are considered to be negligable, as N_2O is not a typical constituent of LFG per AP-42 (Section 2.4).
6. Fugitive emissions of CH_4 are calculated based on 40 CFR Part 98 Subpart HH Equation HH-4, and generally per Equation HH-8 minus the 2nd term of HH-8, which is applicable to combustion unit emissions (calculated and reported separately).

ATTACHMENT 2

(AIR TOXICS DEMONSTRATION)

I certify to the best of my knowledge and belief formed after reasonable inquiry that this facility is in compliance with the toxic air pollutant requirements in COMAR 26.11.15 and 26.11.16.

____

Andrew Kays, Executive Director   Date

1-HOUR SCREENING ANALYSIS

Tox-A-Matic 2012
Gude Flare
Brandon Donovan
3/15/2023

8	Typical hours of emissions per 8-hour work day
7	Typical days per week of emissions
52	Typical weeks per year of emissions
no	Building downwash (default is yes)
2.89	Screen3 or AERSCREEN model run maximum concentration (ug/m3) from a 1 lb/hr emission rate

CAS	Name	Emissions Controlled lb/hr	Screening Level ug/m3	Exempt	Small Emitter 1	AER	Screen 3 or AERSCREEN Impact ug/m3	Small Emitter 2	% screen Level	Pass?	Bomb
				26.11.15.01B(5)	26.11.15.03B(3)	26.11.16.02A(4)		26.11.15.03B(4)			
7647010	HYDROCHLORIC ACID (HYDROGI	0.045833	29.832311			pass	0.1325		0.44	pass	

8-HOUR SCREENING ANALYSIS

Tox-A-Matic 2012
Gude Flare
Brandon Donovan
3/15/2023

8	Typical hours of emissions per 8-hour work day
7	Typical days per week of emissions
52	Typical weeks per year of emissions
no	Building downwash (default is yes)
2.89	Screen3 or AERSCREEN model run maximum concentration (ug/m3) from a 1 lb/hr emission rate
0.7	8-hour multiplier (default is 0.7)

CAS	Name	Emissions Controlled lb/hr	Screening Level ug/m3	Exempt	Small Emitter 1	AER	Screen 3 or AERSCREEN				Bomb
							Impact ug/m3	Small Emitter 2	% screen Level	Pass?	
				26.11.15.01B(5)	26.11.15.03B(3)	26.11.16.02A(4)		26.11.15.03B(4)			
7647010	HYDROCHLORIC ACID (HYDROGI	0.045833	165.271			pass	0.0927		0.06	pass	

ANNUAL SCREENING ANALYSIS

Tox-A-Matic 2012
Gude Flare
Brandon Donovan
3/15/2023

8	Typical hours of emissions per 8-hour work day
7	Typical days per week of emissions
52	Typical weeks per year of emissions
no	Building downwash (default is yes)
2.89	Screen3 or AERSCREEN model run maximum concentration (ug/m3) from a 1 lb/hr emission rate
0.08	Annual multiplier (default is 0.08)

CAS	Name	Emissions Controlled lb/yr	Screening Level ug/m3	Small Emitter 1	AER	Screen 3 or AERSCREEN Impact ug/m3	% screen Level	Pass?	Bomb
				26.11.15.03B(3)	26.11.16.02A(4)				
7647010	HYDROCHLORIC ACID (HYDROGI	133.4667	0.7			0.0035	0.50	pass	